

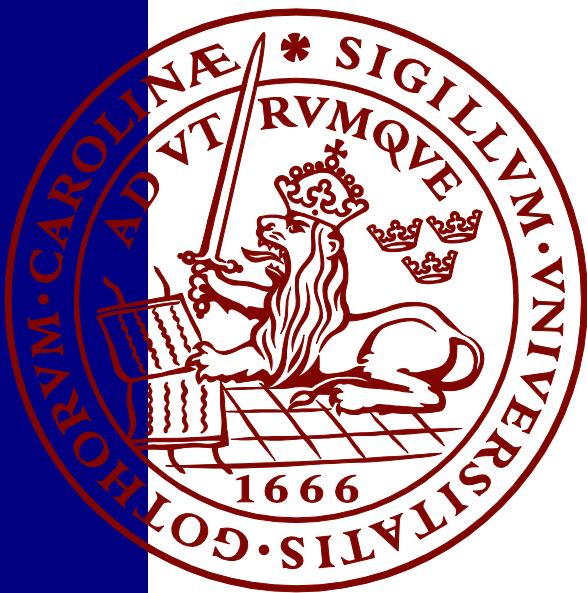
Our Transition

A cross-sectional comparison of sustainability transition
initiatives in Denmark

Jonas Boye Konggaard

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Abstract:

Sustainability transition initiatives are crucial in tackling global sustainability challenges but evaluations of their impacts are to a large extent lacking. This is a problem as it leads to uncertainty of their actual contributions which is a hindrance for public and political support.

Due to the complex nature of STIs it has proven very difficult to make comparable assessments as most studies end up focusing on case specific internal factors and dynamics rather than external impact. For the purpose of solving this problem a new assessment framework (T-score) is developed and applied to a Danish context. The framework is positioned in relation to other relevant assessment frameworks and focus on aspects relating to transformational potential. Specifically, it is investigated how Danish STIs are contributing to sustainable development utilising a database (voresomstilling.dk) from 2015 of more than 500 STIs. The application of the framework leads to a plethora of insights into the Danish STI-landscape concerning actors and activities. The framework brings a needed novel approach to the field of sustainability transition assessment that can help both researchers and decisionmakers identify the most promising STIs.

Keywords: Sustainability transition initiatives, transformative potential, Assessment framework, multi-level perspective, Transition experiment, impact evaluation

Word count: 12000

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Table of Contents

1 Introduction	1
1.1 The call for a sustainability transition	1
1.2 The research gap in Sustainability Transition assessment literature	1
1.3 Research aim	3
1.4 Research outline	3
2 Background	4
2.1 Sustainability transition initiatives	4
2.2 The “Our transition” database	5
3 Theory.....	6
3.1 How do sustainability transitions come about?	6
<i>3.1.1 Socio-technical systems</i>	<i>6</i>
<i>3.1.2 The multilevel perspective</i>	<i>6</i>
3.2 Critical review of existing assessment frameworks	7
<i>3.2.1 A tentative evaluative scheme for sustainability transition experiments (TESSTE) (Luederitz et al., 2017).....</i>	<i>8</i>
<i>3.2.2 The sustainability experiment systems approach (SESA) (Hubeau et al., 2017)..</i>	<i>10</i>
<i>3.2.3 An evaluation framework for sustainability transition experiments (Williams & Robinson, 2020)</i>	<i>12</i>
<i>3.2.4 Transformative capacity and local action for urban sustainability (Castán Broto et al., 2018).....</i>	<i>13</i>

3.2.5 A multi-dimensional assessment of the environmental and socioeconomic performance of community-based sustainability initiatives in Europe (Celata & Sanna, 2019b)	14
4 The T-score framework.....	16
4.1 Key insights from the research field	16
4.2 Overview of framework	17
4.2.1 Disruptiveness	18
4.2.2 Collaboration.....	19
4.2.3 Supporting variables.....	20
4.3 How does it relate to existing frameworks?.....	21
5 Methodology.....	22
5.4 Data analysis	26
5.5 Limitations/weaknesses.....	26
6 Results	27
5.1 Actors.....	27
4.2 Activities in terms of sustainability.....	28
4.3 Current status.....	30
4.4 Transformative potential	31
4.5 Geographical differences	32
4.6 Correlation between dissemination and T-score.....	33
4.7 Activity	34
7 Discussion	36

7.1 Contributors to sustainability transitions in Denmark.....	36
7.2 Aspects of sustainability addressed.....	37
7.3 Development over time	38
7.4 The highest transformative potential	40
7.5 Are the initiatives grouped in certain areas and does geography play any role?	42
7.6 Reflections on the T-score framework.....	42
7.7 Future studies.....	44
8 Conclusion.....	44
9 References	46
10 Appendix	50

Abbreviations

- CBI - Community Based Initiative
 SDG - Sustainable Development Goal
 T-score – Transition score
 STI – Sustainability Transition Initiative
 MLP – Multi-level perspective
 STRN - Sustainability Transitions Research Network
 TESSTE – Tentative evaluative scheme for sustainability transition experiments
 SESA - Sustainability experiment systems approach
 TESS - Towards European Societal Sustainability
 NGO - Non-governmental organisation

1 Introduction

1.1 The call for a sustainability transition

The main challenges facing humanity in our time such as environmental degradation, climate change and inequality are deeply rooted in the systemic structures and institutions of society (Markard et al., 2012). To tackle these challenges, a sustainable transition that radically transforms core socio-technical systems such as those relating to food, energy and mobility is needed (Eionet, 2016).

This is a very complex task that requires a wide variety of action from actors across different domains and disciplines (Köhler et al., 2019). We need action, be it small or big, high-tech or low-tech, market based, political or voluntary that contributes to the transition towards social, economic and environmental sustainability. Using a common umbrella term such actions could be referred to as sustainability transition initiatives (STIs).

But how do we identify and promote the initiatives that make the greatest contributions?

Not all initiatives are equally beneficial so to ensure efficiency and progress, evaluations of performance and impacts are needed. Assessment that generates a knowledge base from which informed decisions can be taken and recognises what is being done (Harris, 2012).

Due to the complexity and diversity of STIs this has proven a very difficult task as a look into the research field reveals major gaps in the literature concerning STI assessment.

1.2 The research gap in Sustainability Transition assessment literature

A key issue in the literature is that most studies focus on process-related aspects of initiatives and understanding them rather than evaluating their output and external impact (Arai et al., 2019). “Research in this field sometimes merely aims to provide a taxonomy of the characteristics of initiatives, rather than an assessment of their impacts” (Celata et al., 2019a, p. 909). There is a general focus on the process of the STIs rather than the substance of their contributions (Forrest & Wiek, 2015).

Capturing and calculating social, economic, and environmental effects and returns of various actions is a very complex and daunting task. In its place there seems to be a general assumption in the literature that evaluation of internal processes can serve as a proxy for impact assessment “We might tend to assume the two are related: that the more effective a group’s internal processes, the more significant its broader impacts” (Harris, 2012).

Another consistent trend in the literature is the reliance on case-based research methods that has led to a vast archive of studies containing detailed information on individual initiatives (Celata et al., 2019a; Köhler et al., 2019). Despite attempts (Luederitz et al., 2017) no standardised evaluative scheme has been broadly accepted and applied within the research field meaning that the method and focus differ from case to case. This is a problem as it has resulted in a fragmented research field where learning and dialogue across studies is low because “coordinating efforts are widely lacking” (Luederitz et al., 2017, p. 63). There is a large pool of interesting results to draw from, but they are context specific and not meant to be generalized often reflected in comments such as “the results should not be generalized across time nor to other individual transition initiatives” (Ruckert, 2017, p. 19).

There is a lack of assessment approaches that compare impacts across initiatives as “we can understand social phenomena better when they are compared in relation to two or more meaningfully contrasting cases or situations” (Bryman, 2016, p. 72). In particular cross-case studies that span multiple domains (food, energy, water etc.) and sectors which are “completely missing from the literature” (Celata et al., 2019b, p. 940). The call for comparative studies of STIs goes several years back (Markard et al., 2012; Wiek et al., 2012). Such studies could provide useful information on which types of STIs make the greatest contribution towards sustainability and guide future efforts.

Finally, it is relevant to question whether current scientific research on STIs is helpful for key stakeholders and policymakers (Eionet, 2016). Peace et al. (2017) argues that there is a balance between robustness and understandability that needs to be found and that we must be careful of assessments that are too complex for non-researchers to benefit from. Along these lines De Smedt. (2010) argues that research outcomes need to be more specific and politically relevant to be of value for policymakers.

In total a picture emerges of a research field brimming with observations and case-specific insights that are rarely converted into actionable knowledge. How STIs work, how many participants there are, their aim, their demographics and so on are all interesting aspects but in the midst of this internal focus we lose track of the thing that matters the most: How does this initiative contribute towards a more sustainable world/society? This is not to say that in depth case studies should be abandoned as a research method but rather that we need more diversity in the type of assessments carried out (Ness et al. 2007).

1.3 Research aim

Considering the important research gap described in the previous section the main aim of this thesis is to develop an assessment framework that addresses the shortcomings identified in the STI assessment literature. Specifically meaning that it should incorporate versatile criteria that allows for assessing and comparing transition performances across diverse initiatives. All while being intuitive, transparent and relevant outside an academic context.

Secondly, I aim to test and demonstrate the framework by applying it to a database consisting of more than 500 Danish STIs to answer how STIs contribute towards sustainable development in Denmark.

1.4 Research outline

In order to fulfil this research aim the five steps illustrated in figure 1 are carried out.

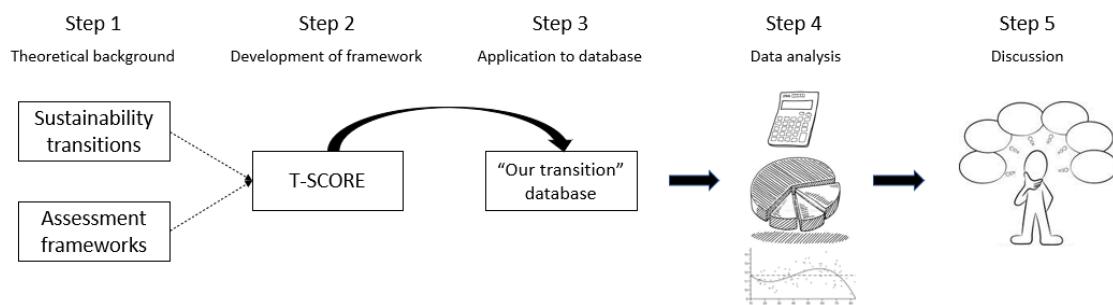


Figure 1. Research outline containing five steps.

The first step of the thesis is to create a theoretical foundation that the subsequent steps will be built on. The foundation is composed of two main resources 1) a theoretical understanding of sustainability transitions leaning on the multi-level perspective (MLP) and 2) a comprehensive critical review of the STI assessment literature focusing on existing frameworks.

Understanding the processes of transitions is a prerequisite for identifying the components that should be incorporated into the T-score framework (Loorbach et al., 2017). The critical review of existing approaches is a crucial step to learn from established frameworks and to position the T-score framework within the research field.

In step 2 the assessment framework called Transition score (T-score) is developed by converting theory into concrete variables.

In step 3 the T-score framework is applied to a Danish context using the database "Vores omstilling" ("Our transition") that was founded in 2013 and consist of more than 500 Danish STIs. Due to its size

and purpose the database is an excellent resource that makes up a representative sample of the Danish transition landscape.

In step 4 the vast amount of data is processed and presented in a clear and accessible way using figures, charts and tables.

In the 5th and final step the results of the data analyses and their implications are discussed and put into the perspective of relevant findings in the research field.

2 Background

2.1 Sustainability transition initiatives

In transition research, sustainability transitions are described as “long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption.” (Markard et al., 2012, p. 956)

As such it is a concept used to label processes of change rather than individual initiatives and their contributions. However, it can be argued that the individual initiatives act as critical drivers and catalysts that help promote the long-term sustainability transformation processes.

In this context “sustainability transition initiatives” is a broad term that encompasses a very large and diverse group of actions that in any way contributes to a process towards sustainability. This is in line with the Sustainability Transitions Research Network (STRN) who characterises sustainability transitions as multi-actor processes “Transitions are enacted by a range of actors and social groups from academia, politics, industry, civil society and households” (Köhler et al., 2019, p. 2).

In this thesis sustainability is defined by referring to the 17 UN Sustainable Development Goals (SDGs) meaning that any initiative that contributes towards at least one of the SDGs is considered a STI.

It should be noted that terminologically speaking, “transition initiative” typically refers to the transition town movement (Hopkins, 2014) or as synonymous with community based initiatives (CBIs) (Forrest & Wiek, 2015), grassroot innovations (Seyfang & Smith, 2007), and transition experiments (Luederitz et al., 2017). In other words, it is predominantly a term used to label actions that are associated with the civil society sector and thereby more associated with social innovation rather than technological innovation (Feola and Nunes, 2014).

These unique types of actions are considered subcategories of STIs alongside private and government sector initiatives. This is a deliberate choice made to include a broader range of actions acknowledging that “[transition] activities can be initiated from any position in society” (Wittmayer et al., 2017, p.25). Rather than limiting the analyses to one specific group of actions, the intention is to make an openminded and unbiased investigation of the Danish transition landscape. A broader approach allows for an interesting direct comparison of initiatives that are rarely compared to each other although they share the same aim of contributing towards sustainability.

2.2 The “Our transition” database

In 2013 the Danish news media “Information” and the Danish Broadcasting Corporation (DR) launched a campaign and competition called “What to do now? – Our transition towards a sustainable society”. The idea was to compile and honour initiatives that “show a concrete path towards a great transition” (Højholt, 2015). Additionally, the aim was to create a source of inspiration and an online community for actors in Denmark engaged in these activities.

The competition ended in 2013 with a jury electing nine winners across nine regions and a publication describing the winning initiatives in detail (Heuseler et al., 2013)

After the official finale of the campaign it has turned into an active database still open for new entries that at the time of writing consists of approximately 550 initiatives that in a myriad of ways and to a varying degree contribute to transforming society towards sustainability.

The broad criteria for being able to enter the database have resulted in a very diverse database consisting of many different types of actors and activities. This also means that it is an unbiased and nonexclusive resource where the only thing that all entries have in common is their identification of themselves as STIs.

A main weakness of the database is its poor layout and user-friendliness that makes it difficult to navigate and generally lowers its serviceability as an inspirational resource. Therefore, processing the vast amount of data in the database and presenting it in this thesis is a way of making all the “hidden” information inside more accessible.

3 Theory

3.1 How do sustainability transitions come about?

In section 2.1 it was clarified that sustainability transitions are processes that affects and fundamentally alters socio-technical systems. To be able to fully understand sustainability transitions we therefore need to dive into and unpack the concept of socio-technical systems first.

3.1.1 *Socio-technical systems*

Energy supply, water supply and transportation are three examples of core socio-technical systems in modern societies. Each system has established technologies, practices for how things are done (institutions) and actors with well-defined roles and hierarchies, meaning that they are a cocktail of social and technological aspects (Eionet, 2016).

In their entirety these elements continuously reproduce and reinforce the structure and function of the system locking it in to a certain way of doing also known as path dependency (Markard, 2012). The path dependency ensures that changes to the system are mainly incremental as incumbent actors are incentivised to improve existing ideas rather than develop new ones (Eionet, 2016).

The key question for sustainability transition research hence becomes how to overcome the lock ins of unsustainable socio-technical systems and initiate processes of radical transformation.

3.1.2 *The multilevel perspective*

This is the exact challenge that the multi-level perspective (MLP) attempts to conceptualize in its multi-level framework depicted in figure 1. It shows how a stable configuration in the regime can be challenged by radical alternatives that takes advantage of “windows of opportunity” (Loorbach et al., 2017)

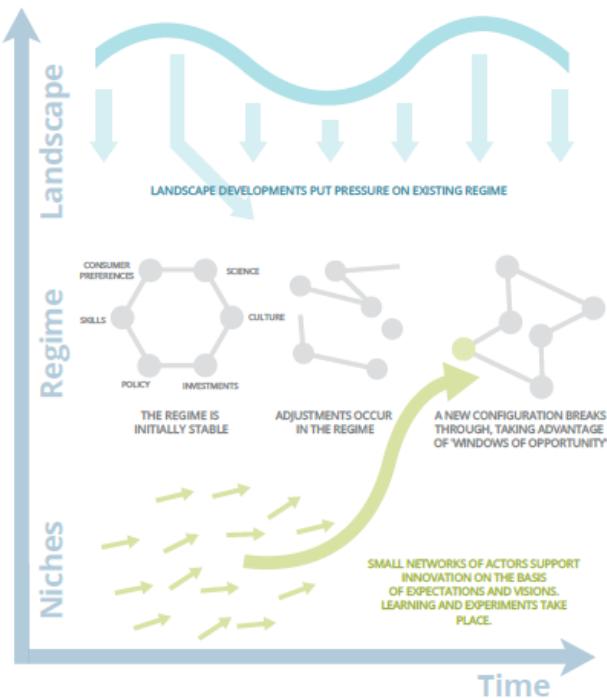


Figure 2: The multilevel perspective (Eionet, 2016, p. 21)

According to the MLP mainly two things can cause sustainability transitions to occur. The first one being through radical innovations emanating from protected spaces (niches) and the other being major external events in the general society (landscape). I focus solely on the former as I am interested in agency and how STIs deliberately can contribute towards sustainability transitions.

To this end the MLP provides a useful way of conceptualizing transition processes and particularly the dynamics between established structures and innovative ideas and practices (Williams and Robinson, 2020).

3.2 Critical review of existing assessment frameworks

A central aim of transition research is “to offer frameworks, concepts, and a language that helps to facilitate and structure discussion and reflection” (Loorbach et al., 2017, p .609). Therefore it should not come as a surprise that assessment of sustainability transition initiatives is a popular topic within the research field and several new frameworks have been proposed in recent years (Luederitz et al., 2017; Hubeau et al., 2017; Williams & Robinson, 2020; Castán Broto et al., 2018; Celata & Sanna, 2019b). Considering that a main aim of this thesis is to develop a new assessment framework it is relevant to look at what already exists in order to take part in and position this thesis within the current debate. A centrepiece in this debate was contributed by Luederitz et al. (2017) who have proposed a new tentative evaluative scheme and explicitly invited scholars to engage in the development of better

assessment of STIs. They stated that their scheme is “a platform of exchange open to improvement” (Luederitz et al., 2017, p. 72) which makes it an appropriate starting point for this review.

3.2.1 A tentative evaluative scheme for sustainability transition experiments (TESSTE)

(Luederitz et al., 2017)

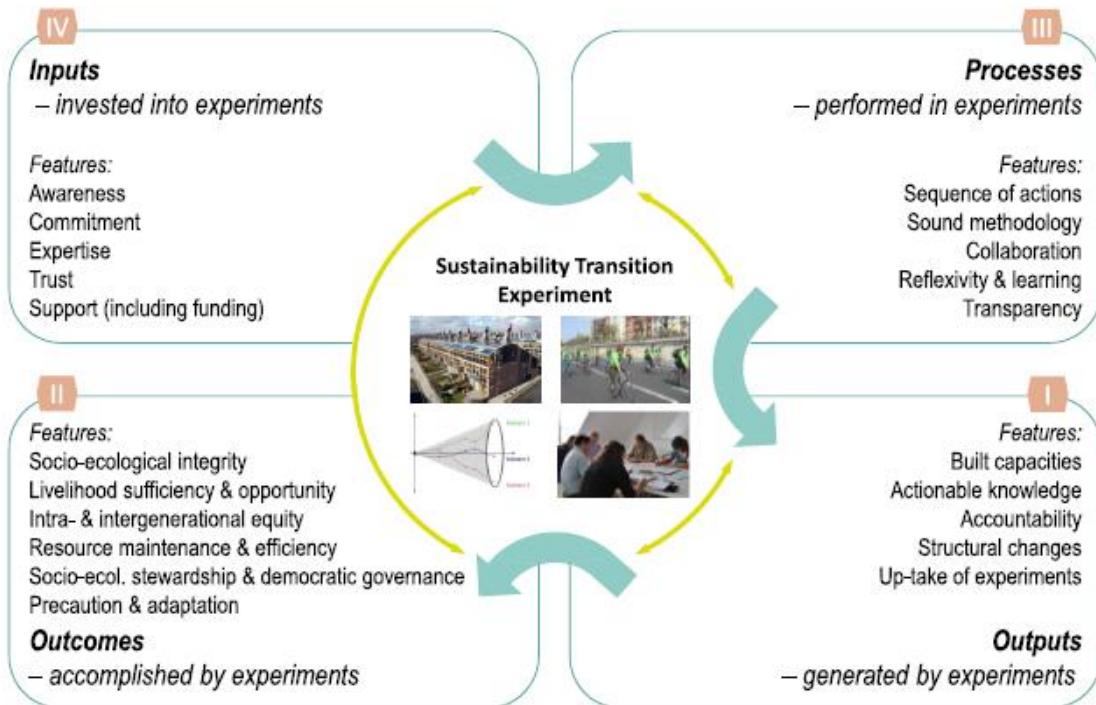


Figure 3: depiction of the TESSTE framework (Luederitz et al., 2017)

As shown in figure 3 the TESSTE scheme includes four evaluative dimensions based on the basic logic model of evaluation.

For each of the four evaluative dimensions the scheme lists multiple features of interest (24 in total) and asks the evaluator to assess whether the specific feature is present or satisfied.

All features are assessed in a binary fashion using close-ended questions with only yes/no as possible answers. It checks if a certain criterion is met but does not aim to determine how well or to what degree it is met. The performance is not directly evaluated and that is problematic in terms of improving initiatives and generating actionable knowledge. The TESSTE is first and foremost a cataloguing tool that aims at standardising assessment and creating consistency within the research field. This is an important goal but it should be complemented with ambitions to evaluate the performance of the initiatives as well.

Furthermore, they claim that the scheme will allow for cross-case comparisons between successful and unsuccessful initiatives making it possible to identify which features are important for success and vice versa. “The framework can help find hypotheses and causal mechanisms relating to the question “what makes an experiment succeed or fail?”” (Luederitz et al., 2017, p.73). While it is important to make comparisons and learn from experiences across cases it is not possible in the way they describe. The course of action that they propose builds on the assumption that it is immediately evident whether an initiative is successful or unsuccessful. This is a false assumption as success must be defined and evaluated before it can be determined. Success is defined differently within the literature referring to diverse aspects such as the ability to emerge and grow (Tess, 2017) , climate change mitigation potential (Landholm et al., 2018) and impacts towards certain sustainability criteria (Forrest & Wiek, 2015).

Another point for improvement is the questions themselves which in some instances are too difficult e.g. “Does the transition experiment involve participants who possess the necessary skills and knowledge to carry out the experiment?” (Luederitz et al., 2017, p.70). To have a chance at answering the question above a thorough investigation of all the participants is needed. Even if such an investigation is carried out, it is still near impossible to objectively determine the skills and knowledge of other people. To reduce subjectivity, I would argue that we should strive to investigate and prioritize elements that can be observed objectively. However, it is worth noting that subjectivity is unavoidable in any given assessment, but the goal should be for the subjectivity to lie in the interpretation of objective data which is more transparent than subjective interpretation of subjective data. Questions such as the one quoted above can also be very time consuming which is aggravated when there is a large number of individual cases to look into as is the case in this thesis. Disregarding the criticism above I agree with the relevance of the four evaluative dimensions that serve as the foundation of TESSTE. These dimensions ensure a comprehensive assessment of STIs and provide a solid structure for a framework to be built around.

3.2.2 The sustainability experiment systems approach (SESA) (Hubeau et al., 2017)

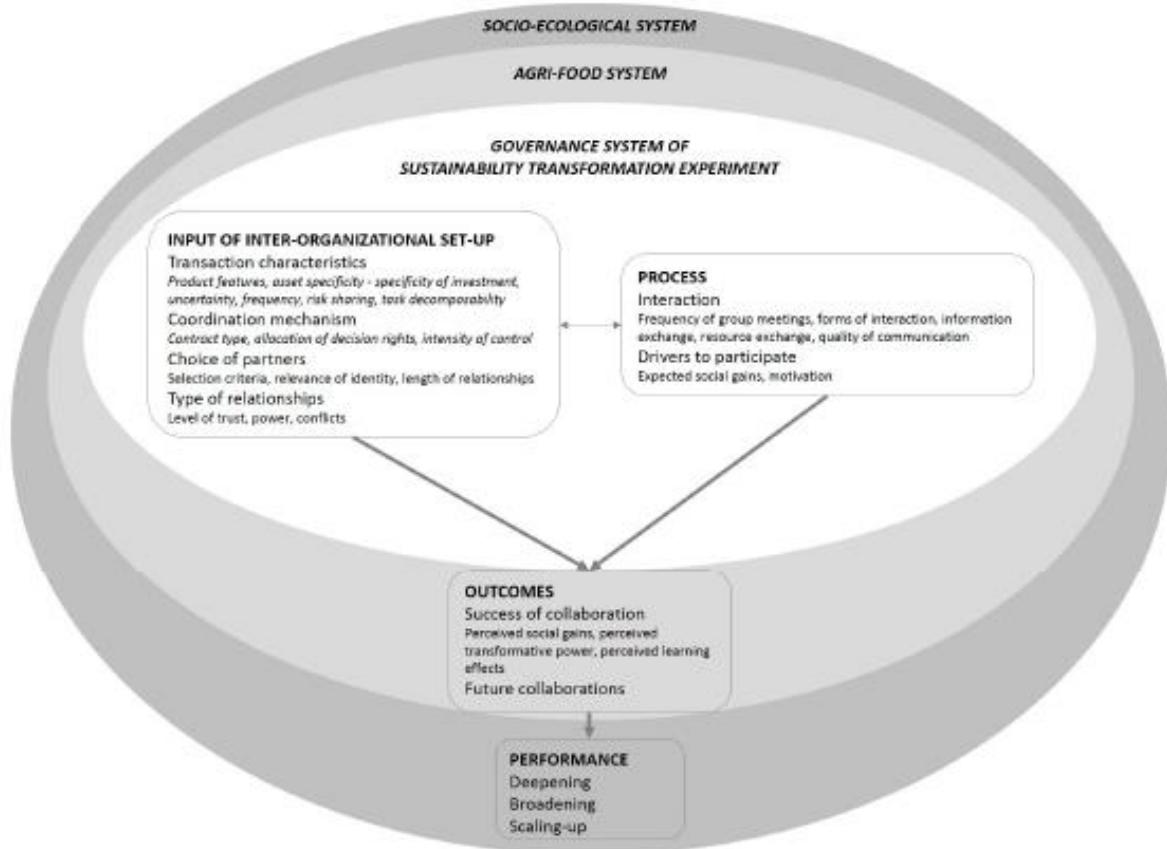


Figure 4: depiction of the SESA framework (Hubeau et al., 2017)

The Sustainability Experiment Systems Approach (SESA) shown in figure 4 is another recent contribution to the STI assessment literature. It is applied to four cases within the agri-food system but the authors state that it can be applied to initiatives in other domains as well (Hubeau et al., 2017). They repeat the call for assessment approaches that allow for cross-case comparison, but also approaches that can be applied across sectors in particular the private sector.

It distinguishes itself from the TESSTE framework in several important ways.

Firstly, it takes a specific and in-depth focus on collaboration rather than a general view meaning that the “organisational and relational structure” (Hubeau et al., 2017, p.3) of initiatives is the main area of interest. They argue that collaboration is a key factor for the success and performance of initiatives. Collaboration accelerates transition processes by spreading cost and risk, creates a deeper understanding and enhances the impact of small actors (Hubeau et al., 2017).

Due to this focus they investigate which factors influence the collaboration process and how collaboration affects performance by conduction a cross-case analysis of STIs in the Flemish agri-food

system. They find that aspects such as trust, resource exchange, equality in the power distribution, length of relationship and motivation are critical to the collaboration success and that a higher quality of collaboration leads to a better performance (Hubeau et al., 2017). Furthermore, they conclude that the diversity in actors involved increase the impact.

Like TESSTE, the SESA framework is also built around four evaluative dimensions of which three are the same (inputs, processes and outcomes) but instead of output (what was generated) it looks at performance (impact) as the fourth and final evaluative dimension. As mentioned previously performance is particularly interesting in the context of this thesis due to my focus on contributions of STIs towards sustainability. Hubeau et al. (2017) define performance based on three criteria showed in table 1.

Table 1: Evaluation of performance (own design adapted from Hubeau et al. (2017))

Criteria	Explanation
Deepening	Introducing new ideas that challenge culture, practices, or structure in an innovative way
Broadening	repeating the initiative in different contexts
Scaling-up	embedding the initiative in dominant ways of thinking (culture) and doing (practice).

The degree to which each of these criteria are deemed to be fulfilled the better the performance. Performance is assessed indirectly based on characteristics that are considered crucial to achieve an impact.

The assessment of performance means that the SESA framework takes an analytical approach. It lists a variety of “evaluation criteria” under each dimension which are evaluated on a scale from low to high requiring an individual analysis of each criteria. Such a qualitative rating against an established set of criteria has been done before (Forrest & Wiek, 2014) and it provides an opportunity to compare performances between initiatives.

Like TESSTE, SESA is an elaborate framework that is very time consuming to apply which is also acknowledged by the authors (Hubeau et al., 2017). It took several years to carry out their four case studies with 6 interviews per case on average. It thus seems to be a recurring issue that evaluative frameworks are too extensive and resource demanding and that a balance must be found between applicability and the level of ambition.

3.2.3 An evaluation framework for sustainability transition experiments (Williams & Robinson, 2020)

Williams and Robinson (2020) focus on sustainability transition impacts repeating the call for evaluations of the “actual effects and consequences” (Williams & Robinson, 2020, p. 59) of STIs.

Their main aim is to conceptualise how STIs contribute to transformational societal change and integrate it into a framework while recognising that transitions spans multiple domains and occurs within complex systems (Williams & Robinson, 2020). In order to measure impact, they identify five characteristics listed in table 2.

Table 2: Characteristics of impacts (own design adapted from Williams and Robinson (2020))

Characteristic	Examples of indicators
Reduction of structural and institutional barriers to transition	“Participants report inclusion of new actors and issues in public spaces and discourse”
Change of values and norms	“New sustainable practices/norms evidenced in policy statements or reports”
Influence on social, cultural or political trends	“Participants report project alignment to broader social, political and cultural trends”
Embedding sustainable behaviour in practice and norms	“Participants report development and adoption of new sustainable narratives, practices, values or norms”
Meeting both human and ecological needs	“Participants report ways in which the STI has contributed to meeting SDG goals”

From their long list of indicators (30 in total), it is immediately evident that, like the two previous frameworks, their framework is very extensive and requires a significant amount of time and resources to apply as it relies heavily on information from involved participants. It is also evident that the indicators work more like a checklist of characteristics rather than a performance evaluation of how well the STI is doing in each category as was also the case in the scheme proposed by Luederitz et al. (2016).

It is argued that one of the main challenges of assessing sustainability transition impacts is that they happen over long periods of time and can only be detected in the long term (Williams & Robinson, 2020; Regeer et al., 2016). To address this issue Williams and Robinson (2020) argue that it is better to look at anticipated or potential impact rather than realised impact. They say that “we can anticipate certain types of impacts if certain ‘markers’ of transition are present” (Williams & Robinson, 2020, p.63). This idea was also suggested by Forrest and Wiek (2015) who suggest that transformative potential should be incorporated as an aspect of assessment which is done by Castán Broto et al. (2018) in the framework presented below.

3.2.4 Transformative capacity and local action for urban sustainability (Castán Broto et al., 2018)

The fourth framework reviewed in this section revolves around the concept of transformative capacity of transition initiatives. Transformative capacity refers to the *potential* of initiatives to “drive purposive systemic change towards sustainability (Castán Broto et al., 2018, p. 451). The authors determine transformative capacity through an evaluation of ten individual components that are considered vital for the ability of an initiative to bring about transformational change. Listed underneath in table 3 is a very condensed overview of the ten components described in Castán Broto et al. (2018):

Table 3: Components of transformative capacity (own design adapted from Castán Broto et al. (2018))

Component	Explanation
1. Inclusive collaboration	involving a variety of actors on an equal footing
2. Leadership	certain actors championing a case and inspiring enthusiasm
3. Addresses social needs	empowering and improving the wellbeing of vulnerable groups
4. Explicitly tackles systemic barriers to change	regulations, values, established routines
5. Visions that are aiming for radical change	
6. Radical solutions	experiments or ideas that actively demonstrate solutions that challenge the existing policies, technologies or social practices (not merely plans or intentions)
7. Proactive dissemination	efforts to replicate and scale up initiatives
8. Reflexivity and self-evaluation	
9. multilevel agency	individuals, households, social groups, organisations, networks
10. multilevel scales	local, municipal, regional, national and supranational

Compared to the three previous frameworks it is a simpler framework that focus on one particular aspect (transformative capacity) rather than a broader methodical evaluation of several dimensions such as inputs, processes and outcomes. As evident from the table above aspects relating to collaboration appear in several components (1, 9 and 10) reflecting that collaboration is seen as a key element in transition processes which was also pointed out by Hubeau et al. (2017) and backed by numerous scholars within the research field (Feola & Nunes, 2014; Wittmayer, 2016; Markard et al., 2012; Seyfang & Longhurst, 2013).

Apart from collaboration it is also worth noting that they stress the importance of solutions being “radical” and “visionary” aligning with Hubeau et al. (2017) and Williams & Robinson (2020) who both deem these elements vital for the impact of initiatives.

Interestingly they use a database that is comparable both in size (400) and composition to the “our transition” database although their database consists of initiatives from all over the world instead of a single country.

They use a method that relies on web research rather than interactive case studies setting it apart from all other frameworks mentioned. It is done by a precise examination of the initiative specifically searching for the ten components listed above and whether it is present or not. As has been the case in Luederitz et al. (2017) and Williams and Robinson (2020) this means that the framework is not interested in how well an initiative is fulfilling each component making it binary and unnuanced in its evaluation. A way to address this issue is demonstrated by Celata & Sanna (2019b) who have developed the last framework reviewed in this section.

3.2.5 A multi-dimensional assessment of the environmental and socioeconomic performance of community-based sustainability initiatives in Europe (Celata & Sanna, 2019b)

The framework used in this study is based on data from the European research project TESS¹ (Towards European Societal Sustainability) and with the caveat that it is targeted towards CBI's rather than all types of STIs.

The framework focuses solely on assessing sustainability impact and is divided into four different dimensions (environmental, social, economic and technological) acknowledging that sustainability is multidimensional (Celata & Sanna, 2019b). As shown in table 4 there are two indicators for each of the four dimensions.

Table 4: Dimensions of sustainability impact (own design adapted from Celata and Sanna (2019b))

Dimension	Indicator	Description
Environment	- Carbon reduction - Carbon efficiency	(Total kilograms of CO2) reduced per year) (Percentage of carbon footprint reduction per capita)
Social	- Social capital - Social inclusion	(Ability to promote social ties) (Heterogeneity of participants)
Economic	- Economic impact - Financial sustainability	(Initiatives expenditures) (Diversity of revenue-sources)
Technological	- Innovativeness - Human capital	(Experimentation with new products/service) (skills and ability to provide informal knowledge spillover)

¹ The project explored the role of grassroots social innovations in transitioning towards a low carbon Europe and was active from November 2013 to November 2016.

The idea behind the framework is to make a comparative performance assessment of a large sample of diverse CBI's and determine which initiatives are "best" (Celata & Sanna, 2019b).

What makes this framework interesting is that it provides an alternative way of assessing impact where impact is well defined using only a few direct and indirect indicators. Additionally, it makes a direct comparison between different initiatives by ranking them according to their performance on each category (see figure 5).

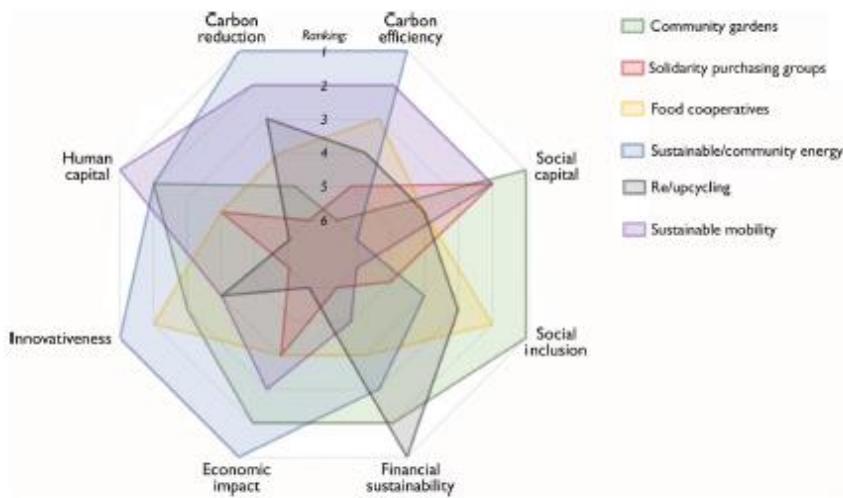


Figure 5: Radar chart showing the relative performance of six different groups of CBI's (Celata & Sanna, 2019b)

Unfortunately, their ratings lack transparency as they do not offer insights into how each individual initiative is scored but only how they rank relative to each other.

The narrow definition of impact opens to critique of whether the eight indicators are able to capture the whole picture. For instance, environmental impact is determined exclusively by "carbon reduction" overlooking many other aspects of environmental sustainability such as pollution and biodiversity. We need to be careful using exclusive indicators as they might end up giving a misleading result. This is also acknowledged by the authors who state that "the least performing CBIs, in other words, may in fact have important intangible, indirect, or long-term effects that are not captured by our methodology" (Celata & Sanna, 2019b, p. 949).

Another indicator that I would like to draw attention to is "innovativeness" which is determined by the number of new products and services put forward by the initiative. This indicator focused on quantity and leaves out the aspect of quality. As was pointed out by the literature and also present in Castán Broto et al. (2018) the radicalism and ability of innovations to challenge existing structures is crucial when considering the transformational power of innovations.

Like the rest of the frameworks reviewed in this section several positive and negative aspects can be pointed out meaning that there is a lot of inspiration and knowledge to carry in to the T-score framework which will be presented in the next section.

4 The T-score framework

The T-score framework is an assessment tool developed for the purpose of this thesis to evaluate the transformative potential of STIs towards sustainability transitions. The framework is built on a synthesis of sustainability transition theory and a review of existing assessment frameworks.

4.1 Key insights from the research field

To this point it has been investigated what sort of knowledge is missing within sustainability transition research, how sustainability transitions work and how other scholars have approached the task of evaluating STIs. These steps have resulted in several key insights that needs to be considered in the T-score framework:

- 1) Most assessment approaches are very resource intensive which can be mitigated by designing frameworks with web research in mind rather than interviews and questionnaires.
- 2) Within the field of STI assessment most studies are in-depth case studies focusing on one or a few cases. These studies do not follow any standardised analytical principles and their results therefore tend to be difficult to generalize and compare across studies.
- 3) There is a call for more cross-case comparisons that spans different initiatives from different domains to learn from the differences and similarities between initiatives.
- 4) In many instances' success of STIs is defined in relation to aspects of the internal process rather than its external outcome. More focus is needed on the contribution and impact of initiatives.
- 5) More efforts should be put into rating the performance of initiatives on certain parameters rather than just noting if these parameters are present or not. By appraising how well or to what degree the initiatives are doing it becomes easier to distinguish between initiatives.
- 6) We need research which generate understandable and actionable knowledge that can reach policymakers and other key stakeholders.
- 7) Due to the complexity and long-term nature of sustainability transitions it is difficult to determine the exact contribution of STIs. A promising alternative is to look at initiatives transformative potential

focusing on how they perform in regard to key aspects of the transition process such as collaboration and disruptiveness.

8) Collaboration is a key aspect of the transition process. Having multiple and diverse collaboration partners increases resources and power and makes an initiative more likely to be integrated in the regime.

9) Disruptiveness is a key aspect of the transition process. To challenge existing norms and structures in society, initiatives need to offer new radical solutions and proactively promote them through exposure and visibility.

4.2 Overview of framework

In figure 6 an overview of the T-score framework is presented. It shows that the framework consists of a categorisation as well as a scoring of initiatives. The purpose of the categorisation is to determine the who, what and where of the initiatives. Grouping the initiatives in categories makes it possible to analyse scores in relation to various parameters and add depth to the analysis.

Categorisation

- Project owner
- Geographical location
- Type of output
- Status
- Outcomes in relation to SDG's

Scoring

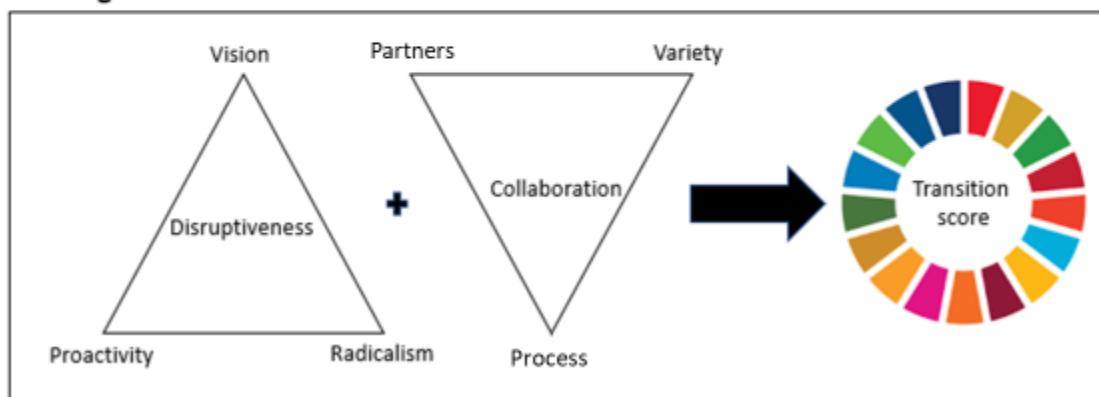


Figure 6: Structure of T-score framework.

The core part of the framework revolves around scoring. Instead of attempting to quantify the direct impact of initiatives it aims to evaluate their transformative potential. Each initiative is given an individual score across six key indicators. The first three indicators “vision”, “proactivity” and “radicalism” relate to the aspect of “disruptiveness”. The last three indicators “Partners”, “variety” and “process” relate to the aspect of “collaboration”.

These six indicators are considered critical components in transition processes but does not relate directly to impact. This means that the initiatives with the highest T-score are the ones that have the greatest potential to cause fundamental shifts in socio-technical systems but not necessarily those with the highest measurable impact in the present.

As illustrated in figure 7 the idea is that “disruptiveness” and “collaboration” are equally important aspects in determining the transformative potential. An initiative can be very disruptive but if it is not integrated it will have a limited impact. Equally an initiative can be well integrated across a variety of collaboration partners but if it only offers incremental change it will also have a limited impact. Both elements need to be in place for an initiative to be able to significantly contribute towards sustainability transitions.

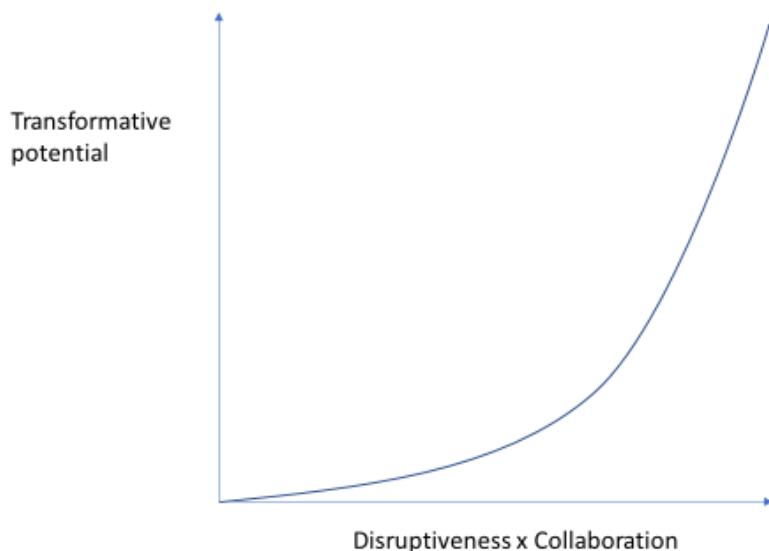


Figure 7: Graph showing the core assumption of the T-score framework.

In the remainder of this section each element of the framework will be explained in more detail.

4.2.1 Disruptiveness

The ability to disturb the status quo. It depends on the scale, ambition, and innovativeness of the initiative as well as the drive to push it forward.

Vision

The overall aim of initiatives – what they want to achieve and on what scale. Having a clearly articulated and ambitious vision is important to empower actors (Markard et al., 2012; Loorbach et al., 2017) and it also sets the upper boundaries for what an initiative can achieve.

Proactiveness

The effort put in by actors to promote and disseminate the initiative (or the idea behind it) to the wider public or the political arena. Pushing ideas and getting others to focus on a problem that you want them to focus on, is a way of capturing the agenda to generate change (Loorbach et al., 2017). It is well established within the field of entrepreneurship that success depends on the persistence of highly motivated individuals (Santini, 2017; Hubeau et al., 2017).

Radicalism

The output of the initiative and degree to which it challenges existing structures through for example alternative practices and new innovative ideas (Castán Broto et al., 2018). Does the initiative target broader regime change, or does it simply aim to adjust the existing regime? Furthermore, it is argued that practical demonstration of solutions is more radical than describing, proposing or teaching solutions (Hopkins, 2014; Castán Broto et al., 2018).

4.2.2 Collaboration

Relations with external partners that takes part in the initiative. It is assumed that the more partners there are and the more heterogeneous they are the better, as it increases the initiatives influence, resources, visibility, and support (Hubeau et al., 2017; Markard et al., 2012). When activists, researchers, policy-makers, entrepreneurs, businesses and others come together there is a better chance for developing holistic solutions that benefits more people and enjoys a broad basis of support (Seyfang & Longhurst, 2013). Initiatives that enjoys broadscale backing can apply more pressure to the socio-technical system.

Partners

The total number of independent external partners directly involved in or explicitly supporting the initiative.

Variety

The composition of external partners. How many different sectors are represented and how diverse are the partners within each sector? (5 categories were identified: civil society, governmental sector, private sector, educational institutions, and NGOs)

Process

The strength, intensity and reciprocity of collaboration ties between partners. It depends on elements such as trust, power distribution, coordination, conflicts, forms of interaction, and resource exchange (Hubeau et al., 2017). The quality of the collaborative processes affects how much an initiative can benefit from its external partnerships.

4.2.3 Supporting variables

The supporting variables include all other information collected to assess the STIs in the database. As mentioned most of this data serves an important function for categorising the initiatives.

Project owner

The actor who is responsible for the initiative. Due to the database being a compilation of initiatives from all sectors of society it is interesting to investigate, among other things, how T-score compares across initiatives from different sectors.

Geographical location

The region in Denmark where the STI is located. This aspect is included to examine whether there are any differences between STIs across different geographical locations.

Type of activity

The main activity that the initiative is involved in (see table 7 for an exhaustive list).

Status

Whether the initiative is active, stopped or completed. Considering that the database dates back to 2013 some entrants have seized to exist either because they failed or were planned as time limited projects. Distinguishing between active and discontinued initiatives sheds light on the differences between initiatives that failed and initiatives that persist.

Outcomes in relation to SDGs

The various outcomes of initiatives are held up against the 17 SDGs to check if and how they contribute towards sustainability. This is a similar approach as was seen in the frameworks by Williams and

Robinson (2020) and Luederitz et al. (2017). Sorting the various outcomes in relation to SDGs helps clarify what aspects of sustainability are covered the most and least by STIs.

Dissemination

A direct measure of how well established and integrated an initiative is. It is assumed that the more they are mentioned in the public and in the media the higher the dissemination. The purpose of this variable is to provide an alternative measure of impact performance which the T-score can be compared to. In other words, its main function is to test the framework and add an extra dimension to evaluate the validity of the results.

4.3 How does it relate to existing frameworks?

Having presented the T-score framework in detail in the section above here is an overview of how its core features relate to the existing frameworks presented in section 3.2.

- 1) The focus on transformational potential as the main area of interest means that there is a strong connection with the framework developed by Castán Broto et al. (2018) who also use largely the same indicators to assess transformational potential (vision, proactiveness, radicalism and collaboration).
- 2) As a natural consequence of the similarities in indicators the T-score framework also uses the same data collection approach as Castán Broto et al. (2018) relying heavily on web research.
- 3) The evaluation of the collaboration process is based on the framework developed by Hubeau et al. (2017) who determines which factors are important for successful collaboration processes.
- 4) Using ordinal performance indicators where the initiatives are rated based on how well they meet certain criteria is also done by Hubeau et al. (2017).
- 5) Categorising the outcomes of initiatives in accordance with the SDGs is done similarly to Williams and Robinson (2020) and Luedertiz et al. (2017).
- 6) The ambition of the framework (to enable a comparative performance assessment of a large amount of initiatives that is accessible and relevant for decisionmakers) is similar to the ambition of Celata and Sanna (2019b).

5 Methodology

5.1 Research design

A main objective of this thesis is to investigate Danish STIs and gain a deeper understanding of how and to what degree they contribute towards sustainability transitions.

To achieve this objective, the T-score framework was developed to systematically assess initiatives in the Danish “Our transition” database (see section 2.2 for a description of the database and why it was chosen). The T-score framework is based on a cross-sectional research design incorporating a large set of variables to ensure a uniform and detailed examination of the initiatives in the database (see figure 8). A high number of initiatives and variables were chosen deliberately to allow for finer distinctions between cases in the analysis (Bryman, 2016). This exact approach was also used by Castán Broto et al. (2018) who structured their framework around “variables such as the initiative’s name, location, key actors, implementation dates, objectives and outcomes” (Castán Broto et al., 2018, p. 453).

	Obs ₁	Obs ₂	Obs ₃	Obs ₄	...	Obs _n
Case ₁						
Case ₂						
Case ₃						
Case ₄						
Case ₅						
...						
Case _n						

Figure 8: The structure of data collection in cross-sectional research (Bryman, 2016, p. 62)

To start off, a literature review of sustainability transitions and the success factors of STIs was carried out to identify relevant variables to include in the framework. The review was performed in the Scopus search engine using the following search terms in various combinations: ‘sustainability’, ‘transition’, ‘experiment’, ‘initiative’, ‘success’, ‘impact’, ‘performance’. To settle on a design for the framework inspiration was sought in the literature by reviewing existing assessment approaches and frameworks. Again, Scopus was used in combination with snowballing. The search terms were the same as the ones mentioned above combined with ‘assessment’, ‘framework’, ‘evaluation’, ‘transformative potential’, ‘scheme’. Once the variables and design of the framework were in place the next step was to operationalise it.

5.2 Operationalisation

As stated by Wiek et al. (2014) operationalising an assessment framework requires an evaluation methodology that specifies how data will be gathered. Making sure that the assessment criteria are transparent and well defined reduces elements of subjectivity and personal interpretations (Bryman, 2016). It also ensures that in a cross-sectional study like this, initiatives are assessed consistently which is crucial for the overall reliability of the results.

The T-score variables

The six variables that together constitutes the T-score (vision, proactiveness, radicalism, partnerships, variety, process) are all ordinal variables rated on a scale from 0 to 3 (very low to high). To ensure consistency a grade instruction for each variable was devised prior to the assessment and finetuned through a series of test runs. The final grade instruction is presented in table 6 below.

Table 5: Grade instruction for T-score variables

Criterion	3 (high)	2 (medium)	1 (low)	0 (very low)
Vision	Aiming for a profound change (e.g. switching from fossil fuels to wind and solar energy) on a global/national scale. Explicitly connects its actions to sustainability challenges on a broad scale (how it contributes)	Aiming for moderate change (e.g. large improvements in energy efficiency) on a regional scale (city, municipality)	Aiming for minor change (e.g. small improvements in energy efficiency) on a local scale (neighbourhood, small village, household)	No vision or goal stated. Does not connect its activities to societal change
Proactiveness	Strong focus on outreach activities. actively takes part in the public debate. Seeks the attention of media and politicians. Often makes appearances in news and other media, keeps a detailed log of appearances in media. Arranges public events	Moderate focus on outreach activities. Make occasional appearances in media	Little focus on outreach activities. Absorbed in internal processes and tasks. Few appearances in media	No outreach activities or exposure
Radicalism	Demonstrates actions/solutions that show concrete ways of restructuring societal systems in more sustainable ways. Practices that are based on innovative ideas that radically differs from the mainstream ways of approaching things	Contain innovative as well as mainstream aspects. Partly challenges the current ways of thinking/doing	Produces knowledge and awareness. Describes solutions or ideas that adjust aspects of societal systems. Works within the norms and institutions of the regime	No output that challenges existing unsustainable norms/structures

Partnerships	More than 10	4-10	1-3	The initiative does not have any partners
Variety	All sectors/groups are represented. A high diversity of partners within each sector	2-3 other sectors/groups are represented.	1 other sector/group are represented. A low diversity of partners within each sector	0 partners, or all partners are homogenous to the initiative
Process	Strong ties with a high degree of interaction and coordination between partners. Inclusive partnerships with an equal distribution of power and extensive sharing of resources	Interaction and coordination on a smaller subset of tasks. Limited exchange of resources	Peripheral partnerships with little interaction and coordination. Unequal power distribution	Pro forma partnerships with no actual interaction

In addition to the T-score variables data was also collected for six supporting variables that are elaborated in the following.

Project owner

In most cases it was immediately evident whom the project owner was, but in cases of doubt available sources on the history and background of the initiative were consulted. For the sake of clarity, the “project owner” variable was split into two categories – an overarching category and a more specific subcategory. The overarching categories identified were civil society sector, NGO sector, governmental sector, private sector and the educational sector. The subcategories were based on the legal status, function, or main description of the initiatives.

Geographical location

Geographical information on each initiative was an integrated part of the database so for this variable I utilised the data already present. Therefore, I also adopted the geographical regions used in the database which were: Copenhagen, Zealand, East Jutland, South Jutland, Funen, North Jutland, The Triangle, Middle & West Jutland, and Bornholm. This means that geographical location was determined on a regional level rather than a local level which limits the possibility to zoom in on a specific town, city, or municipality. However, it is still possible to look at regional differences, and ultimately it was decided to stick with the predefined categories to reduce the workload.

Type of activity

A main activity was determined after reading the available information about each initiative. It could be tricky in some cases where there were more activities to choose from. Developing the final list of different activities was an iterative process where the list was adjusted continuously to accommodate

all initiatives and bunch certain activities together to increase clarity. In the end 31 categories were identified in total and they are listed in table 3.

Status

In determining the status of initiatives, it was first checked whether the initiative was active or not by looking for recent activities – typically on websites and in Facebook groups. If the initiative was inactive, it was investigated whether this was because it had been abandoned or because it had reached its goal/expiration date. The former group of initiatives were labelled as stopped initiatives and the latter group were labelled as completed initiatives (making it three categories in total: active, stopped and completed).

Outcomes in relation to SDGs

To evaluate how the various outcomes of initiatives relate to the SDGs, a document containing an overview of the 17 sustainable development goals was created. The overview was used as a constant reference when reading about the initiatives to be able to easily compare their described outcomes with the SDGs. Using this method, it was noted which specific goals each initiative was contributing to.

Dissemination

Dissemination is a latent variable that was measured using Google search results as a proxy for how established and integrated the initiative is. A search was conducted by writing the name of the initiative into the google web search engine using quotation marks to ensure that only results containing the exact name would be included. In cases where the name was not unique, 2-3 keywords were added to exclude irrelevant search results. While this approach could be criticised for lacking scientific strength it was chosen because it provided a quick and simple way of getting a concrete comparable value. Many things affect the number of search results in the google search engine but considering that its purpose is to serve as a rough estimate it is a suitable indicator.

5.3 Data collection

The data required for the T-score framework was almost exclusively collected through web research going through all information available on each initiative. In most cases the main sources were websites and descriptions written in the database by the initiatives themselves. This material was scanned for evidence of ideas, goals, activities, strategies, and partners to support a judgement about the extent to which each initiative met the six T-score criteria. The data was organised in an excel spreadsheet using the structure shown in figure 8. Organising data in this way provided an overview

and made it easy to compare and crisscross variables in all ways imaginable. As mentioned in section 4, it was a deliberate choice to design the variables in a way that did not necessitate time-intensive data collection methods such as interviews or questionnaires as it would be incompatible with the scope of the study.

5.4 Data analysis

As a vital part of the data analysis a “T-score” composite variable was made by combining the six ordinal variables described in section 5.2 (vision, proactiveness, radicalism, number, variety, quality). Considering that each ordinal variable is assessed on a scale from 0 to 3 this means that the T-score ranges from 0 to 18. Computing this overall performance score gives a way to understand the performance of an initiative in just one number which is very attractive from a communicative perspective. As an outsider it is much easier to comprehend a single number rather than six different ones. Furthermore, distinctions between initiatives can be seen more clearly on a 0-18 scale compared to a 0-3 scale simply because there will be a greater spread across the scale.

When all data was collected and added to the excel spreadsheet crosstabulations between different components were carried out looking for interesting findings. Pie charts, stacked charts, radar charts and tables were used to present the results as clearly as possible.

5.5 Limitations/weaknesses

A main weakness of the framework lies in the way the individual T-score variables are scored. Variables like vision or proactiveness are qualitative and can therefore not be measured directly. Since the T-score framework depends on quantitative assessments to be able to compare initiatives, it must convert qualitative data into quantitative data. This is done by setting up a scale and defining which qualitative characteristics corresponds to which step of the scale. Even if the scale and characteristics are thoroughly defined the assessment ultimately hinges on a subjective projection of the initiative’s activities and descriptions on to this scale. Not having a specific value to read off opens for interpretations that can harm the validity and reliability of the data. In this thesis the strategy to address this problem has been to make a thorough grade instruction that point out what the evaluator should look for. Additionally, the inter-rater reliability has been tested by having different people conduct evaluations of the same initiatives (Bryman, 2016).

However, it is not possible to provide perfect assessment criteria for every initiative to fit into meaning that a lot is still left up to the evaluator. In this way T-score works in the same way as grading in school and shares the same strengths and weaknesses.

Another important thing to note is that the “our transition” database consists of approximately 550 initiatives but due to time constraints it has only been possible to include 271 initiatives in this study. The initiatives were picked in random order so it should not affect the representativeness of the results.

6 Results

In this section the data accumulated through the T-score framework is processed to provide key insights concerning the initiatives from the “our transition” database.

5.1 Actors

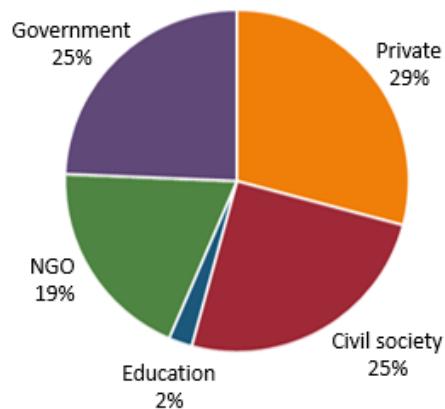


Figure 9: Composition of project owners based on sector.

There is an even distribution of initiatives across four of the sectors (NGO, private, governmental and Civil society) and only a few initiatives from the education sector. The most frequent types of subcategories are small and medium sized businesses, municipalities, public administrations, interest organisations, and community-based initiatives (community gardens, food cooperatives, community energy etc.).

4.2 Activities in terms of sustainability

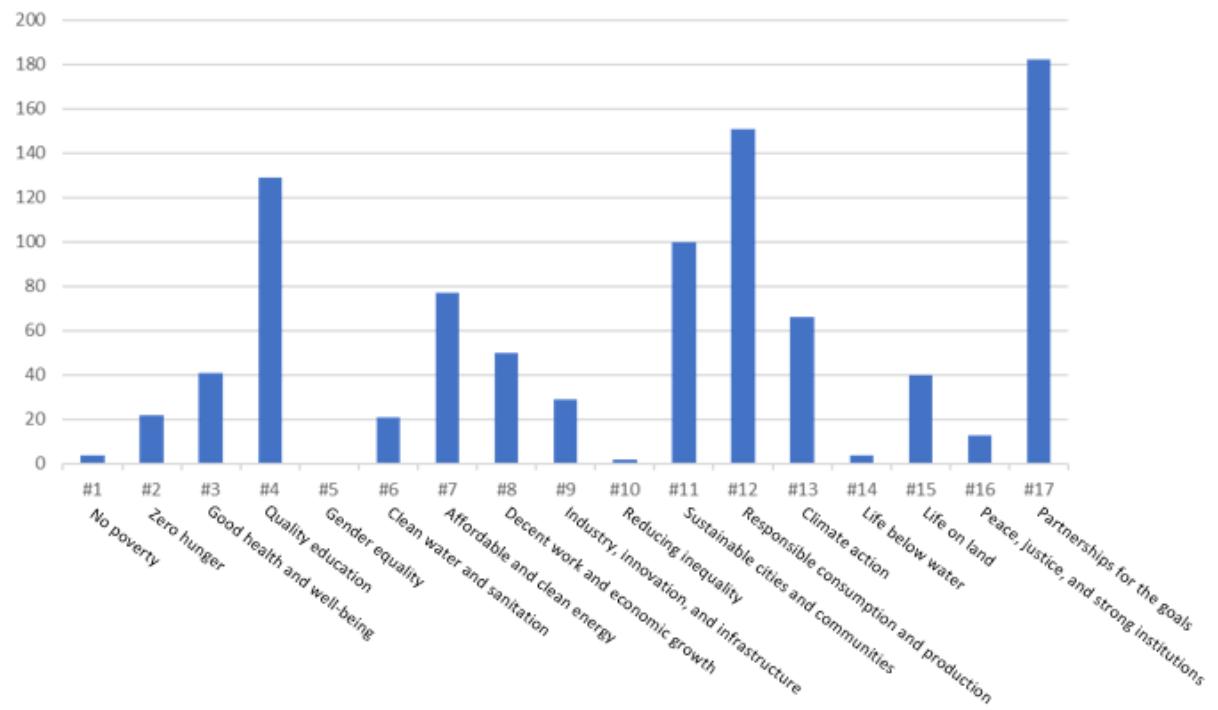


Figure 10: How frequent are each SDG covered by the initiatives in the database.

Besides ‘Partnerships’ (goal 17) ‘responsible consumption’ (goal 12) (56%), ‘quality education’ (#4) (47%), and ‘sustainable cities and communities’ (goal 11) (37%) are the SDGs most frequently covered.

In the other end of the scale ‘no poverty’ (goal 1) (1.5%), ‘gender equality’ (#5) (0%), ‘reduced inequalities’ (goal 10) (0.7%) and ‘life below water’ (goal 14) (1.5%) are the least covered SDGs.

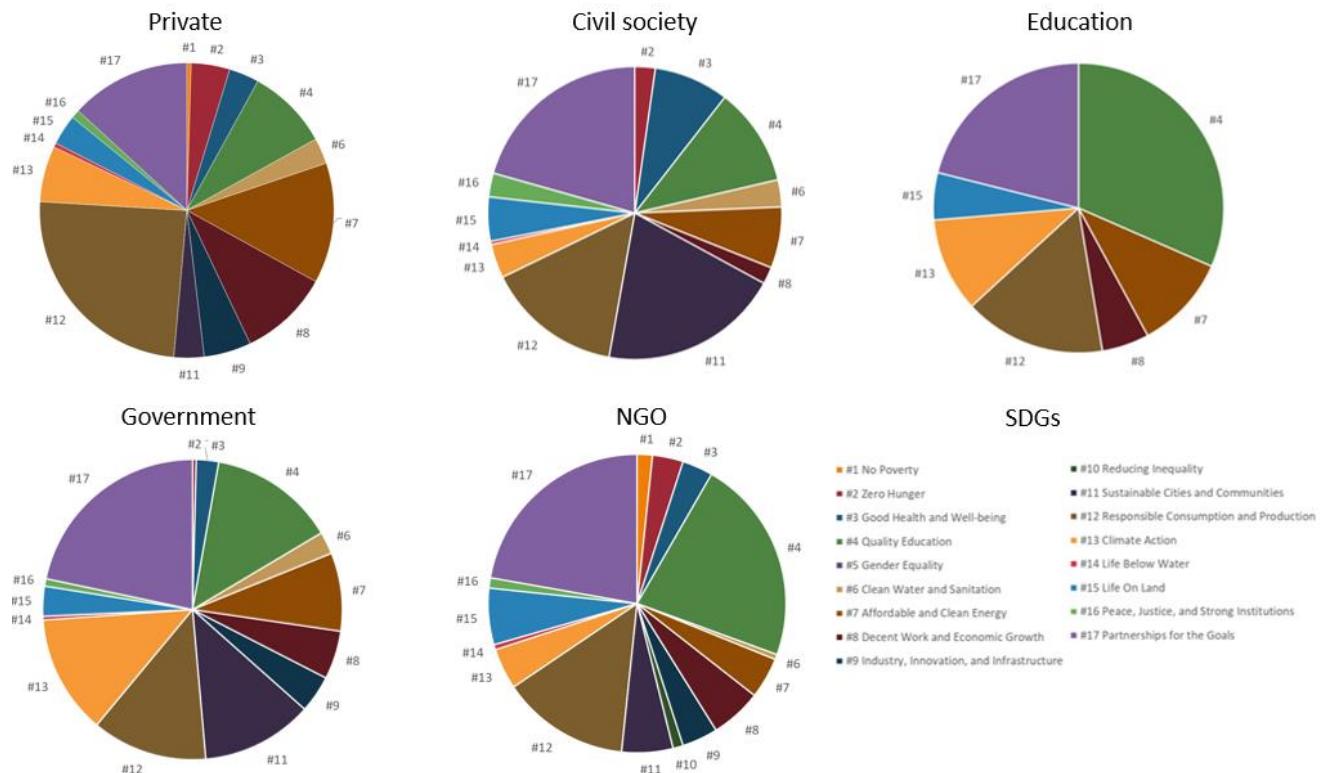


Figure 11: Pie charts showing the SDGs covered by each sector.

Private sector initiatives are relatively more focused on ‘affordable and clean energy’ (goal 7), ‘decent work and economic growth’ (goal 8) and ‘responsible consumption and production’ (goal 12). They are relatively less focused on ‘partnerships’ (goal 17).

Civil society initiatives are relatively more focused on ‘sustainable cities and communities’ (goal 11) and ‘good health and wellbeing’ (goal 3) and relatively less on ‘industry, innovation and infrastructure’ (goal 9).

Government sector initiatives are relatively more focused on ‘climate action’ (goal 13).

NGO sector initiatives are relatively more focused on ‘quality education’ (goal 4) and the only ones to focus on ‘no poverty’ (goal 1).

4.3 Current status

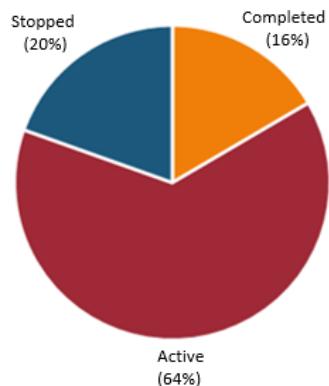


Figure 12: Current status of initiatives in the database as of May 2020.

Of all the included initiatives in this study 64% are still active, 16% are time-limited initiatives that have been completed and 20% are initiatives that have been dropped or cancelled.

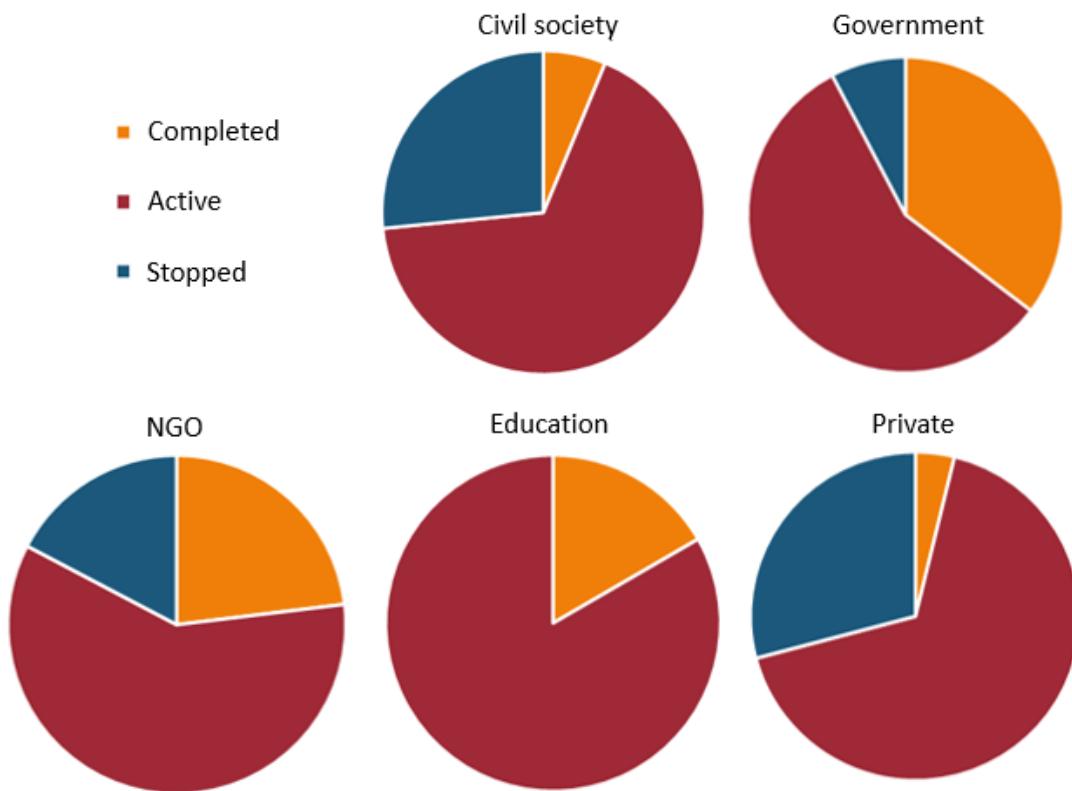


Figure 13: Current status of initiatives based on sectors.

The pie charts in figure 13 shows that the government sector initiatives have the highest proportion of completed initiatives and civil society and private sector initiatives have the highest proportions of stopped initiatives.

4.4 Transformative potential



Figure 14: Radar chart showing the average score of the six T-score variables for all active (blue), completed (yellow) and stopped (red) initiatives.

Compared to initiatives that are completed or stopped, active STIs generally score higher regarding the variables relating to disruptiveness (vision, proactiveness, radicalism).

Stopped initiatives score relatively low regarding the variables relating to collaboration (sectors, network, quality).

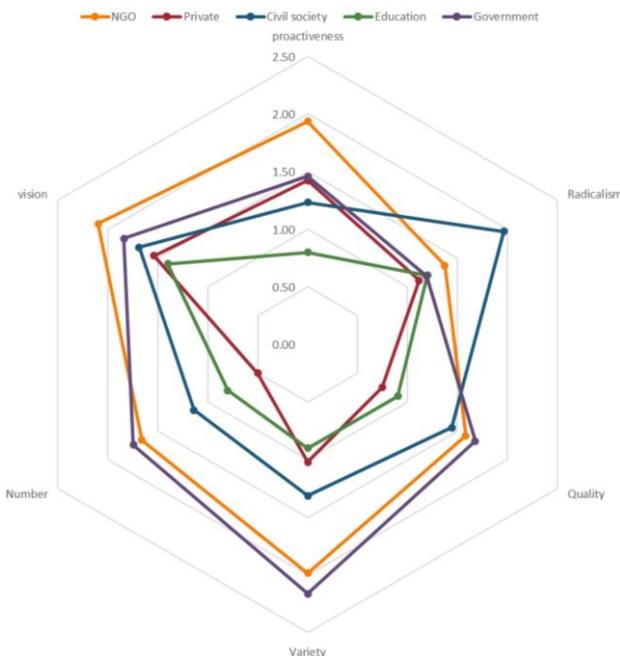


Figure 15: Radar chart showing the average score of the six T-score variables across active initiatives from the five sectors (NGO, private, civil society, education, government).

NGO sector initiatives tend to be the highest scoring on average especially regarding vision and proactiveness.

Civil society sector initiatives score relatively high regarding radicalism.

Government sector initiatives perform well in all aspects of collaboration (sector, network, quality).

Private and education sector initiatives generally have the lowest average score across all parameters (except proactiveness).

4.5 Geographical differences

Table 6: Quantity, Status, sectors, average T-score and average google search results based on the geographical location of initiatives.

Region	Copenhagen	Zealand	East Jutland	South Jutland	Funen	North Jutland	The Triangle	Mid & West Jutland	Bornholm
Quantity	104	40	38	19	19	18	13	10	5
Active	56%	80%	68%	53%	68%	67%	54%	80%	60%
Completed	17%	8%	18%	32%	5%	22%	15%	0%	40%
Stopped	27%	13%	13%	16%	26%	11%	31%	20%	0%
Private	32%	30%	26%	21%	42%	28%	23%	30%	20%
Civil society	23%	35%	26%	11%	21%	11%	31%	40%	0%
Education	2%	3%	3%	11%	0%	0%	0%	0%	0%
Government	25%	13%	5%	53%	21%	50%	23%	20%	80%
NGO	18%	20%	39%	5%	16%	11%	23%	10%	0%
Avg. T-score	8.2	8.2	9.6	7.1	10.3	9.9	6.5	9.4	8.8
Avg. Search results	7404	3363	12602	3061	5153	7139	697	5700	6235

Table 7 shows that most of the initiatives are located in Copenhagen (104) and secondarily Zealand (40) and East Jutland (38).

The highest proportion of active initiatives are in Zealand and Mid & West Jutland (80%).

The highest proportion of stopped initiatives are in Copenhagen (27%), Funen (26%) and The Triangle (31%).

There is a relatively high proportion of private sector initiatives on Funen (42%).

Civil society initiatives are most prevalent in Mid & West Jutland (40%), Zealand (35%) and The Triangle (31%) and less prevalent on Bornholm (0%), North Jutland (11%) and The South (11%).

There is a high proportion of government sector initiatives in Bornholm (80%), South Jutland (53%) and North Jutland (50%) and a relatively low proportion in East Jutland (5%) and Zealand (13%).

The highest proportion of NGO initiatives are in East Jutland (39%) and the lowest on Bornholm (0%) and South Jutland (5%).

Initiatives from the Triangle have a significantly lower average T-score and less average google search results than initiatives from the other regions. Initiatives in South Jutland (10.3), North Jutland (9.9), East Jutland (9.6) and Mid & West Jutland (9.4) have the highest average T-score.

4.6 Correlation between dissemination and T-score

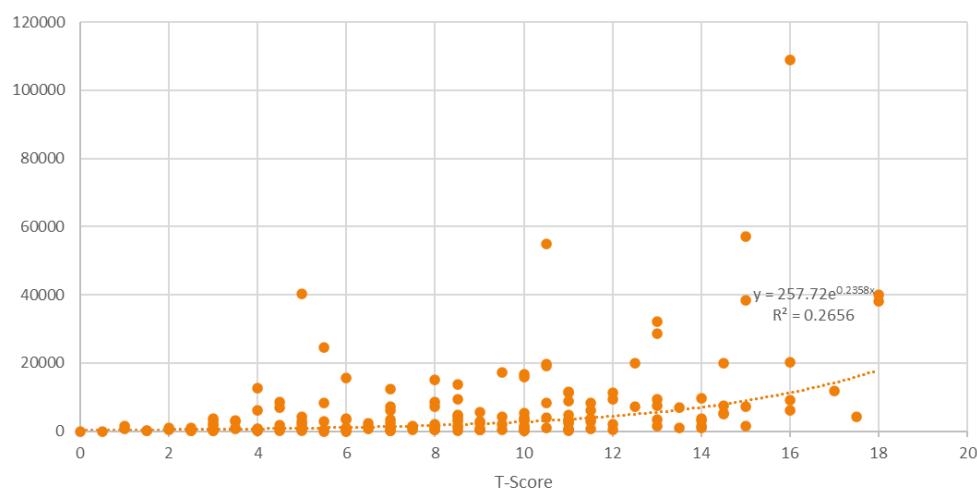


Figure 16: The correlation between T score and google search results for all initiatives.

Looking across all initiatives there is no clear detectable correlation between T-score and dissemination.

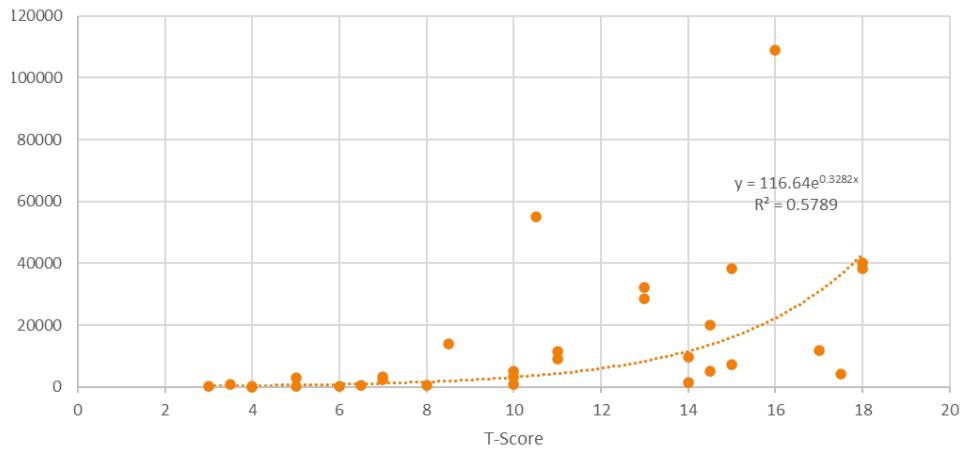


Figure 17: The correlation between T score and google search results for all NGO sector initiatives.

Separating by sector it is evident that NGO initiatives seem to have a relatively strong exponential correlation between T-score and dissemination ($R^2=0.58$). The function $Y = 116.64e^{0.3282x}$ translates into an increase in search results of approximately 40% for each T-score point

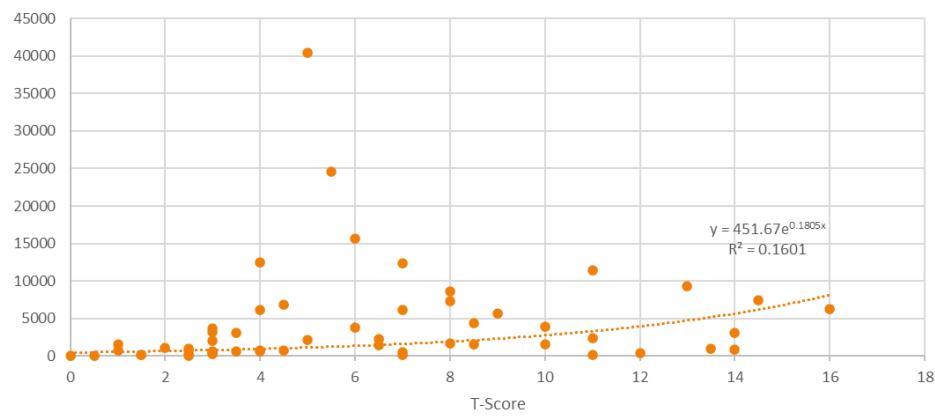


Figure 18: The correlation between T score and google search results for all private sector initiatives.

Initiatives from the private sector is showing the weakest correlation between T-score and dissemination ($R^2=0.16$).

4.7 Activity

Table 7: Type of activity compared to status, average T-score and average google search results.

Type of activity	Quantity	Active	Completed	Stopped	Avg. T-score	Avg. Search results
Gardening	29	66%	3%	31%	7.5	4182
Energy improvement	25	24%	48%	28%	10.5	2187
Service	16	81%	0%	19%	4.3	1885
Education	15	73%	13%	13%	10.2	7160

Product	15	47%	7%	47%	3.6	1058
Sharing economy	14	43%	0%	57%	8.4	10515
Network	13	92%	0%	8%	9.3	11930
Ecovillage	12	83%	17%	0%	11.1	7566
Campaign	12	50%	42%	8%	9.6	3912
Food Production	12	75%	8%	17%	8.4	3095
Recycling	12	58%	25%	17%	6.9	5875
Food coop	11	73%	0%	27%	8.3	4223
Information resource	9	67%	22%	11%	7.3	3962
Festival	8	75%	13%	13%	10.0	12975
Nature preservation	7	57%	29%	14%	13.4	12653
Permaculture	7	100%	0%	0%	8.9	1918
Innovation	6	100%	0%	0%	11.3	4007
Food waste	6	67%	0%	33%	11.1	40045
Information event	5	20%	60%	20%	9.0	377
CSR	5	40%	20%	40%	1.3	200
Art	4	75%	0%	25%	6.3	3364
Circular economy	3	100%	0%	0%	12.3	3829
Vision	3	100%	0%	0%	11.7	13883
Transportation	3	100%	0%	0%	10.7	11903
Transition initiative	3	100%	0%	0%	7.5	949
City planning	3	33%	67%	0%	3.5	2890
Award	3	33%	67%	0%	3.0	264
Research	2	50%	50%	0%	17.0	11700
Financing	1	100%	0%	0%	13.0	32200
Policy	1	0%	100%	0%	0.0	0
Wastewater	1	0%	100%	0%	0.0	0

The table shows that ecovillages (83.3%) and networks (92.3%) are the types of activities that are most likely to persist.

The types of activities that are most likely to stop are CSR (40%), products (46.7%), gardening initiatives (31%), food coops (27.3%), sharing economy initiatives (57.1%) and food waste initiatives (33.3%).

The highest T-score can be attributed to initiatives engaging in nature preservation (13.4), innovation (11.3), food waste (11.1) and ecovillages (11.1).

The lowest scoring types of activities are awards (3.0), CSR (1.3), products (3.6) and services (4.3)

Initiatives engaged in “food waste” have the highest amount of google search results while “Information event” initiatives have the least.

7 Discussion

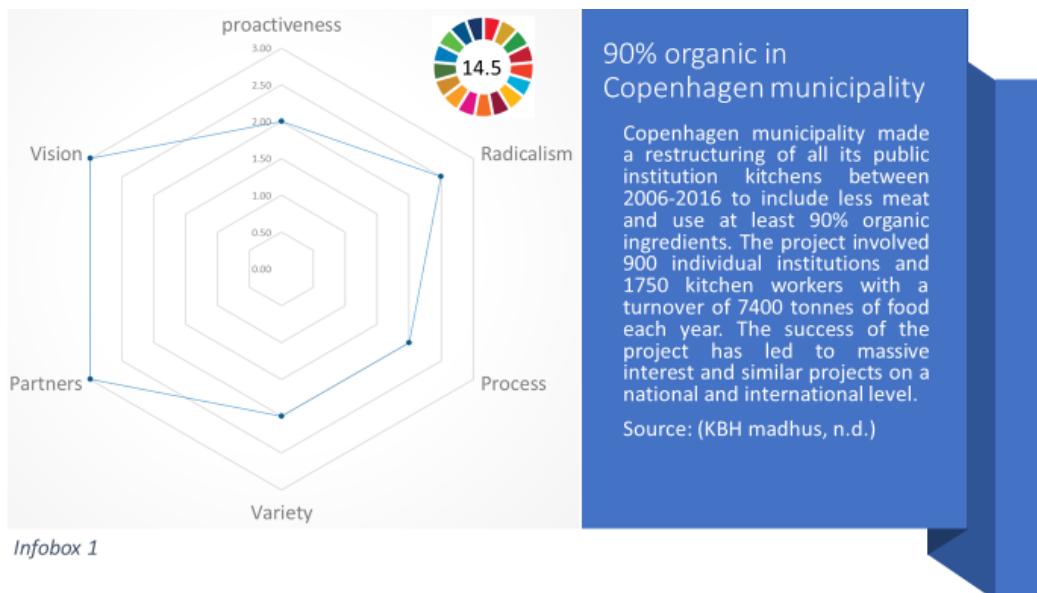
In this section the results and what they tell about the Danish STIs contribution towards sustainable development is discussed. Furthermore, the T-score framework is evaluated and ideas for adjustments and future studies outlined.

7.1 Contributors to sustainability transitions in Denmark

The Danish STIs are distributed evenly across sectors which goes to show that many different types of actors from all spheres of society want to be (and feel that they are) a part of the sustainability transition process in Denmark. It also shows that the “Our transition” database and the campaign that started it was very successful in reaching and appealing to all types of actors. From this observation it would seem that the nationwide competition format accompanied by intensive media coverage is an excellent method to build databases of STIs.

While almost all initiatives in the database aim at transitioning various socio technical systems they operate on different levels. Some actors like grassroots and CBIs operate from the niche level whereas others, such as government organizations and corporations are (by definition) part of the regime. Contrary to the idea of the MLP the T-score analyses has shown that the strongest transformative potential does not exclusively reside in niche level actors. This nuance to the MLP has also been pointed out by many other scholars who talk about an “overemphasis on niche-derived agency” (Smoleniec et al., 2017, p. 499).

There are several examples of regime level actors who aim for radical change such as Copenhagen municipality making all public canteens 90% organic (infobox 1).

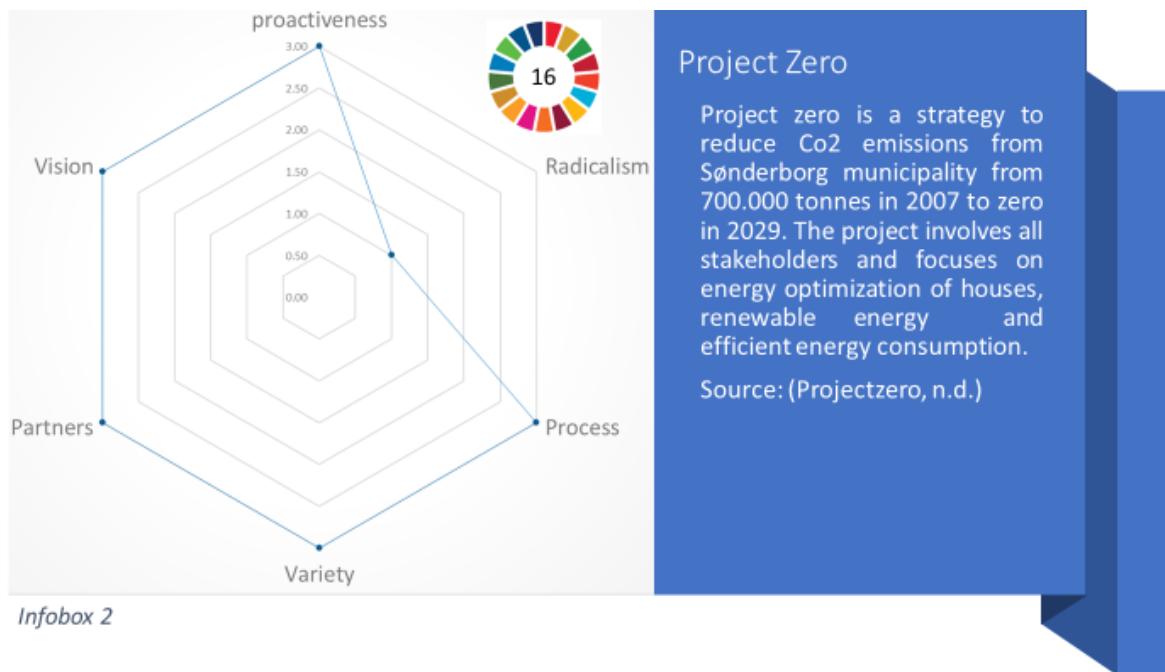


CBIs and grassroots are appealing due to their openness, democratic structure and practical experimentation (Ornetzeder & Rohracher, 2013). Nevertheless, it is undocumented when networks such as Ecolise state that “their progress towards global sustainability targets far exceeds that of mainstream society”. (Ecolise, 2019, p.2).

When identifying transformative STIs it is a mistake to automatically rule out initiatives that works within the regime. The T-score analyses demonstrate that eyes should be kept on the ball rather than the player.

7.2 Aspects of sustainability addressed

The distribution is more skewed when it comes to the SDGs addressed by the STIs. Some outcomes are pursued way more than others such as sustainable cities (goal 11) and responsible consumption (goal 12) that stand in contrast to outcomes that are almost completely unrepresented such as poverty (goal 1), gender equality (goal 5), and inequality (goal 10). A possible explanation of this bias should likely be found in the institutional setting in Denmark. The fact that Denmark is a wealthy country that supports a high standard of living and has well-developed social services influences the way sustainability challenges are perceived. Therefore, it makes sense that areas such as hunger, inequality and poverty are not considered substantial issues receiving minimal attention. With all basic needs covered the Danish initiatives instead focus mostly on contributions through consumption and technology a good example being “Project zero” carried out by Sønderborg municipality (infobox 2).



This finding indicates that considerable differences between countries should be expected in terms of the composition of STIs and their distribution across the SDGs they address. Most notably between STIs located in countries in the global south versus countries in the global north. Concrete examples being water and sanitation as a typical Challenge tackled by initiatives in the global south and waste reduction, energy management and climate change mitigation as typical Challenges tackled by initiatives in the global north (Castán Broto et al., 2018).

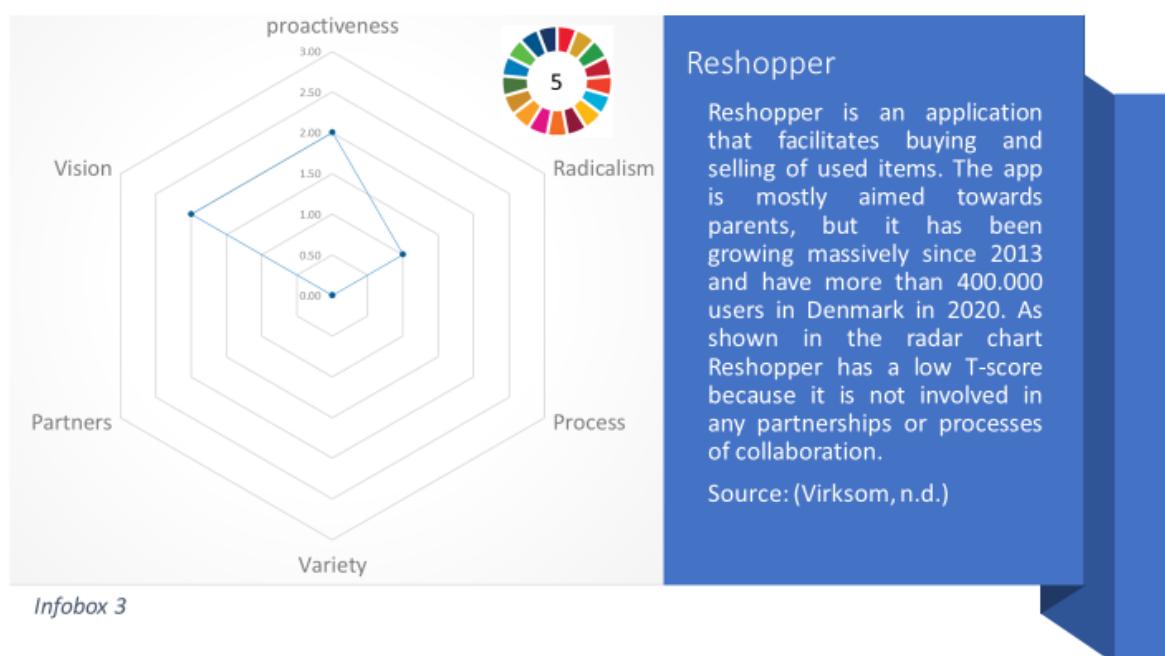
Interestingly, the picture painted of the Danish transition landscape in this thesis is consistent with the composition of initiatives featured in Aalborg Sustainability Festival. In their evaluation of the 2018 edition they looked at how their events distributed across the SDGs and also found goal 11 and 12 as the most covered and goal 1 and 10 as the least covered. It boats well for the reliability of the results presented here that they are echoed by what is essentially a small-scale extract of “Our transition”.

During the data collection process, it became clear that many initiatives actively use the SDGs as a tool for labelling their activities and making their contributions visible to outsiders. This suggest that using the SDGs as a method of categorising initiatives is a suitable approach that resonates with the initiatives themselves.

7.3 Development over time

Due to the database dating back to 2013 only 64% of the initiatives evaluated are still active. Therefore, some might argue that the database is outdated and does not reflect the current trends of the Danish transition landscape. While this is a valid criticism, having “old” data makes it possible to track how

each initiative has evolved and fared over time which adds an interesting dimension to the analysis. For instance, the results showed that the government sector have relatively higher percentage of completed initiatives and fewer stopped initiatives than the other sectors. Due to their political nature and being subject to changing agendas, it is perhaps natural that many government sector initiatives are time limited projects. It also makes sense that government sector initiatives are less likely to fail as they do not operate on market terms and often do not depend on volunteers or being profitable (Seyfang and Smith, 2007). The largest proportion of stopped initiatives was found in the private sector in particular business start-ups focusing on recycling or sharing economy services which made up 35% (8 out of 23) of all stopped private sector initiatives. These start-ups identified an opportunity in the market in 2013 ““We touched down on a rising trend” (Virksom, 2020) but was outperformed by other competitors such as “Reshopper” who ended as the main “winner” of this market (infobox 3). This example shows that not all STIs are complementary and sometimes success of one initiative can compromise the success of others.



Another main group of stopped initiatives is community gardening initiatives that made up 37% (7 of 19) of the stopped initiatives from the civil society sector. Besides relying on volunteers, a suggestion why gardening initiatives seems more vulnerable than other community-based initiatives could be that they follow a cycle dictated by the seasons. Each year gardening initiatives more or less have to start over in a never-ending cyclical process. This stands in contrast to for example ecovillages where the development is continuous and more linear.

7.4 The highest transformative potential

In appendix 1 there is a list of the 15 highest scoring initiatives. At first glance it is noticeable that the top five are all NGOs and almost all 15 initiatives are engaged in different activities. From this list it would seem that, generally speaking, the activity in itself is less important than how it is conducted which is similar to what was found by Celata and Sanna (2019b).

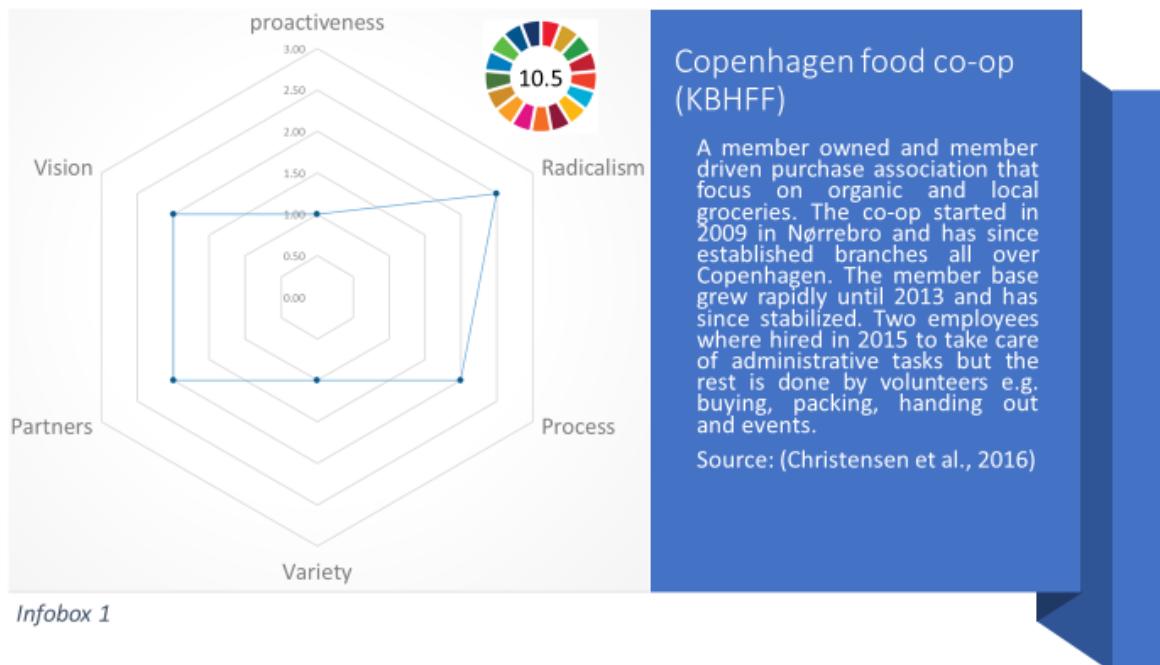
A reason for the high T-scores of NGO initiatives could be that they tend to be very focused on a specific goal - so called single-issue initiatives (Ornetzeder & Rohracher, 2013). Their focus helps them being clear and effective in their communication. Good examples are "Intentionally Wild" who focus on biodiversity, "Stop wasting food" (see infobox 4) and "Blaffernationen" who focus on hitchhiking. Besides having a clear agenda, these initiatives are very outreaching and have established many partnerships and alliances with actors in all sectors of society in their effort to strengthen their agenda. Being social movements, their activities are not bound to a local setting but instead they are aiming to receive attention on a national scale. Additionally, these initiatives are characterised by exceptionally dedicated and driven founders. In the case of "Stop wasting food", founder Selina Juul have participated in hundreds of radio and tv features, national and international conferences and written approximately 200 debate posts and chronics (Juul, n.d.).



The two highest scoring government sector initiatives both concern large scale investment in renewable energy and are similar in their ambition, approach and scope. They both serve as examples

of how powerful and impactful local administrations can be when they take the lead and involve all parts of a community.

Only a few civil society initiatives are observed at the top which could be a result of resources and lack of focus. Almost all civil society initiatives revolves around the concept of community and enhancing social capital but often does not have one clear aim or agenda that they work towards. Some initiatives like “Copenhagen food coop” (infobox 5) deliberately avoid political engagement because they prioritize allocating time and energy into the internal organisation rather than how they can maximize political influence (Christensen et al., 2016). Relying on volunteers mean that they typically involve less powerful and less experienced actors, who does not have the resources and knowledge to navigate the political arena and obtain support by policy makers. This impedes their exposure to the wider public and could be a reason that civil society initiatives are finding it harder to reach their full potential (Bergman et al., 2010).



Civil society initiatives are also by far the most radical in general which could be a reason that they are less likely to get established in the mainstream. Natural processes of growth and influence such as professionalisation and collaboration with regime actors are aspects that might clash with the values of community-based initiatives constituting a potential conflict between impact and internal integrity (TESS, 2017).

7.5 Are the initiatives grouped in certain areas and does geography play any role?

Going through the initiatives in the database specific local areas make a distinct impression. Among these are the islands of Samsø, Bornholm and Fejø. Which are all loaded with initiatives. This have also been noticed by the EU Horizon 2020 program that recently awarded Bornholm and Samsø 1st and 2nd place in their “RESpnsible Island Prize” competition (Dansk energi, 2020). These islands are ideal as laboratories for how to build sustainable societies as they are relatively small and isolated micro models of fully functioning societies. The same tendency is identified in some municipalities especially in Sønderborg municipality in South Jutland (infobox 2). This goes to show that having a proactive local administration with an ambitious strategy can make a great difference. Contrary to the belief of Hopkins (2014) and the transition town movement that the government sector should support but not lead this finding suggest that local governments can have a vital role as catalyst for sustainability transitions both through policy and by creating favourable conditions for STIs to emerge (Castán Broto et al., 2018). It is worth recognising that while market actors have to be confident that their investments will pay off on the short-term, governments can afford to take higher risks. Mazzucato (2013) point out the fact that many of the most important innovations in modern times were pushed forward by state funding which emphasise the vital role of the government sector.

Copenhagen is by far the geographical “region” with the highest number of initiatives but that does not mean that the other regions are not contributing as many of the highest scoring initiatives are mostly located outside Copenhagen. Copenhagen is also the place with the highest percentage of stopped initiatives which corresponds to a finding by Feola and Nunes (2014) that the least successful transition initiatives are located predominantly in urban areas because “local attachments among urban transition initiatives are weak” (Feola & Nunes, 2014, p.24)

7.6 Reflections on the T-score framework

The purpose of the framework is to identify those initiatives with the highest transformative potential across sectors. To ensure validity the variables must be crosscutting and bear the same weight and meaning to all the different types of initiatives. However, the results have shown that private sector initiatives perform significantly worse when it comes to the three T-score variables that are associated with collaboration. It poses the question of whether collaboration is a fair dimension to evaluate private sector initiatives by?

The idea is that collaboration should reflect how well an initiative have managed to establish itself and consequently its possibility of having an impact. In the case of private sector initiatives where the

output is a service or product, it is likely better to evaluate impact by economic turnover as it reflects their influence through the market. In general, there is notable difference between using the market as the mean of influence versus the political arena or the public discourse. This caveat is not accounted for in the T-score framework and it means that it might be underestimating the transformative potential of this specific group of private sector initiatives.

It might be the same reason that there is no correlation between T-score and dissemination for private sector initiatives as was shown in figure 18. Dissemination measured though google search results is more relevant for initiatives who are using the political and public discourse as a medium of influence. An obvious example being social movements who are very dependent on publicity.

In their central study about evaluative schemes Luederitz et al. (2017) stress four features as key. A framework needs to be generic, comprehensive, operational, and formative. In developing the T-score framework a main goal has been to make it applicable to different types of STIs (i.e. generic) and easy to apply (i.e. operational). However, any formative element has been neglected as the data collection process did not involve any interaction with the initiatives. This path was chosen in part to make the framework easier to apply but also due to practical considerations in relation to the timeframe and scope of the thesis.

It has been pointed out by other scholars that members of initiatives should be involved in evaluations to make them inclusive and participatory (Matthews et al., 2019; Ruckert, 2017). It is argued that in order to accurately determine details about an initiative direct communication is required (Ruckert, 2017). Looking at the T-score variables, especially “process” stands out as the most complex variable as it is based on information that in most cases requires direct interaction to acquire. In other words, the lack of inclusivity in the T-score framework constitutes a significant drawback but it is also the factor that made it possible to include a large number of initiatives.

As stated by Forrest and Wiek (2015) it is important to be able to differentiate transformational and incremental solutions. The T-score framework provides a needed overview of the transformative potential of an entire landscape of STIs due to its operationalizability. Thereby it satisfies the request made by Forrest and Wiek (2015) and can be a helpful tool in identifying which cases to investigate in more detail. Case studies are often chosen randomly and subjectively by researchers and there has been a call for a more systematic approach (Tikkanen et al., 2019) The T-score framework is such an approach as it systematises the initiatives according to their score and provides a solid basis for case study selection.

7.7 Future studies

To add a formative element to the T-score framework the next step from here is to reach out to a diverse selection of initiatives with the T-score as an entry point for dialogue. The purpose of this interaction is to get feedback and thoughts from the practitioners. For example, regarding their perception of the impact of their initiative, transformative potential., and their relation to the “Our transition” campaign. Additionally, case studies could offer a more detailed perspective on which factors and characteristics sets certain initiatives apart and ideally support initiatives in becoming more effective. In this way the T-score framework is recommended as a tool to discover patterns and seeing the bigger picture while case studies can function as a complementary activity to investigate important details.

8 Conclusion

In this thesis the cross-sectional assessment framework “T-score” was successfully developed and applied to a large database of Danish sustainability transition initiatives in order to compare and determine how these initiatives contribute to sustainable development in Denmark. A new assessment framework was deemed necessary due to the identification of several shortcomings within the research field of STI assessment. Shortcomings include a lack of comparison and synthesis across case studies, a focus on process rather than output, and a lack of relevance to actors outside academia. The Framework was developed through a cross pollination of theory and different approaches of existing schemes and frameworks. It focuses on transformative potential by evaluating the vision, proactiveness and radicalism of STIs (disruptiveness) as well as the quality, variety and number of partnerships that they are involved in (collaboration). The underlying assumption is that the degree to which STIs contribute to processes of transformation is determined by a combination of their disruptiveness and collaboration.

The analysis of the initiatives revealed that Danish STIs are represented evenly across all sectors and levels of society albeit with a varying degree of transformative potential. Their activities and contributions are highly influenced by the socio-economic context. Being based in a welfare state with a high standard of living a large proportion of initiatives relate to “advanced” goals such as producing and consuming responsibly (SDG 12) and investing in clean energy (SDG 7) whereas basic goals such as reducing poverty (SDG 2) and gender equality (SDG 5) receives very little attention. In terms of specific activities gardening initiatives, energy renovation projects and services/products are the most frequent STIs.

Approximately one in three of the initiatives are discontinued. In the Civil society sector and private sector most of these are failed projects abandoned because of a lack of support and/or profitability whereas the discontinued initiatives in the government sector, and to a lesser extent NGO sector, are mostly projects that were completed and/or had a predefined expiration date.

The type of initiatives with the highest transformative potential were NGOs followed by government, civil society and then private sector initiatives in the bottom. Especially single-issue NGOs strongly promoting a specific agenda are expected to contribute significantly towards sustainability due to their ability to establish alliances and partnerships in all spheres of society. The most significant impact from government sector initiatives are observed in cases where there is a local administration with a strong will to act and take the lead – in most cases by carrying out ambitious CO2-reduction strategies.

Initiatives rooted in Civil society are the most radical which likely explains why they generally are struggling to establish partnerships. It is predicted that the contribution of civil society initiative would be much larger if they put more emphasis on spreading their ideas and practices although this might risk compromising their integrity.

The reason private sector initiatives have a much smaller transformative impact than the other sectors should partly be explained by how the T-score framework was designed and the strong emphasis it puts on collaboration. This means that the framework is less suited for evaluating private sector initiatives in general and especially those whose contribution consist of spreading sustainable products and services through the market.

Setting aside the need for small adjustments, the T-score framework has proven to be successful in providing an overview of the diverse landscape of Danish STIs. This overview helps identify the most promising solutions to the current sustainability challenges and hence where resources should be prioritised.

To increase the formative potential of the framework It is recommended for future studies to engage in a dialogue with practitioners using the T-score as an entry point. Diving into individual cases is the next step in order to make more detailed findings and add depth and perspective to the T-score results.

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10 Appendix

Table 8: Highest scoring initiatives in the “Our transition” database:

#	Name/title of initiative	Sector	Activity	Search results	T-score
1	Intentionally Wild	NGO	Movement for biodiversity and wilder nature	40000	18
2	Haver til maver	NGO	National schoolgarden project	38200	18
3	Access2innovation	NGO	Platform for business development in Africa	4140	17.5
4	Nordic folkecenter	NGO	Promotes and researches in renewable energy	11700	17
5	Stop wasting food	NGO	Movement against foodwaste	109000	16
6	Projectzero	Government	PPP to create a CO2-neutral community	20200	16
7	Folkeskoven	Private	Planting trees	6230	16
8	Grobund	Civil society	Living- and entrepreneur community	8580	15
9	Blaffernationen	NGO	Promotes hitchhiking	7100	15
10	Samsø financing model	Government	Municipal investment in renewable energy	1470	15
11	Makvärdet	Civil society	Creative hub for transition projects	9220	15
12	Naturmødet	Government	Yearly peoples meeting about the Danish nature	57200	15
13	Kalundborg symbiosis	Private	Symbiotic partnership between 11 companies	7480	14.5
14	Ansvarlig fremtid	NGO	Campaign for divestment	5160	14.5
15	90% organic	Government	Plan to restructure municipal kitchens	12700	14.5