People's Power

Lessons on Influencing Factors from Discontinued Local Energy Initiatives

Master's Thesis

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Abstract

Local energy initiatives (LEIs) promote sustainable energy systems in their regional contexts through the usage of renewable energies and energy saving. Their projects range from the adoption and development of technologies to alteration of energy use practices. Accordingly, the potentials of these bottom-up innovations of LEIs are diverse with regard to energy transitions (such as the *Energiewende*) or innovation and diffusion processes of related products and services. This attracts the interest of policymakers, companies and researchers. Successful mobilisation of these potentials requires a comprehensive understanding of the factors influencing the development of local energy initiatives. Research on these influencing factors has thus far almost exclusively focused on empirical data obtained from continued initiatives. This research gap raises questions regarding the comprehensiveness and robustness of the results. Therefore, this master thesis focuses on discontinued local energy initiatives in order to explore their insights on influencing factors. Qualitative content analysis provides the systematics for the explorative investigation of the empirical data of 16 interviews from six German case studies. The analysis shows that the development of local energy initiatives is particularly influenced by factors of *motivation* and *commitment*, *finances* and *interaction with political actors*. The factors' inhibitory or supportive influence is thereby case- and time-specific. Furthermore, the analysis shows that the discontinuation of LEIs is not monocausal, but is caused by a complex interplay of different factors. The discontinuations of the examined LEIs, however, are above all associated with inhibitory influences of factors related to *interaction with political actors*. Such influences are rarely described in the literature.

Zusammenfassung

Lokale Energieinitiativen (LEIs) setzen sich in ihren regionalen Kontexten für nachhaltige Energiesysteme durch die Nutzung erneuerbarer Energien und Energieeinsparung ein. Ihre Projekte reichen von dem Einsatz und der Entwicklung von Technologien bis zur Veränderung von Praktiken im Umgang mit Energien. Entsprechend divers sind die Potenziale dieser bottom-up Innovationen von LEIs im Hinblick auf Energietransitionen (wie der *Energiewende*) oder Innovations- und Diffusionsprozesse verwandter Produkte und Dienstleistungen. Diese Potenziale wecken das Interesse von Politik, Wirtschaft und Forschung. Für eine erfolgreiche Erschließung bedarf es eines umfassenden Verständnisses hinsichtlich der Faktoren, die die Entwicklungen der lokalen Energieinitativen beeinflussen. Diese Einflussfaktoren sind in wissenschaftlichen Studien untersucht worden, bisher jedoch weitgehend anhand von Fallstudien aktiver Initiativen, wodurch die Ausführlichkeit und Robustheit der Ergebnisse fraglich bleibt. Angesichts dieser Forschungslücke beschäftigt sich diese Masterarbeit mit den Erfahrungen eingestellter Energieinitiativen, um die enthaltenen Erkenntnisse über Einflussfaktoren zu erschließen. Die empirische Grundlage der Studie bilden 16 Interviews aus sechs deutschen Fallstudien. Als Methode für die explorative Untersuchung wird die qualitative Inhaltsanalyse herangezogen. Die Analyse zeigt, dass die Entwicklung lokaler Energie-initiativen besonders durch Faktoren der *Motivation* und des *Engagements*, der *Finanzen* sowie der *Interaktion mit politischen Akteuren* beeinflusst werden. Dabei ist es fall- und zeitspezifisch, ob sich die Einflüsse der Faktoren hemmend oder unterstützend auswirken. Darüber hinaus ergibt die Analyse, dass die Einstellung der LEIs nicht monokausal ist, sondern durch ein komplexes Zusammenspiel unterschiedlicher Faktoren bedingt wird. In den untersuchten Fallstudien wird die Einstellung jedoch vor allem mit hemmenden Einflüssen von Faktoren der *Interaktion mit politischen Akteuren* assoziiert. Solche Einflüsse werden in der Literatur bisher wenig beschrieben.

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List of Abbreviations

BMWi	Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy)
CDU	Christlich Demokratische Union Deutschlands (Christian Democratic Union of Germany)
EEG	Erneuerbare-Energien-Gesetz (Renewable Energy Act)
EEwärmeG	Erneuerbare-Energien-Wärmegesetz (Renewable Heat-Energy-Sources Act)
GI(s)	grassroots innovation(s)
IF(s)	influencing factor(s)
LEI(s)	local energy initiative(s)
LA 21	Local Agenda 21
LU	Lead User
LUM	Lead User Method
MaP	Muli-actor Perspective
MLP	Muli-Level Perspective
NGO	non-governmental organisation
PV	photovoltaic
QCA	qualitative content analysis
RE	renewable energies
RS	research question
SPD	Sozialdemokratische Partei Deutschlands (Social Democtratic Party of Germany)
SWOT	Strength, Weakness, Opportunity, Threat
SUI	sustainable user innovator
SQ(s)	sub-question(s)
The Greens	Bündnis 90 / Die Grünen (Alliance 90 / The Greens)
UI(s)	User innovation(s)

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1 Introduction: Local Energy Initiatives & the Energy Transition

In view of global climate change with far-reaching consequences, the Paris Agreement defines the goal of keeping the average global temperature rise well below 2°C compared to pre-industrial levels. By ratifying the agreement, 187 countries have recognised this goal and committed themselves to making their contributions to achieving it, including Germany (UNFCCC, 2015, 2019). To achieve this goal, a transition to an energy system based on renewable energy is inevitable, as the fossil-fuel bases system is responsible for the main part of global emissions of climate-damaging greenhouse gases (Ram et al., 2018). This transition requires immediate and decisive action, jointly taken by policy-makers, business and civil society at local and global level (Loorbach, 2007; Ram et al., 2018; Rotmans, 2017). International agreements such as the 1992 Agenda 21 and the 2015 Paris Agreement highlight the importance of civil society participation in the energy transition (UNCED, 1992; UNFCCC, 2015). At the national level, taking Germany as an example, the Federal Government highlights the contributions of civil society as indispensable for the national energy transition *Energiewende* and promotes these top-down through policies such as the Renewable Energy Act (BMWi, 2019b; EEG, 2017). Civic participation in the bottom-up implementation of the German energy transition is high and in 2017 the largest share of 32% of the total electricity from renewable energies was produced by private people (Figure 2) (AEE, 2019b; Beermann & Tews, 2017).

> "'The demise of the stone age was caused not by a lack of stones, but by the better alternatives that presented themselves'"
>
> Jeroen van der Veer, former CEO Shell Oil (cited in: Rotmans, 2017, p. 65)

But contributions of civil society actors go beyond the production of renewable energies and comprise socio-technical innovations ranging from the development of new sustainable products and services, through innovative configurations of existing technologies and adaptation to local needs, to novel local organising, value creation and empowerment or social acceptance for renewable energy projects (cf. Bergman & Eyre, 2011; Brummer, 2018; De Vries et al., 2015; Hyysalo & Juntunen, 2018; Nielsen et al., 2014; Pieper, 2018; Schoor et al., 2016; Seyfang & Smith, 2007). However, the numbers of energy initiatives are currently declining and the expansion of renewable energies is stagnating in Germany, which is associated with public acceptance, among other factors (AEE, 2019a; DWG, 2019; Wierling et al., 2018).

To understand which conditions and processes enable successful civil participation and mobilisation of embodied sustainability potentials, researchers explore factors that influence the development of energy initiatives (Boon & Dieperink, 2014; Feola & Nunes, 2014; Hyysalo & Juntunen, 2018; Pieper, 2018; Seyfang et al., 2013; Wüstenhagen et al., 2007). A comprehensive understanding of such influencing factors (IFs) can assist practitioners and supporting actors in their strategy- and action-planning (Boon & Dieperink, 2014; Feola & Nunes, 2014; Seyfang et al., 2013). These factors can be grouped into six clusters (1) Intern: factors such as motivation, expertise or internal cooperation; (2) Project: financing, legal form of the initiative or project location; (3) Community Sector: community acceptance or cooperation with community actors; (4) State Sector: policies or cooperation with political actors; (5) Market sector: energy prices or cooperation with market actors; and (6) Third Sector: networks or cooperation with third sector actors.

It should be noted that thus far, research has almost exclusively focused on empirical data obtained from active, and therefore somewhat successful initiatives. This research gap raises questions regarding the comprehensiveness and robustness of the understanding of influencing factors (Boon & Dieperink, 2014; Feola & Nunes, 2014; Nielsen et al., 2016; Ornetzeder & Rohracher, 2013). Reasons given for this bias in favour of research on continued ("successful") initiatives range from descriptions of the practical difficulty of attracting discontinued ("unsuccessful") initiatives for these studies, to best practice approaches aimed solely at scaling and replicating success cases (Boon & Dieperink, 2014; Brix, 2015; Haggett et al., 2013; Hoppe et al., 2015; Ornetzeder & Rohracher, 2013)

This thesis focuses on discontinued local energy initiatives (LEIs), in order to address this research gap and contribute to successful mobilisation of LEIs' sustainability potentials by enhancing the understanding of factors influencing their development. Thereby, the research has the twofold ambition of exploring the unknown and comparing the known. Firstly, to create a space for discontinued LEIs to share their lessons, to learn about factors critical for LEIs' discontinuation and to explore possibly undiscovered influencing factors. Secondly, to compare results from research on discontinued LEIs with those of continued ones described in the literature, in order to enhance robustness and comprehensiveness of our understanding of influencing factors. The following research question and three sub-questions guide the thesis:

Research question:

What can we learn from discontinued local energy initiatives regarding factors influencing their development?

Sub-questions:

SQ I	- Which factors stimulated or hampered the development of the discontinued LEIs?
SQ II	- Which influencing factors led to the discontinuation of the LEIs?
SQ III	- Do these empirical results expand the previous understanding of IFs derived from continued LEIs?

In order to address the outlined research gap by answering the presented research questions, the thesis builds on an interpretive methodology and follows a qualitative case study approach (Flyvbjerg, 2006; Haverland & Yanow, 2012; Yin, 2014). The power of people through bottom-up innovations is the focus of two research fields which form the theoretical foundation of the study, namely user innovation (UI) research (Lüthje & Herstatt, 2004; von Hippel, 1988) and grassroots innovation (GI) research (Seyfang et al., 2013; Seyfang & Smith, 2007). Combined, notions and knowledge of the two research fields illustrate the socio-technical innovation spectrum and are therefore suitable for the study of local energy initiatives with their diversity of innovations (Bergman et al., 2010; De Vries et al., 2015). The empirical data on six discontinued local energy initiatives are collected in 16 interviews, which follow narrative and semi-structured interview methods in order to create the desired explorative space as well as to ensure comparability of the data (Loch & Rosenthal, 2002; Longhurst, 2003; Wengraf, 2001). A qualitative content analysis approach provides the systematics for structuring and coding the interviews (Kuckartz, 2012; Mayring, 2014; Schreier, 2012).

Individual and cross-case analyses reveal that factors of internal motivation and commitment, financial factors, and above all, factors of interaction with political actors influence the development of local energy initiatives. These influences can be stimulating, but are also associated with the discontinuation of local energy initiatives. However, the discontinuation is not monocausal but triggered by a complex interplay of various factors. The influences of factors are thereby time- and case-specific. This means that the same factor can have both inhibitory and supportive influences depending on the case and time or even simultaneously. A comparing analysis shows that results of the present study on discontinued LEIs are largely consistent with those of continued LEIs studied and described in the literature thus far. However, some of the factors that are identified in this study as particularly influential and associated with the discontinuation of LEIs are hardly discussed in the literature.

The introductory Chapter 1 defines LEIs as an object of research and locates them within the literature and the energy transition. Chapter 2 elaborates the theoretical background before Chapter 3 introduces the research methodology. Chapter 4 presents three in-depth case analyses that give first empirical insights regarding the research questions. Chapter 5 answers the research questions by first (5.1) synthesising the results of all individual case analyses in a comprehensive cross-case analysis to answer the sub-questions I & II; and then (5.2) comparing these results with the results of studies on continued LEIs described in literature to answer sub-question III. Chapter 6 summarises the thesis and completes it with final conclusions to answer the research question.

1.1 Transitions Research and the German Energiewende

A transition is a process in which a system fundamentally transforms (Rotmans et al., 2001). These shifts are nonlinear and materialise over periods of a generation and more (Loorbach et al., 2017; Rotmans et al., 2001). An ongoing and well-known example is the current energy transition, which challenges "existing dynamically stable configurations facing persistent sustainability challenges, and [they] present[s] opportunities for more radical, systemic, and accelerated change." (Loorbach et al., 2017, p. 600). In the 1990s the field of sustainability transitions[3] research emerged which enjoys a growing scientific and public interest (Loorbach et al., 2017). Questions about how and why historical, current and future transitions come, came and will come about, as well as the implications for practice and governance approaches (such as transition management (Loorbach, 2007, 2010; Rotmans et al., 2001)) are at the heart of this interdisciplinary field of research (cf. Grin et al., 2010; J. Hoffman & Loeber, 2016; Loorbach et al., 2017). The *Multi-Level Perspective* (Rip & Kemp, 1998) is widely applied in transition research to analyse socio-technical system changes (Kemp & Rotmans, 2004). Therefore, the next subsections introduce the *Multi-Level Perspective* and present an accordingly conducted system analysis of the German energy transition.

1.1.1 Multi-Level Perspective

The Multi-Level Perspective (MLP) as introduced by Rip & Kemp (1998) is one the central concepts in transition studies. Over the years scholars criticised[4] it, refined its notions and developed expanding concepts (Avelino & Wittmayer, 2016; Geels & Schot, 2007; Loorbach et al., 2017). The MLP distinguishes three levels of a system, namely landscapes, regimes, and niches.

Landscapes, or the macro-level, encompass the natural environment, infrastructure settings such as cities but also political culture, social values or worldviews. Within the system they evince the highest structuration of activities in local practices and the slowest changes in transitions (cf. Geels, 2002; Grin et al., 2010; Rip & Kemp, 1998; Rotmans et al., 2001). **Regimes**, or the meso-level, are the dominant institutions and practices guiding private action and public policy. Cultures and routines, as well as their embodiment in structures and organisations build the regime. Characteristics of regimes are dynamics seeking reinforcement and preservation (such as optimisation of the status quo), and a medium structuration of activities in local practices, which can lead to an initial rejection of transition dynamics up to a

[3] Sustainability transitions are those transitions leading to more sustainable systems (Loorbach et al., 2017)

[4] Critics such as neglect of agency or how to apply the three analytical levels empirically (Berkhout et al., 2004), bias towards bottom-up change model or epistemology and methodology (Geels, 2011)

certain point followed by support (cf. Geels, 2002; Grin et al., 2010; Loorbach et al., 2017; Rip & Kemp, 1998; Rotmans et al., 2001). **Niches** are places of innovative socio-technical practices, deviating from dominant regimes. They are considered protected spaces[5] allowing for experimentation and learning necessary for radical innovations to emerge. Niches are characterised by low structuration of activities in local practices and in transitions they change quickly or even trigger related shifts (cf. Geels, 2002; Grin et al., 2010; Loorbach et al., 2017; Rip & Kemp, 1998; Rotmans et al., 2001; von Hippel, 1988). Figure 1 illustrates these three levels sorted by their degree of structuring, as well as transitions pathways over time.

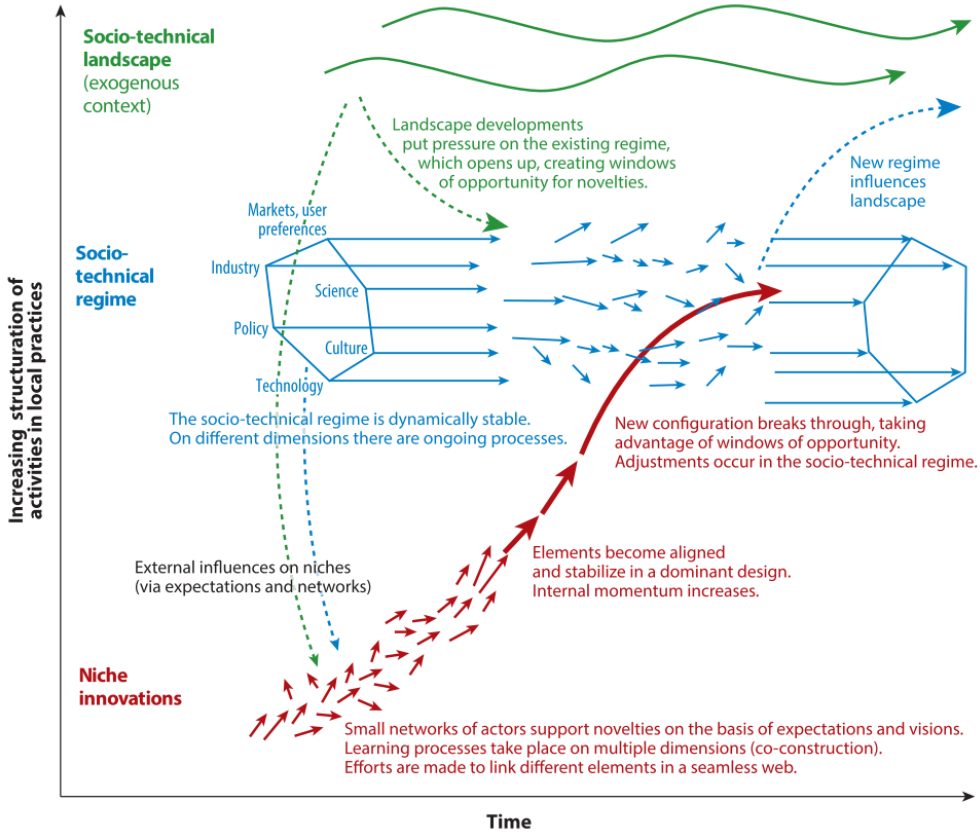


Figure 1: Dynamic Multi-Level Perspective on transitions (Loorbach et al., 2017, p. 606)

Transitions are characterised by parallel fast and slow developments and mutual coherent changes in institutions and practices inevitably entrenched in multiple layers of society and culture. Thus transitions "are very complex and comprehensive phenomena" (Grin et al., 2010, p. 3). Thereby transitions involve a wide range of actors (Markard et al., 2012). The transitions pathway outlined by Geels and Shot (2007) and illustrated in Figure 1 can be perceived as simplified and ideal-typical: "(a) niche-innovations build up internal momentum, through learning processes, price/performance improvements, and support from powerful groups, (b)

[5] Protection as afforded through e.g. acceptance of uncertainty and initially low expectation of product performance (Nielsen et al., 2016; Rogers, 1995) lead markets, subsidies, cultural milieus of early adoption and experimentation (Smith et al., 2010, p. 440)

changes at the landscape level create pressure on the regime and (c) destabilisation of the regime creates windows of opportunity for niche-innovations. The alignment of these processes enables the breakthrough of novelties in mainstream markets where they compete with the existing regime" (Geels & Schot, 2007, p. 400). Wars, major accidents (e.g. Chernobyl, Fokushima) or economic shocks (e.g. oil or economic crisis) are examples for landscape changes that can open *windows of opportunity* for transitions (Geels, 2002, p. 1262; Kemp & Rotmans, 2004).

1.1.2 Energiewende – the German Energy Transition

Energiewende stands for the transformation of the German energy market away from nuclear and fossil fuels towards renewable energies and more energy efficiency (BMWi, 2019b). The BMWi (2019b) emphasises that the *Energiewende* is a "Gemeinschaftsaufgabe", a joint task that can only be realised in cooperation of actors from state, market and civil-society. Due to this vision and the aspired goals Germany was referred to as an example and frontrunner in energy transition (Beermann & Tews, 2017; Edens & Lavrijssen, 2019; Moss et al., 2015; Rotmans, 2017). However, currently daily media discussions about missed climate targets, the federal government's recently passed climate package or debates about a delay for the coal phase out as well as thousands of people protesting with *Fridays for Future* or *Extinction Rebellions* on German streets for appropriate climate protection, indicate that this image is changing (cf. ARD, 2019; Dlf, 2017, 2019; HR iNFO, 2019; Zeit online, 2019).

The nuclear disaster of Chernobyl in 1989 is stated as one of the early events at the landscape level that influenced the course of the *Energiewende*. This was, just like the nuclear disaster in Fukushima in 2011, catalyst for the demands of the anti-nuclear movement dating back to the 1970s and has accelerated the transition regarding the phase out of nuclear power (LPB 2019; Oteman et al., 2014; Wierling et al., 2018). Furthermore, the UN Conference on Environment & Development in Rio 1992 which resulted in the Agenda 21. This brought environmental issues and their perception on the global agenda and illustrated the link to the local level (UNCED, 1992; Wittmayer et al., 2016). Climate change and related public debates and protests are current developments on the landscape level that are influencing regime and niche level and can be expected continue doing so (Geels et al., 2018).

At the beginning of the energy transition the German energy regime was dominated by few actors. Diversification only began after the electricity market was liberalised in 1998 and the Renewable Energy Act (Erneuerbare-Energien-Gesetz, EEG) was enacted in 2000. In the aftermath electricity from renewable energies has risen sharply (AEE, 2019c; Trend:Research & Leuphana Universität Lüneburg, 2013). Germany's current energy regime counts more than

450 electricity providers, but is dominated by "the big four" E.ON, Vattenfall, RWE and EnBW (AEE, 2019c; Mignon & Rüdinger, 2016). The big four's share in production of renewable electricity was 5% in 2017 (see Figure 2). In the German system policy targets are set on federal level, however, implementation is decided on state or municipal level, by e.g. wind zoning plans, subsidy schemes and their like (Oteman et al., 2014). Despite a wide public support for the *Energiewende* in general, local acceptance of renewable energies (RE) projects is a critical issue in this context (Süsser et al., 2017; Zoellner et al., 2008). Acceptance and participation of non-market actors are the subject of the EEG. Until 2017 this had guaranteed everyone a fixed feed-in tariff for its fed-in energy for 20 years. The Act was then changed for a volume-based auction scheme, in which the level of support is determined in a competitive bidding process (Beermann & Tews, 2017; BMWi 2019a; EEG, 2017; Wierling et al., 2018).

The fixed feed-in tariff had an effect of an initial niche protection (Beermann & Tews, 2017). It sparked a far-reaching involvement and contribution of niche actors such as local energy initiatives, what Beermann & Tews (2017, p. 125) call "one of the most striking features of the country's energy transition process." Germany has a long tradition in cooperative organisation, dating back to 1920s (Oteman et al., 2014; Wierling et al., 2018). The analysis of LEIs in Germany by Oteman et al. (2014) exhibits that PV cooperatives and wind cooperatives (Bürgerwindparks) are the most successful and prominent examples of energy related civil participation in Germany. The first, more successful in number of initiatives and the second, in terms of installed capacity (Oteman et al., 2014). In 2017, 32% of the electricity produced from renewable energies came from privately owned production - four times more than "the big four" and double the combined contributions of utility companies (see Figure 2). But contributions of niche initiatives go beyond their production of renewable energies. Their innovative approaches alter or replace dominant institutions and practices, which makes LEIs active participants in the energy transition (cf. Centgraf, 2018). However the volume-based auction scheme introduced with the EEG amendment in 2017, threatens their existence and continuing contribution to the energy transition (Beermann & Tews, 2017; Markard, 2018). Wierling et al. (2018) elaborate this statistically, showing that in the aftermath of Fukushima, numbers of energy cooperatives in Germany have sharply risen to 800 in 2014. In the following four years this number grew only insignificantly to a total of 824 in 2018, revealing statistical correlation with supportive policies (Wierling et al., 2018).

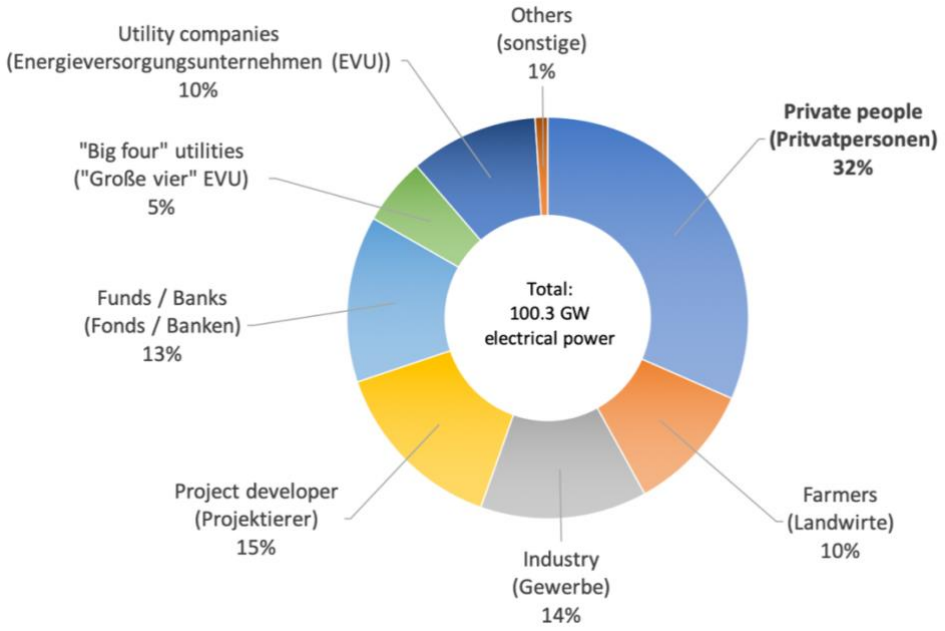


Figure 2: Germany-wide installed renewable electricity generation capacity per owner in 2017 (own illustration, data from (AEE, 2019b)

1.2 Local Energy Initiatives as Research Subject

Local energy initiatives (LEIs) in which actors from civil-society locally contribute to improving energy systems in terms of sustainability are the focus of this master thesis. These LEIs are actors within the introduced niche, attributed as change agents and models for replication and scaling-up in the energy transition (Centgraf, 2018). Accordingly these LEIs embody civil society engagement, which the BMWi (2019b) highlights as indispensable for the joint transition project "Energiewende". Terms for, and definitions of such civil society initiatives in the energy transition change depending on the research perspectives and scientific traditions. Therefore, the next subsection introduces the definition of local energy initiatives used in this thesis. The subsequent subsection locates the LEIs in the literature context and deduces the research gap.

1.2.1 Definition of Local Energy Initiatives

In this thesis local energy initiatives (LEIs) are framed as bottom-up innovations in terms of the *locus* of the innovation, referring to innovations that are not generated by business, industry or government, but civil society (Bergman et al., 2010). Within the introduced multi-level perspective, such bottom-up innovations are niche actors (Aiken, 2015; Rogers, 1995; Tang et al., 2011). The *Multi-actor Perspective* (MaP) is helpful for a clear definition, as it differentiates between actors at the individual and organisational level, as well as between four sectors, namely state, market, community and third sector (Avelino & Wittmayer, 2016). The following figures illustrate the four sectors and their respective actors on the individual and organisational

level (see Figure 3). LEIs are therefore framed as bottom-up innovations in which actors from the community and third sector engage[6] - in their individual roles such as community member, user, volunteer or activist – individually or in organisations such as community groups, cooperatives or associations.

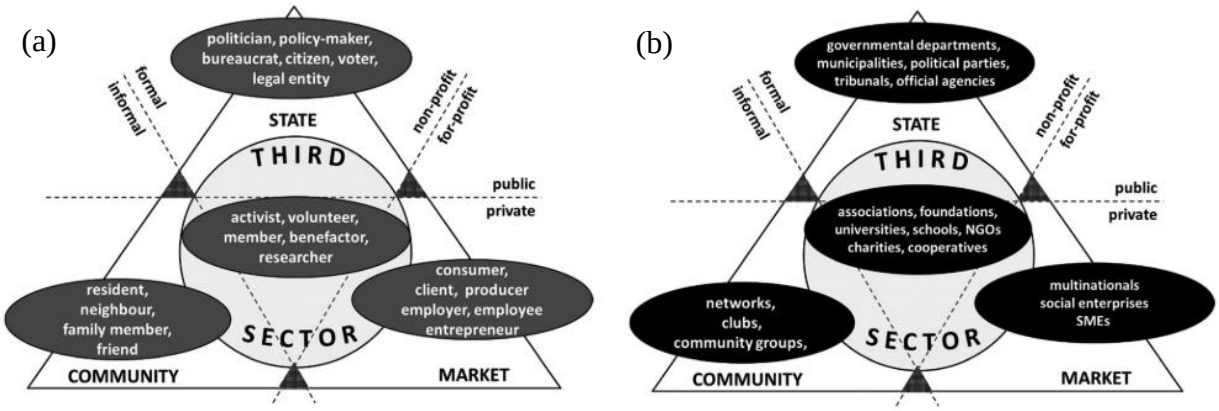


Figure 3: Actors in the MaP on the (a) individual and (b) organisational level (Avelino & Wittmayer, 2016, p. 637)

Furthermore, LEIs are in this thesis defined by their engagement in one or more of the three areas[7] (1) reduction of greenhouse gas emissions, (2) utilisation of renewable energies, or (3) improvement of energy efficiencies. This thesis focuses on "local" energy initiatives for the term's explicit spatial reference that contrasts "global" in terms of scale (Aiken, 2015). However distinct in scale, are the two mutual embedded and closely entangled as "[…] production of, and responsibility for, environmental bads [.]" lay within localities – and thus their "solutions". This interrelation is expressed in the popular slogan "Think Global, Act Local" (Aiken, 2015, pp. 764–765). In contrast "community" can not only encompass both, global and local, but also exceeds spatial reference and according to Aiken (2015, p. 766), "[…] can be seen as either a collective whole, as the aggregate of a collection of individuals, or as a particular collection, small-scale or area."

1.2.2 LEIs in the Literature & Research Gap

In their endeavours for a more sustainable energy system, LEIs appear in various forms of initiatives encompassing e.g. locally-owned renewable energy generation, refurbishment of local buildings, or collective behaviour change programmes (Seyfang et al., 2013). Rarely these initiatives focus on a single technology or behavioural aspects isolated, but are rather multi-faceted and combine different measures, technologies and approaches for more holistic interventions in the aspiration for a more systemic change (Hielscher et al., 2013). On a socio-

[6] in contrast to state and market

[7] the building blocks of the 2030 Climate and Energy Policy Framework by the European Council (European Council, 2014).

technical spectrum of innovations as illustrated in Figure 4, local energy initiatives' endeavours cover the full spectrum (Brummer, 2018; De Vries et al., 2015). Researchers study LEIs from various scientific perspectives regarding their contributions ranging from (1) novel local organising, value creation and empowerment, or social acceptance for renewable energy projects to (2) innovative configurations of existing technologies and adaptation to local needs to (3) the development of new sustainable products and services (cf. Bergman & Eyre, 2011; Berka & Creamer, 2018; Brummer, 2018; De Vries et al., 2015; Hyysalo & Juntunen, 2018; Nielsen et al., 2014; Pieper, 2018; Schoor et al., 2016; Seyfang & Smith, 2007; van der Waal et al., 2018)

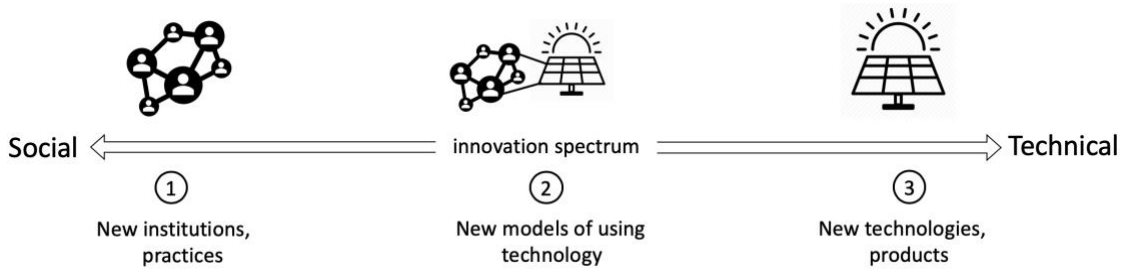


Figure 4: Socio-technical spectrum of innovations
(own illustration based on: Bergman et al., 2010)

Researchers explore the factors influencing the development of LEIs to understand which conditions and processes enable successful civil participation and mobilisation of embodied sustainability potentials (Boon & Dieperink, 2014; Devine-Wright et al., 2009; Feola & Nunes, 2014; Hyysalo & Juntunen, 2018; Pieper, 2018; Seyfang et al., 2013; Wüstenhagen et al., 2007). A comprehensive understanding of factors that influence the development of LEIs can assist practitioners and supporting actors (intermediaries, policy-makers, researchers, companies) in their strategy- and action-planning (Boon & Dieperink, 2014; Feola & Nunes, 2014; Seyfang et al., 2013).

Researchers indicate that these previous studies commonly draw their conclusions from empirical data obtained from continued, hence somehow successful initiatives. They point to questions this research gap imposes regarding the comprehensiveness and robustness of the hitherto understanding of influencing factors (Boon & Dieperink, 2014; Feola & Nunes, 2014; Nielsen et al., 2016; Ornetzeder & Rohracher, 2013; Sovacool, 2014). Rationales for this bias towards analysing success cases are of different nature, as scholars indicate practical difficulties to mobilise discontinued ("failed") cases for research or point to notions of "best practices" aiming at scaling and replicating success cases (Boon & Dieperink, 2014; Brix, 2015; Haggett et al., 2013; Hoppe et al., 2015; Ornetzeder & Rohracher, 2013; Sovacool, 2014). Turnheim &

Sovacool (2019) recently presented a synthesis of these rationales in a typology[8] of biases towards success cases, namely (1) selection bias, (2) cognitive bias, (3) interpretative bias, and (4) prescription bias (Turnheim & Sovacool, 2019). Furthermore, local energy initiative's approaches to socio-technical innovations are experimental and an important aspect of such processes is, to learn from setbacks (Haggett et al., 2013; Sekulova et al., 2017; Seyfang & Smith, 2007). In this context, Hagget et al. (2013) highlight that also sharing their "failures" is an important source of learning and for empowerment for LEIs and quote the following:

> "'Stories of moments of failure were not disempowering. Rather they are informative. […] If all the rough edges have been polished groups don't realise the real struggle of getting that energy project complete'"
>
> (Community energy project member cited in Haggett et al., 2013, p. 11)

Against this research gap authors call for the exploration of discontinued cases to balance the bias and to thereby reveal the undiscovered lessons and to ensure comprehensiveness and robustness regarding our understanding of factors influencing local energy initiatives' developments (Boon & Dieperink, 2014; Feola & Nunes, 2014; Haggett et al., 2013; Nielsen et al., 2016; Ornetzeder & Rohracher, 2013; Sekulova et al., 2017; Seyfang & Smith, 2007)

1.3 "People's Power"

People have the power to transform the energy system. As outlined above this can be argued in all its meanings. This thesis builds on this notion and seeks to contribute to mobilising the sustainability potentials embodied in local energy initiatives' civil participation. The next subsections introduce the accordingly designed research questions, research approach and thesis structure.

1.3.1 Research Question

Against the outlined research gap this thesis puts discontinued local energy initiatives (LEIs) in the focus. Thereby the research has the twofold ambition of exploring the unknown and comparing the known. Firstly, to create a space for discontinued LEIs to share their lessons, in order to learn about factors critical for LEIs' discontinuation and to explore possibly undiscovered influencing factors. Secondly, to compare results from research on discontinued LEIs with those of continued ones described in the literature, in order to enhance robustness

[8] They build their typology on a comprehensive and critical review of various literatures including, among others, innovation studies, science and technology studies, organisation studies, and transition studies (Turnheim & Sovacool, 2019).

and comprehensiveness of our understanding of factors influencing LEIs' developments. These ambitions are framed in an overarching research question containing three sub-questions:

Table 1: Research questions (own illustration)

Research question:	
What can we learn from discontinued local energy initiatives regarding factors influencing their development?	
Sub-questions:	
SQ I	- Which factors stimulated or hampered the development of the discontinued LEIs?
SQ II	- Which influencing factors led to the discontinuation of the LEIs?
SQ III	- Do these empirical results expand the previous understanding of IFs derived from continued LEIs?

1.3.2 Research Approach

In order to address the outlined research gap by answering the presented research questions, the thesis builds on an interpretive methodology and follows a qualitative case study approach (Flyvbjerg, 2006; Haverland & Yanow, 2012; Yin, 2014). A structured literature review comprising the two fields of user innovations literature and grassroots innovation literature lays the theoretical foundation and informs the further research process. The literature findings regarding factors influencing LEIs developments are synthesised in a framework which is operationalised for the preparation of an interview protocol and for the data analysis. The Lead User Method (LUM) is applied to identify the cases (Lüthje & Herstatt, 2004). Empirical data on discontinued LEIs are then collected in face-to-face interviews and enriched and reflected with secondary data. The interviews start with a narrative part that creates the aspired explorative space (Andrews et al., 2008; Loch & Rosenthal, 2002). A subsequent semi-structured interview part allows for the striven data comparison (Longhurst, 2003; Wengraf, 2001). Thereby the research aims for a comprehensive and differentiated view on the cases and the potentially sensitive events by interviewing both, former members of the discontinued LEIs and external key actors they interacted with. A qualitative content analysis approach provides the systematics for structuring and coding the interviews, carried out with the software Atlas.ti (Kuckartz, 2012; Mayring, 2014; Schreier, 2012). In order to answer SQs I & II individual case analyses are elaborated for every studied local energy initiative (LEI) and the results synthesised in a cross-case analysis (cf. Kuckartz, 2012; Schreier, 2012; Yin, 2014). An analysis comparing these empirical results with the literature findings provides answers regarding SQ III.

1.3.3 Thesis Structure

Chapter 1 provides an overview of the research by: framing the energy transition context with a system analysis (1.1); defining the research subject "local energy initiatives" and locating it in the energy transition context as well as the literature (1.2); elaborating the research gap and introducing derived research questions and approach (1.3). Chapter 2 outlines the theoretical background building on grassroots innovation literature (2.2) and literature (2.3). Section 2.4 presents a synthesis and framework of factors that influence LEIs' developments. The research methodology with collection (3.1) and exploration (3.2) of the empirical data is introduced in Chapter 3. For initial answers to the research question and the sub-questions I & II, Chapter 4 illustrates detailed case analysis for three cases. The discussion in Chapter 5 presents a cross-case analysis (5.1) answering sub-question I & II, and a comparison with literature findings (5.2) answering sub-question III. The discussion in Chapter 6 summarises the research, answers the overarching research question, and outlines recommendations (6.2) for local energy initiatives and supporting actors.

2 Theoretical Background: Two Perspectives at Bottom-Up Innovations

Civil participation in sustainable development in general, and energy related topics in particular, has attracted interest of practitioners, scholars and policy makers (Hossain, 2018; Middlemiss & Parrish, 2010; Mignon & Rüdinger, 2016; Smith et al., 2016; Wierling et al., 2018). Two fields of research dealing with contributions of civil-society actors are grassroots innovations (GIs) and user innovations (UIs). Both see a locus for innovations outside of the market and state sectors, in civilians and their roles as community members, users, volunteers, etc. (Bergman et al., 2010) which corresponds with the framing of this thesis of LEI as bottom-up initiatives (see 1.2.1). On a socio-technical spectrum of innovations (Figure 4), UI research focuses on technical innovations, whereas GI research tends towards the social, non-technical end of the spectrum (Bergman et al., 2010; De Vries et al., 2015; cf. Ross et al., 2012). Hölsgen et al. (2018, p. 1) argue that a successful transition to a sustainable energy system requires both, technical and social innovations and the BMWi (2019b) calls for participation of actors from state, market and civil society. These political ambitions form the institutional frame for the *Energiewende*, in which the regime, however, is changing only slowly (including market structures and actors, i.e. utilities, but also routines, i.e. consumer habits, as outlined in 1.1). It is then often the bottom-up innovations from civil society that fill the emerging institutional voids (cf. Hajer, 2003; Kooij et al., 2018; Smith & Raven, 2012). In the context of transition research, GIs are frequently studied as niche actors. For UIs, however, this is new (Nielsen et al., 2016). While UI research is arguably more concerned with influencing factors related to the involved individuals and project, GI research reveals influencing factors related to the initiative's context, to group- and interaction dynamics.

Both research strands study LEIs, but so far largely separately. This results in research "silos" in which potentially mutual benefits remain untapped (Hyysalo et al., 2013; Nielsen et al., 2016, p. 75; Seyfang et al., 2013). These silos, as well as the paucity of coherent theoretical perspectives, stem from differing research traditions (Nielsen et al., 2016). Aiming to bridge this gap, this thesis follows De Vries et al. (2015) example and appeal by building on both, user innovations as well as grassroots innovation research. In the following, the two fields of research are introduced and consideration of LEIs and influencing factors in each field are outlined. This is followed by a comprehensive list of influencing factors and a thereof derived framework which builds the basis for the current research project.

2.1 Review Approach

The literature review forms the basis of this thesis. The results of the review are crucial for the progress of the research since they are the starting point for preparing the interview protocol or the analytical framework. Thus, a transparent and structured approach was chosen to ensure traceability. The procedure is described in the following.

In a first step, publications of the most active authors (in terms of number of publications) in the two research fields served as an entry point. In UI research these authors are E. von Hippel and C. Herstatt (see 2.3); in GI research G. Seyfang and A. Smith (see 2.2). Secondly, on the basis of these first insights (also in terms of terminology) a broad search query for the Scopus database was developed regarding the research topic. Scopus was chosen over Google Scholar, as its features are better suited for targeted transparent and structured searches. It further benefits from a focus on peer-reviewed publications, thereby ensuring quality. Lastly, Scopus has a larger database than other databases, such as Web of Science (Bauschmann & Ahnert, 2017; James & Griffiths, 2016). The logic and structure of the search query is illustrated in Table 2, the full search query can be found in appendix 8.1.

Table 2: Literature search query (own illustration)

Research subject	**Derived search query**
Local Energy Initiatives	Local* OR communit* OR "civil society" OR initiativ* OR user* OR niche OR cooperat* OR co-op* OR associat*
Field of LEIs' activity	renewabl* W/2 energ* OR "energy transition" OR efficienc* OR sav* OR "climat* chang*" OR sustainab* OR carbon OR (reduc* AND (emission* OR CO2 OR greenhous W/2 gas*)
Influencing factors	influen* W/5 (aspect* OR factor*) OR challeng* OR opportunit* OR threat* OR driver* OR barrier* OR motivation* OR stimulat* OR hamper* OR elicit* OR problem* OR fail* OR difficult* OR *succes* OR *condition*
Field of research	grassroot* OR innovation* OR transition*

As a third step, the search was conducted on 4th April 2019 and revealed that 1091 documents contained the searched word combination in their title, abstract and keywords. The search query was phrased broadly to enable a comprehensive literature review; This resulted in the large number of matches, of which, correspondingly, a large part could be excluded as irrelevant after screening title and abstract. In this fourth step, 82 documents were integrated into the used literature administration program Mendeley for further analysis. Reviewing these selected documents was the final step in the process, whereby relevant sources from their reference lists were additionally included to enhance the theoretical foundation. The influencing factors and framework which are presented in the following, are based on 68 documents.

2.2 Grassroots Innovation Research

An analysis of Scopus results for the search “grassroot innovations” in title, abstract and keywords reveals that G. Seyfang and A. Smith are by far the most active GI researchers in numbers of publications. Figure 5 shows that 19 and 17 documents of these two authors are listed, followed by other authors with six and less documents. In addition, the overlaying figure in the lower right illustrates the number of GI publications over time, showing that the first relevant document was published in 1997. After a period of six years without further publications, a small number of documents were published between 2003 and 2007. A steep increase in publications can be seen from 2008, with a peak of 34 related papers in 2018.

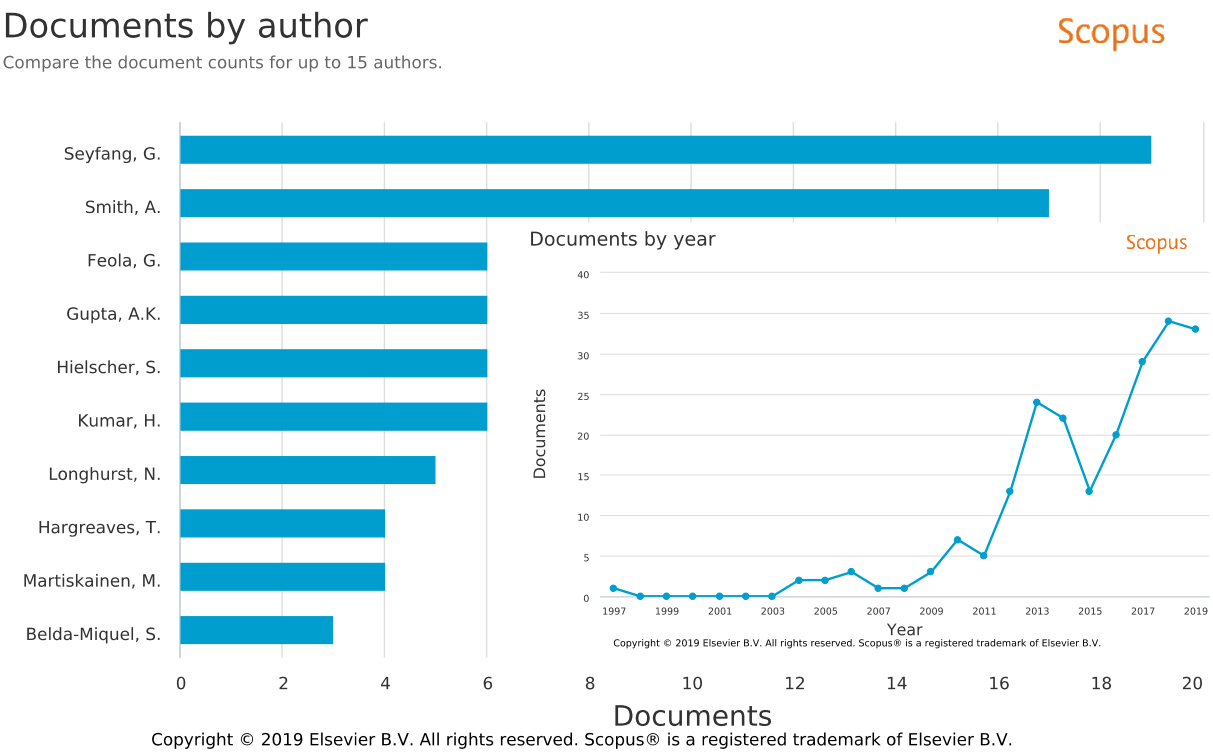


Figure 5: Grassroots innovation publications by author and by year

The most frequently referred to definition (Hossain, 2016) of grassroots innovations is the one by Seyfang & Smith (2007, p. 585) who “[…] use the term ‘grassroots innovations’ to describe networks of activists and organisations generating novel bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to mainstream business greening, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovations as well as using greener technologies.” Gupta (2003), author of the afore mentioned first GI document from 1997 and founder of Honey Bee Network, speaks in this context about the social and ethical capital of society.

Bergman et al. (2010, p. 5) are in agreement with this, defining such bottom-up innovations by the locus of the innovation as "[…] generated by civil society (individual citizens, community groups, etc), rather than government, business or industry". Furthermore, they place grassroots innovations on the social and non-technical innovations end of the socio-technical spectrum, as opposed to the technological innovations end of the spectrum (Bergman et al., 2010). According to Hossain's (2016) systematic literature review, scholars agree, despite variations of additional details in their definitions, that grassroots innovations are bottom-up approaches to sustainable development. Against the background of aspired sustainability transitions, it is their potential for sustainable development (though regularly contested (Hossain, 2018)) that draws attention of researchers, policy makers and practitioners to grassroots innovations (Ornetzeder & Rohracher, 2013; Smith et al., 2016). Seyfang et al. (2013) see the embeddedness of the LEIs in their local communities as key in leveraging this potential. Thereby, GI initiatives organise in various forms i.e. as cooperatives, voluntary associations and informal community groups (Ornetzeder & Rohracher, 2013) and can mainly be found in the five sectors of: community energy, community currency, organic food, cohousing, and agriculture (Hossain, 2018).

2.2.1 LEIs in Grassroots Innovation Research

As Hossain's (2018) systematic review reveals, GIs have widely dealt with energy related topics. This can also be seen from a Scopus analysis on GI literature (Figure 6), according to which 8% of the publications are directly related to energy issues. In addition, the engineering (8%) and environmental science (20%) related publications potentially deal with issues relevant in the context of LEI. Notably, the majority of GI publications (24%) are concerned with themes of social sciences.

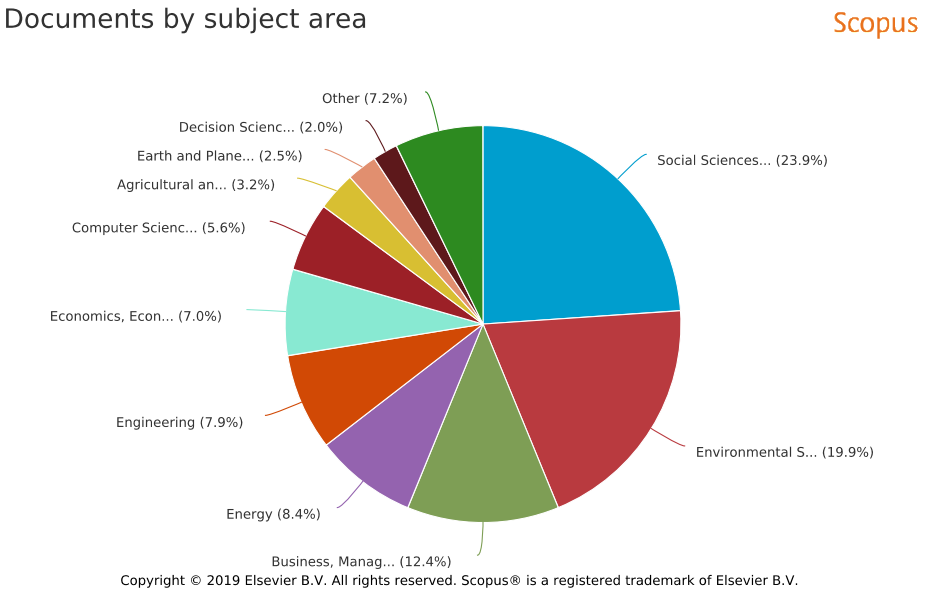


Figure 6: Grassroots innovation publications by subject area

In GI literature, local energy initiatives (LEI) are indicated as examples of initiatives that aim for a more sustainable energy system (Seyfang et al., 2013). To this end, LEIs are involved in various projects, including production, distribution or purchase of renewable energy, retrofitting, or reduction of their own energy consumption or that of others (Oteman et al., 2014; Smith et al., 2016). In their aspiration for a more systemic change, LEI endeavours are rather multi-faceted, combining different measures, technologies and approaches to achieve more holistic interventions. LEIs unite groups of different backgrounds on the basis of a common purpose, thereby managing to overcome structural limitations often faced by individualistic endeavours. Therein lies the potential of LEI to bring required changes in not only the technical and infrastructural, but also social, cultural and economic context. This enables more sustainable lives and practices (Hielscher et al., 2013). Walker & Devine-Wright (2008) propose a typology in which projects are classified according to *characteristics of their processes and outcomes*. In this typology, grassroots innovation projects are characterised by open and participatory processes (opposing closed and institutional) and local and collective project outcomes (opposing distant and private).

2.2.2 Influencing Factors in Grassroots Innovation Literature

Various GI publications describe factors that influence the development of GIs, (Hossain, 2018; Sekulova et al., 2017; Seyfang et al., 2013) which reflects in the synthesis of factors in Section 2.4. The influencing factors and the depth at which they are described, vary depending on the research question, approach and analytical lens. In the following, two studies on influencing factors are outlined, which serve as a starting point for synthesising influencing factors as basis for this research. The studies were selected due to their comprehensiveness in terms of conducted literature reviews, subsequent further research and classification of influencing factors. The first is the article “A thousand flowers blooming?” by Seyfang et al. (2013). Research subject are community energy initiatives in the UK as well as the UK energy sector as a whole. The researchers start with a review on influencing factors on the basis of which they design a quantitative UK-wide study. For this purpose, they organise the influencing factors into five groups, namely (1) group, (2) project, (3) community, (4) network, and (5) policy. The results were analysed using SWOT analysis, dividing the influencing factors into initiative internal strengths and weaknesses (SW) and initiative external opportunities and threats (OT).
The second is the *fertile soil framework* by Sekulova et al. (2017), which is designed to determine a place’s favourability for community based initiatives to emerge, develop and disseminate. Its name stems from the metaphor of *fertile soil*, emphasising that fertility is not only defined by diversity of factors but also by the quality of interrelatedness of these factors.

The "[…] mixture of the social, psychological, cultural, political and environmental conditions in which social organizing tends to take place [.]" forms the soil. Thereby, the fertility of a place is not static but dynamic and constantly changing. The absence of individual factors does not rule out the emergence and existence of LEIs, but the greater the diversity and interrelatedness of present factors, the greater the number and size of LEIs and the longer their existence. Sekulova et al. (2017) build their framework on both, factors described in academic literature and empirical data from qualitative interviews conducted in the region of Barcelona. According to their framework, soil fertility is characterised by factors related to: "a shared history of social organizing, protest, and activism; diversity; values of cooperation and trust; concern with justice and sustainability; presence of counter-cultures; actors' agency and self-empowerment; social networking; non-restrictive external regime; and availability of physical space/s" (Sekulova et al., 2017, p. 2364).

2.3 User Innovation Research

An analysis of Scopus results for the search "user innovations" in title, abstract and keywords reveals that E. von Hippel and C. Herstatt are the most active UI researchers in numbers of publications. As shown in Figure 7, 31 and 19 documents by these authors are listed. While S. Hyysalo has contributed 14 related publications, other authors have contributed ten or less. The overlaying graphic in the lower right corner furthermore illustrates the number of user innovation (UI) publications over time. It can be seen that the first related document was

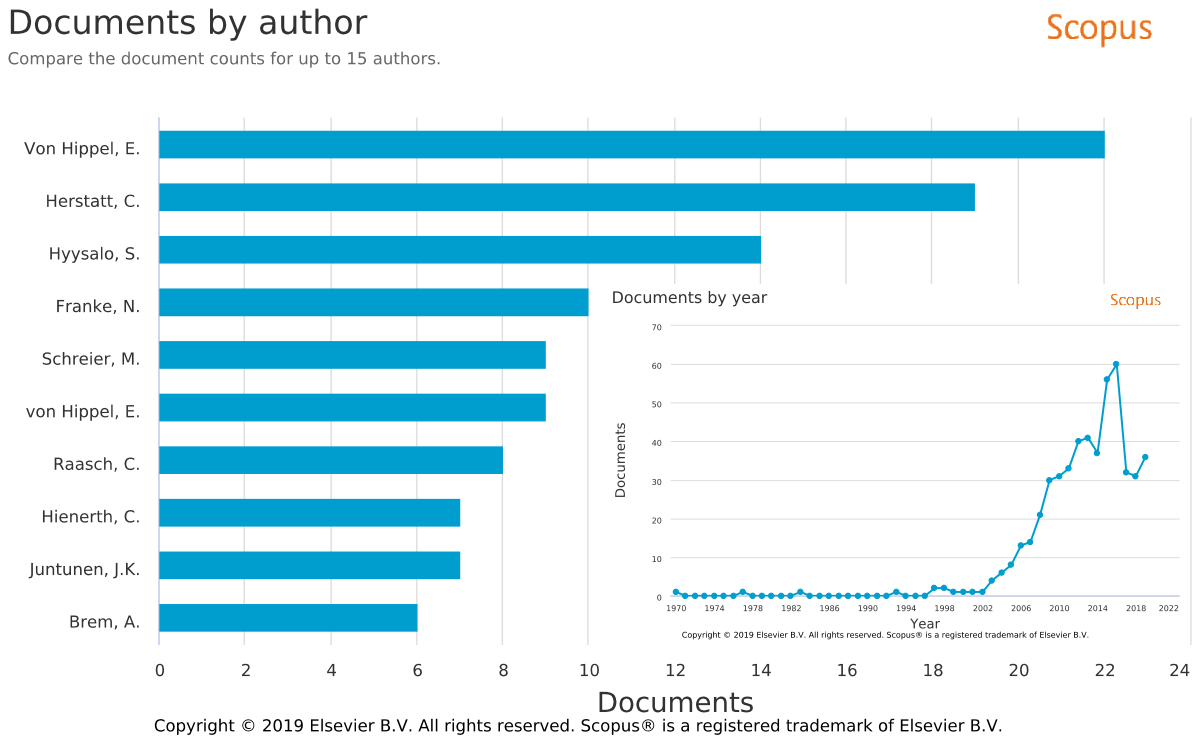


Figure 7: User innovation publications by author and by year

published in 1970, followed by one document every five to ten years until 1997. From that year on, at least one document is listed each year before the research field experienced a rapid increase of publications from 2002 with a peak so far of 60 documents in 2016.

In the 1970s E. von Hippel and his colleagues revealed in their studies on innovations that it was rather the users of certain products than their manufacturers that dominated related innovation processes (von Hippel, 1976). In the following years, they investigated this phenomenon systematically and significance of user innovation research started to increase (Raasch et al., 2008; von Hippel, 1976, 1988). User innovations and manufacturer innovations, which were seen as dominant locus of innovations for many years, differ in terms of expected innovation benefit. While users expect to benefit from utilising their innovations, manufacturers expect to benefit from selling their innovations (von Hippel, 2005). User innovate to satisfy needs they face when using a product or service, needs which are not at all, or only imperfectly met by manufacturer (Hyysalo et al., 2017; von Hippel, 1976, 2005). This corresponds with the definition and framing used in this thesis of LEIs as bottom-up innovations (cf. Bergman et al., 2010). The fact that user innovations are not developed from commercial interest does not mean that these innovations lack commercial potential, but quite the opposite (Franke et al., 2006; Hyysalo et al., 2017; Lüthje & Herstatt, 2004; Urban & von Hippel, 2008). In the search for the most promising innovations, Lead Users play an important role. They have the following characteristics:

- they sense future market needs months or years before other market actors
- they profit strongly from innovations that provide a solution to those needs (Lüthje & Herstatt, 2004; von Hippel, 1988)

Since the 1970s, the UI landscape has changed: through the internet with forums enabling exchange and communities beyond local boundaries (Baldwin & von Hippel, 2011; Braun & Herstatt, 2008; Hyysalo et al., 2018; von Hippel, 2005, 2016); through local makerspaces or FabLabs (Pieper, 2018; von Hippel, 2016); or through toolkits and the DIY trend (Baldwin & von Hippel, 2011; Nielsen et al., 2014, 2016; von Hippel, 2005).

2.3.1 LEIs in User Innovation Research

Thus far, UI research has mainly been conducted in fields of sport equipment, software, medical appliances, agriculture, household and smart home appliances (Pieper, 2018). An analysis of the Scopus search results regarding the subject area (Figure 8) reveals that the largest share of UI publications (30%) is related to business and management, followed by computer science and engineering with 16% and 12%. User innovations in energy related fields are mainly described by S. Hyysalo and colleagues, who have been conducting user innovation studies on

heat pumps and wood pellet burning systems in Finland since 2005 (Hyysalo & Juntunen, 2018; Hyysalo et al., 2013). De Vries et al. (2015, p. 51) explored user innovations in LEI as "configurational user innovations" in which users design "arrangements of loosely related sets of components". M. Ornetzeder and H. Rohracher applied UI notions in niche innovation cases to study the roles of users in innovation, adaptation and diffusion of emerging renewable energy technologies (Ornetzeder & Rohracher, 2006; Rohracher, 2003).

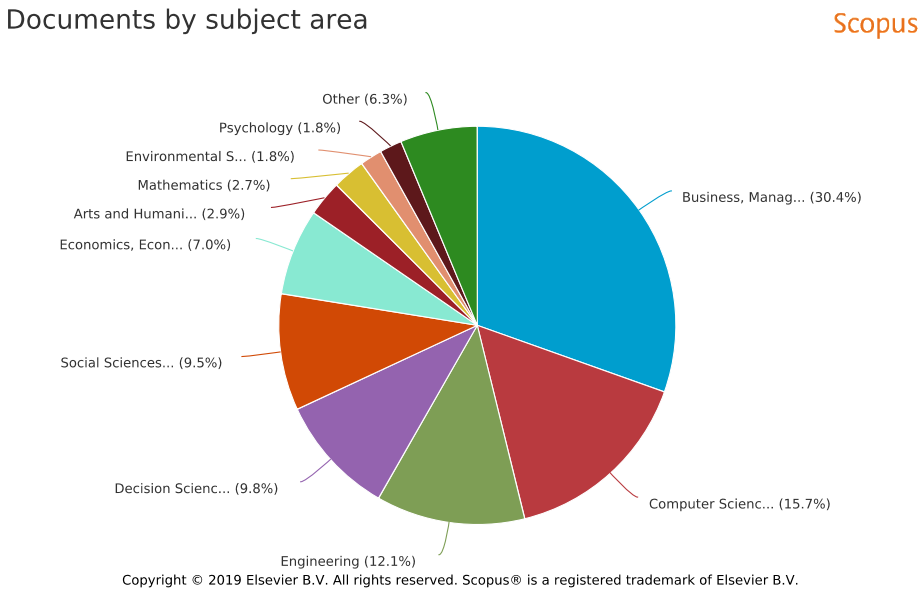


Figure 8: User innovation publications by subject area

Users' contributions and potentials for innovations for sustainability has long been neglected and only attracted academic attention in recent years (Nielsen et al., 2016; Seyfang & Smith, 2007). In this context, the concept of a *sustainable user innovator* emerged, which enlarges the notions of the outlined user innovation research. Like the "traditional", the *sustainable user innovators* (SUIs) innovate on the basis of their personal experiences and needs, but furthermore to improve environmental, social or health issues in their communities or wider society (Nielsen et al., 2016, p. 67). Research on SUI has significantly grown from 2010 onwards and demonstrates a vast theoretical and empirical multiplicity (Nielsen et al., 2016) drawing on similar, partly the same case studies and developments as grassroots innovation and transition studies (Nielsen et al., 2014, 2016; Ornetzeder & Rohracher, 2006, 2013).

2.3.2 Influencing Factors in User Innovation Literature

Few UI studies deal with factors that influence the development of user innovations. According to Pieper (2018), Braun & Herstatt (Braun & Herstatt, 2007) conducted the first related research and labelled the factors *user innovation barriers* (Braun & Herstatt, 2007). Their study, and the few research projects about influencing factors since, dealt with user innovations in the field of

medical devices, farming and sailboats (Braun & Herstatt, 2007; Pieper, 2018). Pieper (2018) made these user innovation barriers the research object for his dissertation "User Innovation Barriers' Impact on User-Developed Products" in which he conducted an empirical mixed method study with (lead) user innovators in the fields of smart home applications (qualitative study), smart home communities, FabLabs and makerspaces (quantitative study, n=299). He distinguishes barriers (technological, social, legal and ownership barriers) and resource constraints (financial, time-related and collaborative constraints). The resource constraints are preconditions for the innovation process and the barriers arise in the course of the innovation process. If contrary to this assumption resource constraints occur during the innovation process, their effects exceed those of barriers and assumingly lead to deceleration or even discontinuation of the UI process (Pieper, 2018). In addition to the outlined barriers from the UI research, this thesis assumes the introduced characteristics of the user innovators (motivation and personal need, ability to sense opportunities and realise them (experience)) as further factors influencing the development of LEI.

A second key UI study on influencing factors (IF) that serves as a starting point for the development of an IF framework is the systematic literature review and conceptualisation of *sustainable user innovations* by Nielsen et al. (2016). They apply the MOAB dimensions (motivation, opportunity, ability, behaviour) as deductive categories to group influencing factors revealed in their systematic literature review. Thereby, they differentiate independent and facilitated user innovations. The first fit the framing of LEIs in this thesis, the latter however, are characterised by an integration of the user innovators in innovation processes of companies and are not considered in this research (Nielsen et al., 2016).

2.4 Synthesis of Influencing Factors

A summary and synthesis of influencing factors (IF) described in grassroots and user innovation literature is presented in the following - as result of the literature review and as framework for the subsequent research process. Thereby, the comprehensive works of Nielsen et al. (2016), Pieper (2018), Sekulova et al. (2017) and Seyfang et al. (2013), as introduced in Section 2.2 and 2.3, are used as starting points to embark from; subsequently, single or several influencing factors introduced in further sources are integrated, in order to enhance the comprehensiveness of the factor basis. However, due to the plethora of explicitly and implicitly described factors in the literature of various research streams and the influential dynamics Sekulova et al. (2017) indicate, which are bound to remain invisible, it is impossible to achieve holism (cf. Ornetzeder & Rohracher, 2013). Furthermore, influences and effects of the factors described in the literature are extensive, often vague and at times presented in divergent causal connections,

indicating a strong interconnectedness. Yet, for all factors introduced in the following, an influence on the development of local energy initiatives is described in the literature, or can be assumed. However, a detailed discussion of the multifaceted and interrelated influences was dispensed.

During the review process, six factor dimensions were established as one feasible structure for clustering the multitude of IF, to facilitate a vivid illustration, and to lay an expedient foundation for the subsequent research process. Central element of this research are local energy initiatives, which is why *(1) Initiative internal* is the central dimension in the elaborated framework, followed by a dimension regarding their work *(2) Project*. Building on the Multi-actor Perspective (see 3.2.2) are the external dimensions *(3) Community sector, (4) State sector, (5) Market sector, and (6) Third sector.* Due to the indicated complexity of factors and influences, this clustering should not be understood as mutually exclusive, but rather interdependent (similar to Sekulova et al. (2017), Ornetzeder & Rohracher (2013) and Nielsen et al. (2016) statements about their proposed factor structures).

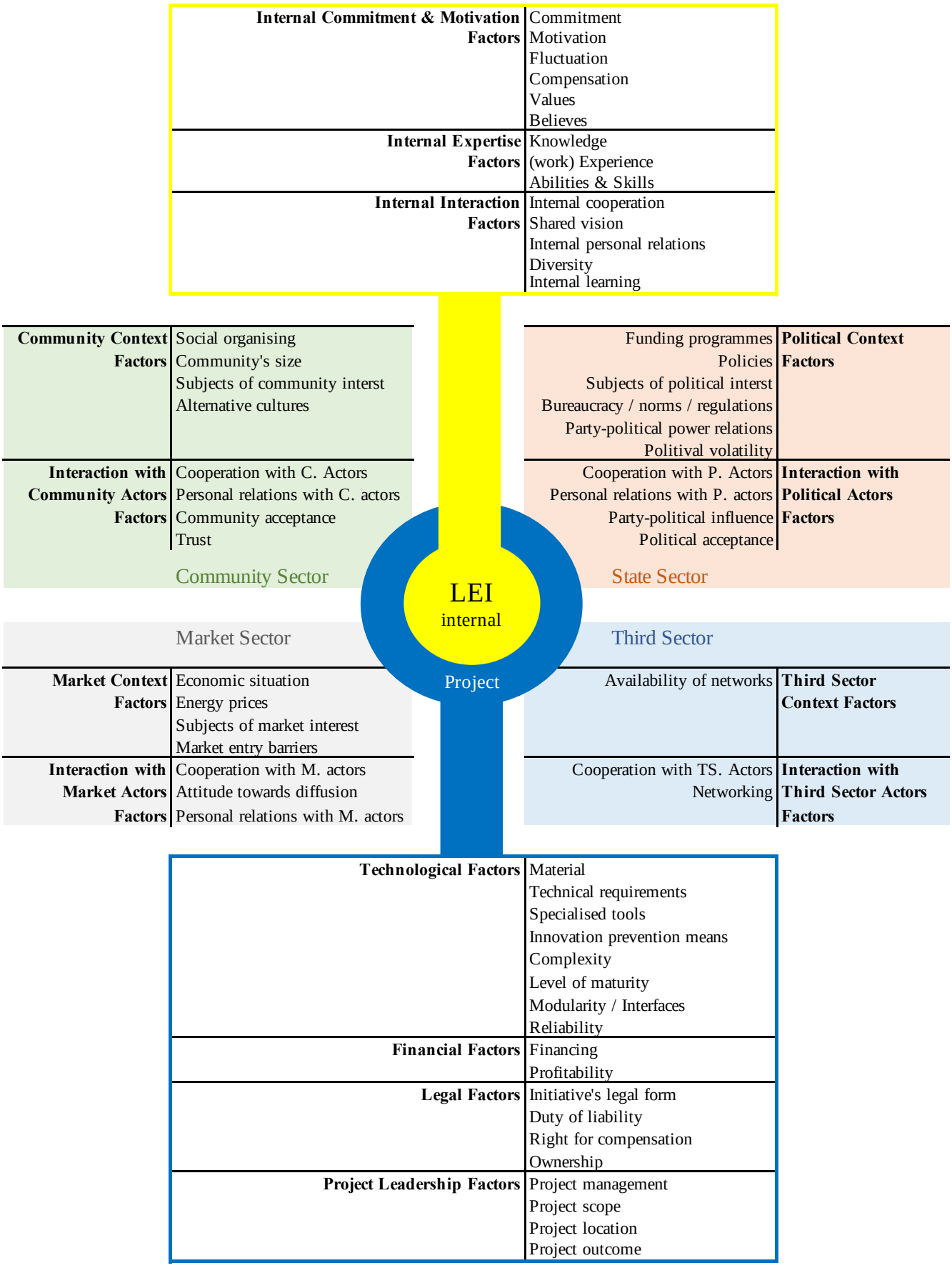


Figure 9: Influencing Factor Framework (own illustration)

2.4.1 Initiative Internal

Internal Commitment and Motivation Factors

As outlined above, individual **motivation** is an essential aspect of UI research (Lüthje & Herstatt, 2004; von Hippel, 1988). With additional aspects, motivation is also described as influencing factor for sustainable user innovators (Nielsen et al., 2016; Ornetzeder & Rohracher, 2006; Ross et al., 2012) and widely in GI literature (Bauwens, 2016; Haggett et al., 2013; Hicks & Ison, 2018; Ross et al., 2012; Seyfang et al., 2013). Further intrinsic factors are enthusiasm and passion (Middlemiss & Parrish, 2010; Nielsen et al., 2016; Sekulova et al., 2017) and internal **values** (Middlemiss & Parrish, 2010; Sekulova et al., 2017). In both UI and GI literature the influence of the **believe** in one's capacity to bring about change is described (Nielsen et al., 2016; Sekulova et al., 2017). **Commitment** of internal members are highlighted and can also be evaluated as core aspect in UI (Centgraf, 2018; Hyysalo et al., 2018; Ornetzeder & Rohracher, 2013; Pieper, 2018; Schoor et al., 2016). At the same time, factors of maintaining commitment, internal **fluctuation** of people and their **compensation** are described (Centgraf, 2018; Haggett et al., 2013; Ornetzeder, 2002; Seyfang & Smith, 2007; von Hippel, 2016).

Internal Expertise Factors

Besides committed members in general, the importance of key individuals with **abilities** to engage determinedly, dynamically and effectively is highlighted (Nielsen et al., 2016; Schoor et al., 2016; Sekulova et al., 2017; Seyfang et al., 2013). As outlined, the ability to sense opportunities is a core aspect of UI, which is related to use **experience** (Lüthje & Herstatt, 2004; Nielsen et al., 2014; Pieper et al., 2013; von Hippel, 1988). Depending on LEIs' endeavours, **knowledge** and **skills** in respective fields are necessary (e.g. technical, financial, political, legal) (Centgraf, 2018; Haggett et al., 2013; Herbes et al., 2017; Middlemiss & Parrish, 2010; Mignon & Rüdinger, 2016; Negro et al., 2012; Nielsen et al., 2016; Oteman et al., 2014; Ross et al., 2012; Schoor et al., 2016; Seyfang et al., 2013; Wierling et al., 2018). These necessities can change along the course of LEIs' development, as different knowledge and skills are needed when establishing, compared to maintaining the initiative (Seyfang & Smith, 2007). Leadership and organisational skills are highlighted to be of central importance for collective initiatives (Oteman et al., 2014; Sekulova et al., 2017).

Internal Interaction Factors

If more than one person is actively participating in the LEI, it becomes a collective undertaking. In this context, **internal cooperation** id described by several authors, e.g.: internal communication (also between potential vertical level) which itself is determined by mutual trust. (Centgraf, 2018; Devine-Wright et al., 2009; Ornetzeder & Rohracher, 2006; Proka et al.,

2018; Sekulova et al., 2017; Yildiz et al., 2015). The importance of a **shared vision** as a connecting element for group members is highlighted in the GI literature. Similarly, a common purpose that brings together user innovators for collaboration, who typically working independently, is described in UI literature (Martiskainen, 2017; Ornetzeder & Rohracher, 2006; Seyfang & Haxeltine, 2012; Seyfang et al., 2013; van der Schoor & Scholtens, 2015; von Hippel, 2005, 2016). In terms of these visions, and also in terms of members and their views, authors advocate **diversity** (Centgraf, 2018; Sekulova et al., 2017; Wierling et al., 2018). Diversity offers both, great potential for enrichment and inclusion but can also result in conflicts (Centgraf, 2018; Sekulova et al., 2017). Processes of openly addressing and collaboratively overcoming such hurdles, as well as collective reflection and experience sharing is linked to influential **internal learning** (Raven, 2012; Sekulova et al., 2017).

2.4.2 Project

Technological Factors

Since all local energy initiatives are in some way involved in energy-related projects, a variety of technological factors are described in the literature. This is particularly the case in user innovation literature, as technical innovations are a central element of interest in this field. Factors arising in the innovation processes are, besides others, availability of needed **material**, **specialised tools** (if necessary) or **innovation prevention means** by producers (Braun & Herstatt, 2007, 2008; Nielsen et al., 2016; Ornetzeder & Rohracher, 2006; Pieper, 2018). Further factors are **complexity** of both, the innovation object, as well as the intended solution (Braun & Herstatt, 2007; Ornetzeder & Rohracher, 2006; Pieper, 2018). Factors related to the respective technology itself comprise, among others, the technologies' **maturity** (readiness-level, product-lifecycle), **modularity** and (infrastructure) **interfaces** or **reliability** (Boon & Dieperink, 2014; Hicks & Ison, 2018; Hölscher et al., 2019; Ornetzeder & Rohracher, 2006; Proka et al., 2018; Seyfang et al., 2013).

Financial Factors

It can be assumed that all LEI need some sort of financial resources to undertake their projects. Unsurprisingly, financial factors are described as influential in both UI and GI literature (Braun & Herstatt, 2007; Brummer, 2018; Centgraf, 2018; Haggett et al., 2013; Nielsen et al., 2016; Reinsberger & Posch, 2014; Ross et al., 2012; Schoor et al., 2016; Seyfang et al., 2013). Numerous publications highlight general **financing** as necessary but do not go into further detail. Aspects linked to financing range from variable and fixed project costs to cost of innovation object and considered technologies (Hicks & Ison, 2018; Pieper, 2018; Pieper et al., 2013). Financing can be obtained through external sources such as investors or financial support

schemes (Boon & Dieperink, 2014; Hölscher et al., 2019; Oteman et al., 2014; Seyfang & Smith, 2007; Wierling et al., 2018). Cuts or loss of often short-termed funds can shock dependent initiatives (Seyfang & Smith, 2007), but as these IFs arise from initiatives' external context, these will be described below. Besides financing, the (expected) **profitability** is influential (in terms of payback period and positive return in general, also beyond financial considerations) (Boon & Dieperink, 2014; Oteman et al., 2014; Pieper et al., 2013; Reinsberger & Posch, 2014; Seyfang et al., 2013).

Legal Factors

Legal factors are widely discussed in UI literature, with regard to one's **right for compensation** as well as one's **duty of liability**. The first is linked to possible loss of warrantee, guarantee or insurance for modified products (Braun & Herstatt, 2007; Nielsen et al., 2016). The latter comes into play when the innovation projects are at odds with patents, copy-rights or secure codes (Braun & Herstatt, 2007; Pieper, 2018). Furthermore, is are innovators' liabilities against third parties using their innovations of influence (Braun & Herstatt, 2007; Pieper, 2018). The above mentioned legal factors become even more problematic, if innovators are not owners of their innovation objects (**ownership**) (Pieper, 2018; Pieper et al., 2013). Duty of liability appears also in GI literature in connection with the **legal form** of the initiative. The legal form (e.g. cooperative, club) entails consequences such as participation opportunities but also liabilities for people in charge (Becker et al., 2017; Brummer, 2018; Herbes et al., 2017; Reinsberger & Posch, 2014; Wirth, 2014).

Project Leadership Factors

Against the background of often demanding combination of task complexity and high workload due to parallel projects combined with considerable responsibilities of voluntary participants, authors highlight **project management** as important. Appropriate physical space and infrastructure are needed (Centgraf, 2018; Negro et al., 2012; Sekulova et al., 2017; Seyfang et al., 2013). This is closely connected to the project's **scope,** which can have far reaching influence and is associated with requirements for e.g. human-power or time (Braun & Herstatt, 2008; Centgraf, 2018; Devine-Wright et al., 2009; Nielsen et al., 2016; Pieper, 2018; Ross et al., 2012; Schoor et al., 2016; Wüstenhagen et al., 2007). Furthermore, the factor of project **location** is widely discussed; regarding e.g. proximity to dwellings or geographical and physical conditions such as wind speed or sun hours (Boon & Dieperink, 2014; Middlemiss & Parrish, 2010; Reinsberger & Posch, 2014; Süsser & Kannen, 2017; Verbong & Geels, 2007; Wirth, 2014; Wüstenhagen et al., 2007). The (potential) **project outcome** is an extensive factor that subsumes aspects that arise in the (suspected) consequence of project realisation. The

project results are linked to the motivation of both the individuals involved and the collective initiative, as these results include (non) financial benefits for the participants (central element in UI research) (Braun & Herstatt, 2007; Lüthje & Herstatt, 2004; Nielsen et al., 2016; Reinsberger & Posch, 2014; von Hippel, 1988), as well as for the initiative or community (Nielsen et al., 2016; Reinsberger & Posch, 2014; Süsser et al., 2017; Süsser & Kannen, 2017); impact on environment and climate (Bauwens, 2016; Hicks & Ison, 2018; Nielsen et al., 2016; Reinsberger & Posch, 2014; Süsser & Kannen, 2017); independence from fossil fuels (Boon & Dieperink, 2014; Hicks & Ison, 2018; Reinsberger & Posch, 2014); or related user efforts (Boon & Dieperink, 2014; Hölscher et al., 2019; Maruyama et al., 2007; Pieper, 2018; von Hippel, 1986; Wüstenhagen et al., 2007). Another widely highlighted aspect of project outcome is the cost-benefit-allocation, hence, participation and ownership scenarios (e.g. for community members) and the question about, 'who pays and who earns?' (Boon & Dieperink, 2014; Herstatt & Hippel, 1991; S. M. Hoffman & High-Pippert, 2005; Kirchhoff et al., 2016; Maruyama et al., 2007; Süsser & Kannen, 2017)

2.4.3 Community Sector

Community Context Factors

Regarding the community context, history and presence of **social organising** are highlighted as influential in the literature, including aspects as social cohesion and a general willingness to act (Boon & Dieperink, 2014; Calabuig et al., 2009; Haggett et al., 2013; Hicks & Ison, 2018; Ornetzeder & Rohracher, 2006; Oteman et al., 2014; Sekulova et al., 2017). In a similar vein, authors describe **alternative cultures** and milieus with respect to dominant institutions (Sekulova et al., 2017; Seyfang et al., 2013). Furthermore of influence are **size of the community** (Calabuig et al., 2009) and **subjects of community interest** as in terms of concern with sustainability and justice in general, and awareness for LEIs' topics in particular (Boon & Dieperink, 2014; Calabuig et al., 2009; David & Schönborn, 2018; Kooij et al., 2018; Maruyama et al., 2007; Middlemiss & Parrish, 2010; Negro et al., 2012; Oteman et al., 2014; Sekulova et al., 2017; Seyfang et al., 2013; Wierling et al., 2018; Wirth, 2014).

Interaction with Community Actors Factors

The (dis)agreement between these described subjects of community interest on the one hand, and the narrative of the LEI on the other hand, can determine the interaction between members of the initiative and community actors (David & Schönborn, 2018). It is linked to the multifaceted factor of **community acceptance** (or rejection), which is described as a prerequisite for projects with impact on the community and which can result in community support (or hindrance) when community actors actively engage (Beermann & Tews, 2017;

Boon & Dieperink, 2014; Brummer, 2018; Centgraf, 2018; Devine-Wright et al., 2009; Herbes et al., 2017; Hicks & Ison, 2018; Hölscher et al., 2019; Huijts et al., 2012; Nielsen et al., 2016; Proka et al., 2018; Seyfang et al., 2013; Wüstenhagen et al., 2007). The social barriers described by UI scholars reflect this on a rather personal level as scepticism, stigmatisation or social pressure that innovators might experience as a consequence to their projects (Braun & Herstatt, 2007; Nielsen et al., 2016; Pieper, 2018). The attitude of external actors is described in interdependence with the **cooperation with community actors**. Thereby, this cooperation is determined by various aspects, i.e. the willingness of residents (incl. end-users) to engage; or the cooperation's distributional justice (cost-benefit-allocation as described in "project outcomes") and procedural justice (participation opportunities and fair decision making) (Beermann & Tews, 2017; Boon & Dieperink, 2014; Devine-Wright et al., 2009; Hicks & Ison, 2018; Hoppe et al., 2015; Koirala et al., 2016; Maruyama et al., 2007; Seyfang et al., 2013; Wierling et al., 2018; Wüstenhagen et al., 2007). Furthermore, **trust** between LEIs and community actors is emphasised, especially, if LEIs pursue projects in communities in spatial distance to their own (Boon & Dieperink, 2014; Devine-Wright et al., 2009; Wüstenhagen et al., 2007). In the context of the outlined interaction, the embeddedness of the LEIs in their communities and **personal relations with community actors** are highlighted (Hicks & Ison, 2018; Ross et al., 2012; Seyfang et al., 2013).

2.4.4 State Sector

Political Context Factors

Both, grassroots as well as user innovation scholars describe influencing effects of **policies** (incl. feed-in tariffs or interest rate policies) and related aspects such as ambiguity, short validities and changes (Beermann & Tews, 2017; Boon & Dieperink, 2014; Braun & Herstatt, 2007; Brummer, 2018; Centgraf, 2018; Hicks & Ison, 2018; Maruyama et al., 2007; Negro et al., 2012; Oteman et al., 2014; Pieper, 2018; Proka et al., 2018; Roesler & Hassler, 2019; Schoor et al., 2016; Seyfang et al., 2013; Wierling et al., 2018; Wirth, 2014; Wüstenhagen et al., 2007). In their quantitative study, Wierling et al. (2018) find a correlation between number of energy cooperatives and the development of policies in their respective European countries. **Funding programmes** are popular ways to finance, as indicated in "financial factors". But their requirements can pose major hurdles: as funding programmes are often designed for traditional innovation processes, thus being unsuitable for bottom-up innovations; targets prescribed by funders towards traditional social, economic OR environmental single-issues; bureaucratic implications which can significantly restrict developments aspired by the LEI. Cuts or loss of often short-termed funds can shock dependent initiatives (Boon & Dieperink, 2014; Nielsen et

al., 2016; Proka et al., 2018; Seyfang et al., 2013; Seyfang & Smith, 2007; Wirth, 2014). Furthermore, **bureaucracy, norms** and **regulations** are indicated as influential in UI and GI literature (Boon & Dieperink, 2014; Braun & Herstatt, 2007; Hicks & Ison, 2018; Hölscher et al., 2019; Negro et al., 2012; Nielsen et al., 2016; Oteman et al., 2014; Pieper, 2018; Reinsberger & Posch, 2014; Seyfang et al., 2013). Similar to the community context, the relation between **subjects of political interest** and the themes and approaches of the LEIs is addressed in literature (Brummer, 2018; Calabuig et al., 2009; David & Schönborn, 2018; Kooij et al., 2018; Oteman et al., 2014; Sekulova et al., 2017). Motivation, clear attention and knowledge of political- and administrative actors regarding respective local sustainable development endeavours are highlighted as prerequisites (Busch & McCormick, 2014; Haggett et al., 2013; Hoppe & Coenen, 2011)

Interaction with Political Actors Factors

Again similar to community factors, it is the (dis)agreement between these described subjects of political interest on the one hand, and narratives of the LEI on the other hand which can determine the initiative's interaction with political actors (David & Schönborn, 2018; Haggett et al., 2013). Few detailed insights regarding this interaction are presented in GI and UI literature. Generally, **cooperation with political actors** is indicated as influential. Political actors' active involvement is highlighted, as local catalysts, to provide and transfer knowledge and the like (Boon & Dieperink, 2014; Hölscher et al., 2019; Hoppe & Coenen, 2011; Hoppe et al., 2015). Haggett et al. (2013) identify the roles of local councils as influential in terms of its policy stance regarding LEIs and as authority which decides on approval or rejection of project plans. According to their analysis, **personal relationships** between local councillors and members of the initiatives influence their cooperation in general and approval decisions as a concrete example (Haggett et al., 2013). Furthermore, **political acceptance** is mentioned, which can be influenced by real or perceived competition between LEIs and municipal utilities (Centgraf, 2018; Haggett et al., 2013; Herbes et al., 2017).

2.4.5 Market Sector

Market Context Factors

Energy prices (oil price, price differences between conventional and renewable energies) are factors from the market context that influence the development of LEIs (Boon & Dieperink, 2014; Seyfang et al., 2013), as is the wider **economic situation** including structure of the market (Hicks & Ison, 2018; Seyfang et al., 2013). It is furthermore described, how LEIs might face **market entry barriers** or regime resistance, depending on their business model. Incumbent market actors such as (local) energy providers or grid operators have an interest in reinforcing

the current system due to path dependencies, lock-ins, sunk investments and the like (Boon & Dieperink, 2014; Geels, 2014; Loorbach, 2014; Maruyama et al., 2007; Negro et al., 2012; Proka et al., 2018).

Interaction with Market Actors Factors

Cooperation with market actors is noted to be influential in situations where LEI's internal or network resources and expertise do not cover all its needs (Boon & Dieperink, 2014; Kirchhoff et al., 2016; Nielsen et al., 2016; Pieper, 2018; Seyfang et al., 2013). Both, professionals (e.g. consultants) and private persons (e.g. other users) are addressed for resources ranging from specialist advice to machines, tools and other hardware (Kirchhoff et al., 2016; Pieper, 2018; Seyfang et al., 2013). In this context however, indications of idea theft and plagiarism can be found in UI literature (Braun & Herstatt, 2007; Pieper, 2018). Similarly, rigid contracts are indicated in UI literature, which prevent any modifications, similar to technological innovation prevention means described in *technological factors* (Braun & Herstatt, 2007). While some innovators define themselves as an alternative to the *regime*, their **attitude towards diffusion** of their innovations into that very *regime* might contradict their beliefs. This is the distinguishing factor between *simple* and *strategic* niches (Nielsen et al., 2016; Seyfang & Smith, 2007).

2.4.6 Third Sector

Third Sector Context Factors

None of the factors described in the literature directly fit the chosen grouping criteria of third sector context factors. Nonetheless, as networking is highlighted as influential in the literature (Becker et al., 2017; Boon & Dieperink, 2014; Feola & Nunes, 2014; Hienerth & Lettl, 2011; Hyysalo et al., 2013; Nielsen et al., 2016; Ornetzeder & Rohracher, 2006; Pieper, 2018; Schoor et al., 2016; Sekulova et al., 2017; Seyfang et al., 2014; van der Waal et al., 2018; von Hippel, 2005, 2016), the general availability of **networks** of different forms (associations, NGOs, other intermediary actors, casual networks with other LEIs, user-, peer-, open source- and other online-communities, etc.) is understood as a context factor.

Interaction with Third Sector Actors Factors

On the one hand, interaction with third sector actors can be a general **networking** in which initiatives build casual network contacts. Here, as for other factors outlined above, diversity is highlighted with regards to LEIs' networks and affiliations (Ross et al., 2012; Schoor et al., 2016; Sekulova et al., 2017). On the other hand, this interaction can be a more intense bidirectional **cooperation with third sector actors**. This entails cooperation with volunteers, which is highlighted as crucial for LEIs (time and expertise) and at the same time is

characterised as often unstable (Nielsen et al., 2016; Schoor et al., 2016; Seyfang et al., 2013). This cooperation can also take the form of sharing of information and mutual support; synergies or an overarching coordination structure are mentioned; as well as learning from practical examples (Becker et al., 2017; Boon & Dieperink, 2014; Centgraf, 2018; Feola & Nunes, 2014; Haggett et al., 2013; Negro et al., 2012; Nielsen et al., 2016; Ornetzeder & Rohracher, 2006; Pieper, 2018; Proka et al., 2018; Ross et al., 2012; Schoor et al., 2016; Sekulova et al., 2017; Seyfang et al., 2014, 2013; von Hippel, 2005).

3 Research Methodology

Rogers opens his world-renowned book "Diffusion of Innovations" with an example of a failed diffusion (Rogers, 1995). Professional failures are the exclusive topic at FuckUp Nights and they enjoy great popularity (“FuckUp Nights,” 2019). Johannes Haushofer, assistant professor at Princeton University, writes his "CV of failure" (Haushofer, 2016). They all believe that "failures" are full of hidden valuable lessons – an iceberg of "failures" carrying the tip of success. This metaphor illustrates the philosophical standpoint taken in this research, that some events might look like failures from a specific perspective (depending on framing, time, goals etc.) but from a different perspective, might actually turn out as (part of) a success.

This research aims at exploring the lessons we can learn from discontinued local energy initiatives in regards to factors influencing their developments. It is therefore based on an interpretive methodology and follows a qualitative case study approach to create space for the exploration of influencing factors (Haverland & Yanow, 2012; Yin, 2014). A case study approach is appropriate, as Flyvberg (2006) highlights its values in possible richness regarding narratives reflecting the complexity of reality; the considered context-dependency of knowledge; as well as the open-ended approach of the case study methodology which opens an explorative space for discoveries (Flyvbjerg, 2006).

The schematic research framework in Figure 10 (inspired by Yin (2014, p. 56)) illustrates the process logic of this research. Literature review and the operationalisation of its findings are illustrated in the previous Chapter 2. The following Section 3.1 presents the collection of empirical data before Section 3.2 outlines the exploration of this data. The introduction of three methods used for the presentation of research results closes this chapter. Thereby, the individual and cross-case analyses explore the empirical data in order to answer SQs I & II; comparing results of these analyses with the findings from literature seeks to answering SQ III.

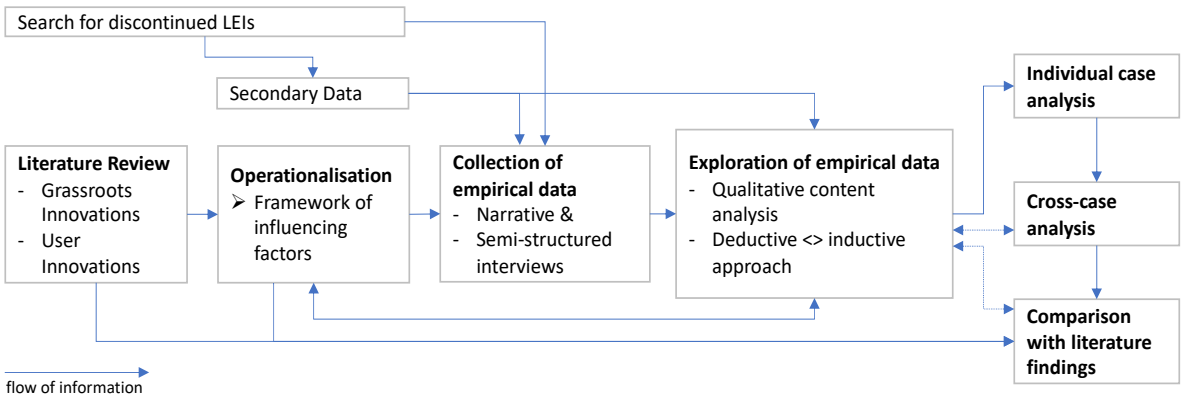


Figure 10: Research framework (own illustration)

3.1 Collection of Empirical Data

Six case studies form the empirical basis of this thesis. The next subsection introduces the case studies with an overview list (Table 4) and the selection process. Thereafter the collection of secondary data and interviews (Table 5) are presented.

3.1.1 Case Studies

Case selection

The *Lead User Method* (LUM) is a well-established process that supports identification and involvement of Lead Users (LUs) in innovation processes (Lüthje & Herstatt, 2004). A scientific comparison of innovation concepts obtained through the LUM on the one hand and innovation contest's open call on the other revealed that LUM's outcomes scored significantly higher in terms of overall quality, use value, degree of elaboration, feasibility, and social impact (Goeldner et al., 2017). The LUM follows a four step approach of which the first three aim at identifying the "rare subject" Lead User, and the last at their involvement (Belz & Baumbach, 2010; Hippel et al., 2008; Lüthje & Herstatt, 2004). As discontinued LEIs are difficult to identify (Boon & Dieperink, 2014) the first three method steps are applied for their identification, following Lüthje & Herstatt (2004, pp. 561–564). Step I, "Start of the Lead User process", defines the target market (see 1.2.1 and Table 3 below) and the goals of the process (see 1.3.1, research question). Step II, "identification of Needs and Trends", literature, internet and databanks are scanned and most attractive trends are selected (see Chapter 1 & 2, introduction and theoretical background). Step III, "Identification of Lead Users", a search approach is applied (see next paragraph) and activities of the bottom-up initiatives screened (see 3.1.2, secondary data).

Table 3: Criteria for the selection of case studies (own illustration)

Field of engagement	- Reduction of greenhouse gas emissions - Utilisation of renewable energies - Improvement of energy efficiencies
Regional scope	- Initial actions mainly focused on their local region - A subsequent spatial diffusion fits the criteria
Organisational and legal structure	- The organisational structure not decisive - Legal structure from community and third sector
Level of commitment	Considerable commitment through dedication of: - time - efforts - money - etc.
Current status	The initiative: - is formally or informally discontinued - has stopped its commitment

Pyramiding is applied as search approach, as it proved efficient in finding rare subjects (Hippel et al., 2008). It is "based upon the view that people with strong interest in a topic or field tend

to know people *more* expert than themselves" (Hippel et al., 2008, p. 1). The characteristic relevant for this research is expertise with discontinuation of a local energy initiative. Therefore, a large number of actors in the field of civic bottom-up engagement was contacted, consulted about their own experiences and asked for referral to actors with more of the relevant experience. Amongst others: active LEIs, networks, associations, consultants, private contacts were consulted via mail, phone, newsletters. A one-page bulletin (see Appendix 8.3) on the thesis and the search request was given to all contacted actors, for their own information as well as for dissemination in their networks. In addition, the cooperative register was searched for cancelled relevant cooperatives. The LEIs of all actors willing to share their experiences were subsequently adopted as case studies. Three LEIs have self-reported after receiving the one-pager through their networks (cases I, II, III); the cooperative register led to contacts with two LEIs (cases IV & V); and one was referred to by previously contacted actors (case VI).

Case descriptions

Case I is a self-proclaimed inventor and entrepreneur. He is ecologically driven and motivated to contribute to the energy transition. He pursues this in his own solar company as well as through innovating in his free time. Within the scope of this study his innovation of a roof concept consisting of foil and PV-modules and its application as a solar carport was explored. During the first contact and interview his innovation had been in abeyance for some time, threatening to fail. But in the course of the study it was successfully realised both privately and above all commercially. Thus, the case no longer meets the selection criteria of the study and is therefore not taken into consideration in the following analyses.

Case II is a registered association founded in 2011. The chairwoman started the initiative and led the association together with another board member. They followed a BIOenergy[9] approach that aimed for environmental protection, energy transition and sustainable development, with simultaneous striving for regional and local value creation with regard to scarcity of raw materials and in terms of personal participation, social development, jobs and apprenticeships, and transparency. To this end, they elaborate respective concepts and strategies with and for municipalities and supported them in the implementation process. After eight years of activity, the general assembly decided for the association's liquidation in 2019.

Case III is a working group that was established as local implementation of the global Agenda 21 strategy. In late 1998 the local council of the small town of about 13.000 inhabitants decided to allocate public budget to establish and maintain a Local Agenda 21. Subsequently voluntary citizens have formed six working groups, one of which, the working group "Energy", is the

[9] Thereby, BIO stands for Participation (**B**eteiligung), **I**nnovation, and ecology (**O**ekologie)

case study of this research. The working group started in 1999 and was active for 13 years before they announced their inactivity in 2012. It was led by a spokesperson and had on average 10 members. The initiative aimed to promote a sustainable local energy system and to create awareness within the municipality for energy related topics (see Table 4). They conducted a variety of activities to inform and mobilise local actors, e.g.: advocation for energy issues in the local administration; protest events and three large energy-fairs; or a comprehensive "solar study" ("Solarstudie")[10] comprising the town's current status and potential for solar systems.

Case IV is a citizen-energy cooperative. It was founded in 2009 with the aim of initiating renewable energy projects with the participation of local residents. The local mayor together with a contact person at the Citizen-Energy-Cooperatives Association have significantly stimulated and led the foundation of the cooperative. The mayor of the community of around 1,700 inhabitants also became chairman of the cooperative's supervisory board. Initially six board members led the cooperative, which was later gradually reduced to three. Until its discontinuation in 2017, the cooperative had installed five photovoltaic systems on municipal roofs with a nominal capacity of 150kWp.

Case V is a cooperative which aimed to install a local heating network in the village. The incinerator was to be fired with wood chips from the surrounding forest. Reforestation and other forest care measures should ensure the sustainability of the project. The village has about 1,600 inhabitants and is located in Saarland. The idea came up in 2005, the official founding of the cooperative was in 2010. It was managed by a chairman and two other board members and overseen by the mandatory supervisory board. In 2015 the cooperative was discontinued without considerable project implementation in the form of installations being realised.

Case VI is a regional energy efficiency cooperative established in 2015. A contribution to a sustainable energy system through energy efficiency measures in which citizens can participate and are financially involved is the idea of this cooperative model. They analysed mainly commercial and municipal buildings regarding potential for energy efficiency, derived energy efficiency measure and implemented them (in cooperation with partners). All services were financed through cooperative shares bought by members. The advantages for customers were that the cooperative was their one-stop-shop and sole contact for all project steps and that they did not require any bank loans due to the financing model. For these services the cooperative asked for 6.5% interest from its customers: 4% were paid as return to the members of the cooperative and 2.5% used to cover internal costs. In 2019 the cooperative decided to liquidate after four years of activity.

[10] The study sparked considerable public interest and won two sustainability awards

Table 4: Overview of case-study information (own illustration)

	Case II	**Case III**	**Case IV**	**Case V**	**Case VI**
Legal form	Registered association	LA 21 working group	Cooperative	Cooperative	Cooperative
Organisational structure	1 Chairwoman 1 additional board member General assembly	1 Spokesperson	1 Chairperson +- 5 additional board members Supervisory board General assembly	1 Chairman 2 additional board members Supervisory board General assembly	1 executive director 5 additional board members Supervisory board General assembly
size	+- 25 members	+- 10 Members	+- 230 cooperative members	+- 50 cooperative members (more households had expressed interest)	+- 80 cooperative members
Goals	- Environmental protection - Contribution to the energy transition - Regional and local value creation - Sustainable development in rural areas	Promotion of a sustainable local energy system. Awareness creation and mobilisation of community and political actors regarding - Energy saving - Installation of renewable energy systems - Improvement of climate protection means - Purchase of green electricity	Initiation of renewable energy projects at local, regional and superregional level, participation in renewable energy projects and initiation of actions for the support of renewable energies, for the improvement of energy efficiency for their members as well as climate protection on local and region level	Contribution to the energy transition, to nature and environmental protection by: - Installation and operation of a wood chip heating system - with wood chips as a sustainable and local source of energy - Distribution of generated heat energy to households in the village	- promote and realise energy efficiency means in the building sector - establish energy efficiency as a profitable return and business model - increase self-responsibility for energy efficiency.
Period of activity	2011- currently in liquidation (Sep.2019)	1999-2012	2009-2017	2005-2015	2015 – currently in liquidation (Sep.2019)
Location of activity	Based and mainly active in communities in Brandenburg	Small town of 13.084 inhabitants (2018) Baden-Wuerttemberg	Municipality of 1.700 inhabitants (2018) Baden-Wuerttemberg	Village of 1,600 inhabitants (2019) Saarland	City of 79.159 inhabitants (2018) Schleswig-Holstein

3.1.2 Secondary Data

Core strength and important element of case study research is the use of multiple sources of evidence (Yin, 2014). Triangulation of these data sources allows for different perspectives on the research object helping to determine its nature and thus enhancing the case study quality (Patton, 2002; Yin, 2014). Besides the interview data collected (see next subsection) this research draws on secondary data from documentation (by the LEIs, events) and archival records (newspapers, registers). For this purpose, the interviewees were asked for documentation for the analysis after their confirmation of participation. Furthermore, online sources (websites, web archives) and physical sources (archives) provided information. The information offered the needed context to prepare the interviews and to reflect the narratives during the analysis. However, the goal of research is not the reconstruction of exact events, but to explore what can be learned from discontinued LEIs about factors influencing their development. The interviewees asked for anonymisation of the cases due to sensitive topics, meaning that secondary data is not cited in this written thesis unless unavoidable and if, also anonymised.

3.1.3 Interviews

The conducted interviews form the core of this thesis. The following paragraphs introduce the applied interview methods, outlines the interview preparation and presents an overview of conducted interviews.

Interview methods

The interviews have a twofold ambition regarding factors influencing LEIs' developments: to create space for the interviewees to share their experiences (SQs I & II) and to compare their experiences with literature findings (SQ III). In narrative interviews (Andrews et al., 2008; cf. Loch & Rosenthal, 2002; Saldana, 2011; Wengraf, 2001) the interviewer invites interviewees to share their experiences in their own words and structure, largely without intervening (Loch & Rosenthal, 2002). This technique allows for the explorative space in which narrations about influencing factors can emerge. It furthermore provides insights in interviewees' subjective emphasis regarding certain events and factors (Saldana, 2011). In semi-structured interviews, open ended questions invite the interviewees to answer in their own words beyond yes or no (Longhurst, 2003). This creates opportunities for explorations within a frame determined by the question, allowing for comparison with other interviews as well as literature findings (Longhurst, 2003; Wengraf, 2001).

Consequently, the interviews conducted for this research started with a narrative interview part followed-up by open ended questions. The pursued research questions touch upon issues

sensitive for the involved actors. Thus, already the first phone contacts with the interviewees made clear that an extensive level of trust was needed for the interviews. Honest and personal mutual interest as well as written confirmation regarding privacy and anonymity allowed for this trust. Accordingly important was personal interaction, wherefore the interviews were conducted in personal face-to-face meetings. Nonetheless was one interviewee not comfortable with a recording of the interview and several interviewees stepped back after initial confirmations, four of them even last minute. Furthermore, both former members of the local energy initiatives, as well as external key actors the LEIs interacted with, were interviewed - in an effort to elicit a comprehensive picture regarding influencing factors and to enable reflection of interviewees' subjective narratives.

Interview protocol

The interview protocol was elaborated according to the above introduced methods of narrative and semi-structured interviewing. The developed framework of influencing factors (see Figure 9) and information from secondary data (3.1.2) provided the basis to formulate open ended questions. The interview protocol (Appendix 8.4) serves as a guideline aiming to elicit the aspired information and ensuring comparability while at the same time offering flexibility to follow unexpected but promising aspects arising during the (narrative) interviews (cf. Saldana, 2011; Wengraf, 2001).

Interview overview

This thesis collected empirical data in six case studies with a total of 16 interviews with 17 people. Ten interviewees are former participants of the local energy initiatives, hence internal interviewees, and six are key actors external to the LEI. The interviews have durations between 00:20h and 01:57h and add-up to 16:40h. The following analyses rely on 14 interviews, as case I was excluded during the process (see 3.1.1). Table 5 presents an overview of conducted interviews regarding the interviewees' roles in relation to the LEI, duration of the interviews and the identifier used in the following to refer to the interviews.

Table 5: Overview of conducted interviews (own illustration)

	Internal / External	**(Former) role**	**Interview duration** [hh:mm]	**Identifier**
Case I	Internal	Innovator / Entrepreneur	01:46	Excluded from analysis
	External	Innovator / User	01:07	Excluded from analysis
		total Case I	**02:53**	
Case II	Internal	Chairwoman and founder	01:24	**C-II_int.1-chair**
		total Case II	**01:24**	
Case III	Internal	Spokesperson	01:34	**C-III_int.1-spokes**
		Member	00:29	**C-III_int.2-memb**

		Member	(00:39)[11]	**C-III_int.3-memb**
	External	Mayor from 2004 onwards	00:58	**C-III_ext.1-mayor**
		Councillor	00:43	**C-III_ext.2-counc**
		Administration employee Contact person at LA 21 office	00:34	**C-III_ext.3-poff**
		total Case III	**04:57**	
Case IV	Internal	Board member (2013-2017)	00:52	**C-IV_int.1-board**
		Board member (2009-2012)	01:07	**C-IV_int.2-board**
	External	Contact at Citizen-Energy Cooperatives Association Baden-Wuertemberg	00:20:00 (interview by phone)	**C-IV_ext.1-assoc**
		total Case IV	**02:19**	
Case V	Internal	Board member	01:56	**C-V_int.1-board**
	External	1. Deputy mayor 2. Administration employee: environment and nature conservation	00:54	**C-V_ext.2-poffs**
		total Case V	**02:50**	
Case VI	Internal	Executive director	00:57	**C-VI_int.1-exec**
		Board member	01:20	**C-VI_int.2-board**
		total Case VI	**02:17**	

3.2 Exploration of Empirical Data

In this section the process of delving into the empirical interview material to carve out the contained insights regarding the research questions is introduced. Given the explorative, descriptive research goal, qualitative content analysis (QCA) was chosen as expedient method to analyse the interviewees' narratives (cf. Schreier, 2012). Individual and cross-case analyses discuss the outcomes of the QCA and provide the logic to present the results of the empirical data exploration. The next subsections introduce these three methods.

3.2.1 Qualitative Content Analysis

The QCA is a method to analyse different formats of recorded qualitative data, such as audio recordings of interviews or their transcripts (Mayring, 2000; Schreier, 2012). Schreier (2012, p. 3) formulates the goal of QCA as being "[i]n most general terms, […] to systematically describe the meaning of your data." To this end the analysis follows a systematic but flexible approach which leads to a reduction of the material with regard to aspects relevant for the research aim (Schreier, 2012) in the present study the factors that influence LEIs' developments. The analysis structures the data in coding units and assigns each with one or more codes (categories and subcategories) of a coding framework, the central element of QCA (Hussy et al., 2013; Kuckartz, 2012; Schreier, 2012). Both elaboration and application of the

[11] Did not agree to recording, wherefore his narratives are not cited in the analysis but used for reflection

coding framework are interpretative and, unlike quantitative content analysis, take latent meanings into account (Heins, 2016; Schreier, 2014). Thereby, an iterative process with feedback loops between research question, data, and data analysis is distinctive for QCA (Kuckartz, 2012). This enables the analyst to capture meanings regarding the chosen aspect(s) from extensive qualitative data; and while reducing the material, producing new information concerning (in)coherences between cases (Schreier, 2012).

Kuckartz (2012) distinguishes three basic methods of QCA (1) *structuring* ("inhaltlich strukturierend" Kuckartz, 2012, p. 77 ff.; engl.: cf. Mayring, 2004, 2014) (2) *evaluative* ("evaluativ" Kuckartz, 2012, p. 98 ff.) and (3) *type-forming* ("typenbildend" Kuckartz, 2012, p. 115 ff.). This thesis follows a structuring approach in which the coding framework is determined in an iterative inductive-deductive process[12] (information loops indicated in Figure 10). With this coding framework the research material is structured and finally discussed in regards to the aspects of interest in order to answer the research questions (Kuckartz, 2012). Table 6 presents the seven-phase approach of structuring QCA as defined by Kuckartz (2012, p. 78 ff.) (original flowchart illustration see 8.2) as well as their specific implementation in the present analysis. The master student conducted the analyses alone, using the qualitative data analysis software Atlas.ti as this software is indicated as especially suitable for QCA of audio files (Mayring, 2000; Zakaria & Zakaria, 2016).

Table 6: Implementation of the phases in the structuring QCA as defined by Kuckartz (2012) (own illustration)

Phases defined by Kuckartz (2012, p. 78 ff.)	**Performed implementation**
1) Initial data examination	- fast listening to entire interview (to develop a feeling for the material in its entirety) - Highlighting of passages in which influences seem to be described (units of concluded meaning as coding units) - Writing memos during listening - Writing initial interview summary after listening
2) Development of thematic categories	Three starting points for the development of categories 1) Factor groups from the influencing factor framework (Figure 9) (deductive, based on literature) 2) Inductively abstracted from the passages marked in step 1 (the influencing factor framework was continuously enhanced by relevant inductive categories abstracted from data) 3) Categories derived from research questions beyond influencing factors (deductive, from interview protocol)

[12] The elaboration of the coding framework can take an approach of any ratio between deduction (theory-directed) and induction (data-directed). Pure forms of deductive or inductive elaborations are possible, but rare (Heins, 2016; Hussy et al., 2013; Kuckartz, 2012).

3) Coding of entire material with thematic categories	- Coding of all interviews with developed categories
4) Compilation of all passages within a category	- Compilations generated in Atlas.ti
5) Inductive development of subcategories from material	- For the categories that correspond to a factor group in the influencing factor framework, subcategories (corresponding to factors) were inductively identified
6) Coding of entire material with enhanced coding framework	- Coding of all audio interviews with enhanced coding framework[13] - Repetition of steps 4) 5) 6) until coding framework is expedient
7) Category based analyses and presentation of results	- Category based analyses and presentation of results as Individual & Cross-case analyses (see 3.2.2)

The final coding framework is the result of an iterative, inductive-deductive development process as outlined above. In the present thesis the influencing factor framework as illustrated in Figure 9 constitutes the core of the coding framework with the factor groups corresponding to categories and the individual factors being subcategories (respective Atlas.ti Coding Framework of IFs see Appendix 8.5). Additional coding categories are introduced in Figure 11.

Name	Comment
Consequences of the events	Interviewees describe the consequences resutling from the events regarding themselves / others / in general
Desired conditions	Interviewees describe conditions that would have helped them / their initiative. What they consider conditions for success
General information	Statements regarding: - name of the initiatve - legal form - organisational structure - period of activity - size
Information regarding external actors	Information regarding external actors the initative interacted with and which are relevant for the analyses
Information regarding internal actors	Information regarding external actors the initative interacted with and which are relevant for the analyses. Who participated? (D
Initiative´s activities	Respondents describe activities formally written in their statutes, or that have been planned and / or implemented informally to r
Interviewees´ insights gained	Interviewees describe insights they gained from the events
Interviewee´s roles	Interviewee´s roles
Recommendations / Message from Interviewees	Respondents state recommendations for other initiatives / messages to involved actors

Figure 11: Coding categories additional to factor groups(own illustration)

3.2.2 Individual & Cross-Case Analysis

The final phase of the qualitative content analysis (QCA) are category-based analyses and presentation of the results, for which various methods are available (Kuckartz, 2012; Mayring, 2014; Schreier, 2012). For the present research individual case analyses are elaborated for every studied local energy initiative (LEI) and the results are synthesised in a cross-case analysis (cf. Kuckartz, 2012; Schreier, 2012; Yin, 2014). The aim is to understand the individual cases with regard to the subjects studied and to derive desired lessons. In the cross-case analysis these insights are compared regarding similarities and differences in order to identify patterns and to derive comprehensive lessons (cf. Flyvbjerg, 2006; Yin, 2014). Starting point for these analyses is the interview material, structured and coded in a QCA procedure as presented above. The

[13] Exemplary illustrations of audio files coded in Atlas.ti see Appendix 8.6. Exemplary illustrations of coded verbatim quotations cited in the following analyses see Appendix 8.7.

narratives of the interview partners, now coded with regard to the influencing factors and their groups (subcategories and categories) are systematically analysed. The following questions guide the analyses:

Table 7: Guiding questions for the individual and cross-case analyses (own illustration)

Research Question:
What can we learn from discontinued local energy initiatives regarding factors influencing their development?
Sub-questions:
SQ I - Which influencing factors do the interviewees describe, both hampering and stimulating?
SQ II - Which influencing factors led to the discontinuation of the local energy initiative?
Additional questions with regard to the research question
- How did discontinued LEIs deal with factors' hampering influences?
- Which conditions do interviewees describe as prerequisite for LEIs success?
- What did interviewees learn from the events?
- What recommendations and messages do interviewees have for other LEIs and involved actors?

Many internal and external actors influence the development of local energy initiatives (LEIs). Some of these actors shared their subjective perspectives in interviews for this research. For a comprehensive analysis of their different narratives the *Multi-actor Perspective* (MaP) is applied. The MaP (Avelino & Wittmayer, 2016, p. 635) distinguishes actors at three levels: (1) individual actors and (2) organisational actors (as illustrated above in Figure 3) as well as (3) sectors (see Figure 12). Thereby the MaP allows for a clear distinction of involved actors and their respective roles. This enables to understand the interests of actors as well as power relations between actors, necessary for a comprehensive analysis of actors' narratives and actions (Avelino & Wittmayer, 2016).

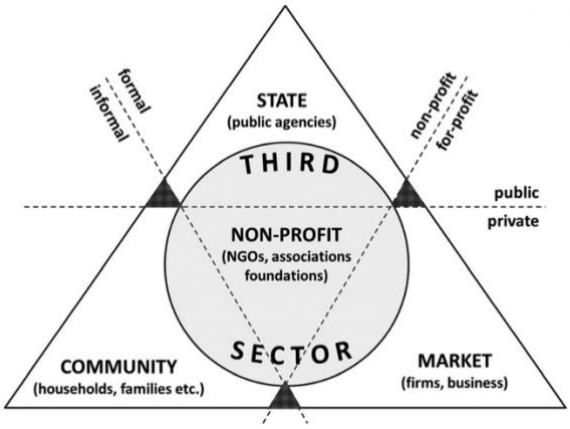


Figure 12: Sectors in the MaP
(Avelino & Wittmayer, 2016, p. 636)

The present research is interested in factors that influence the development of discontinued LEIs. Framed as bottom-up innovations, it can be argued that the development of LEIs follows the *s-shaped diffusion curve* of innovations described by Rogers (1995) (cf. Hölsgens et al., 2018; critical Hyysalo et al., 2018). For the analyses, the developments of the initiatives are divided into four phases, as illustrated schematically in Figure 13. An analysis of the factors

and their influences as a *chronological sequence* over time (2014, p. 154) enables to understand how they impact the individual developments of the initiatives. Besides these temporal aspects also aspects of mutual influences between factors have to be considered for a comprehensive understanding of influencing factors. Causal mapping allows to uncover these interrelations and was therefore applied for visualisations along the LEIs' developments (cf. Bryson et al., 2004; Jenkins & Johnson, 1997).

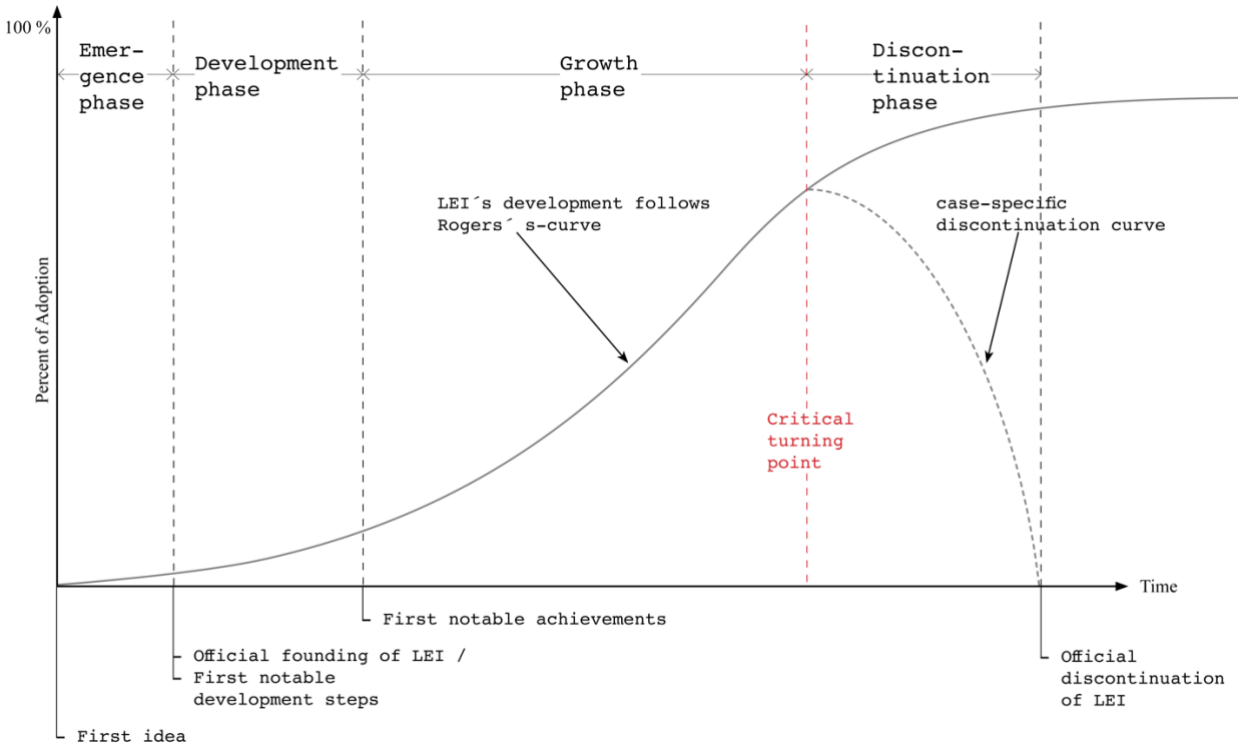


Figure 13: Schematic illustration of the development curve of a Local Energy Initiative (own illustration)

3.3 Comparison with Literature Findings

The third sub-question of the research asks, if the empirical results expand the previous understanding of influencing factors derived from continued LEIs. Accordingly, this question guides the analysis comparing the results of the cross-case analysis and the literature review. Thereby, both the indicated factors as well as their described influences are compared.

4 Findings: Three In-Depth Case Analyses

This chapter illustrates a detailed analysis of three individual cases. These three cases were selected because they have a higher information saturation compared to the other two cases (interviews with more both internal and external interview partners, see Table 5). This data allowed for a correspondingly detailed analysis of factors and their influence on the development of local energy initiatives (LEIs) Thus, this chapter gives in-depth insights regarding the research sub-questions SQs I and II. Each of the following case analyses starts with an overview of the most important influencing factors and their mutual influences over the development phases of the LEIs. The focus is on the hampering influences between factors in order to identify those that led to the discontinuation of LEIs (SQ II). Figures for every case graphically illustrate the factors with their influences on one another and on the development of the LEI as introduced and schematically illustrated in Figure 13. Subsequently, detailed analyses of the influencing factors based on the IF-framework (Figure 9) are presented.

4.1 Case III: A Local Agenda 21 Working Group

The analysis reveals that the development of the working group (Case descriptions) was mainly influenced by internal and political factors. Strong internal motivation and commitment united the working group and pushed their endeavours forward. The cooperation with political actors, however, changed over the course of time and became hampering after difficult personal relations with political actors and issues of party politics came into play (see Figure 14).

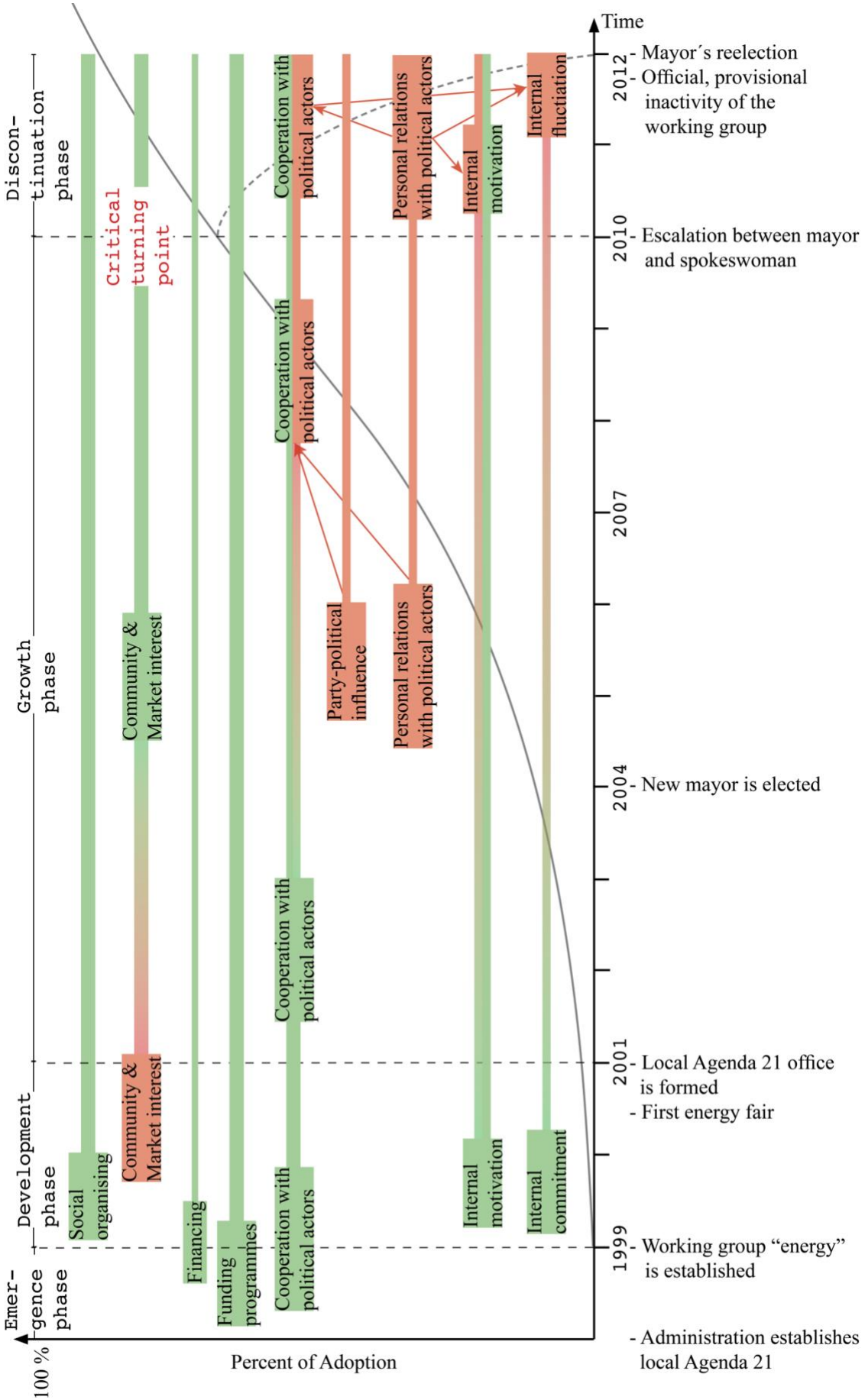
In 1998 the small town’s council decided to join the global Agenda 21 movement by establishing a Local Agenda 21 (LA 21) programme. National funding programmes were available which the local administration allocated to LA 21 working groups of various themes. In this context the LA 21 working group "Energy" started in 1999. In order to intensify the established good cooperation between working groups and the local administration, they set up a Local Agenda office in the town hall in 2001. The contact person at the Agenda Office was now continuously working on the topics, which allowed for larger projects than the workgroup members could have realised voluntarily in their free time. Following, the working group organised its first big energy fair which marks the start of the growth phase.

In the late 1990s, energy related topics, and thus the working group "Energy", were of weak interest in the local community and for local market actors. But with events like the energy fairs or their "solar study" (more below) the working group could generate increasing awareness and interest for energy issues during the growth phase. According to interviewees, this development was enabled due to strong motivation and commitment of the workgroup members and

particularly the spokeswoman (formerly deputy spokeswoman) (C-III_ext.3-poff, #00:14:39). The election of the incumbent mayor in 2004 marks a point of change in the development of the working group. While the cooperation with the Local Agenda office, and largely with the local council remained positive, the cooperation with the mayor and thus with the local administration as a whole was now deteriorating. This was mainly caused by party political interests and difficult personal relations between the working group's spokeswoman and the mayor. For the first years after the election the working group was able to pursue its work and create positive impact in regard to its objectives. But the thematic, methodical and personal arguments between mayor and spokeswoman became more serious in the course of the growth phase. According to the spokeswoman, the limit of personal incongruity she could reasonably accept was reached, when the mayor censored her article in the local journal in 2010 and did not let her speak on this issue during a public question and answer session in the local council. This constitutes a critical turning point in the development of the working group. Afterwards, there was hardly any constructive cooperation between the two actors.

Consequently, the working group tried to avoid interacting with the incumbent mayor as much as possible and to focus on its content and goals. Although the cooperation with the contact person in the Local Agenda office and the local council was intensified and still positive, the difficult interaction with the mayor could not be circumvented (C-III_int.1-spokes, #00:43:30, #00:43:30) (C-III_ext.2-counc, #00:26:47). In 2012 the next mayoral election in the small town took place. The working group's spokeswoman and her husband actively engaged campaigning against the mayor and for his opponent. Since she could not imagine a continued cooperation, she resigned from the working group after the mayor's re-election. Not only her motivation, but also the motivation of her companions had decreased severely under the situation. Thus, no one was willing to replace her as spokesperson and on these grounds the working group announced its temporary inactivity. In this announcement they indicated the possibility to continue their work and to pursue their goals further, if the circumstances were no longer hampered by personal disputes and party politics

Figure 14: Case III development curve with significant factors and their influences over time: green = stimulating, red=hampering, gradient=changing over time, green & red = simultaneous stimulating and hampering aspects; red arrows = hampering interrelations; solid curve = Rogers' s-curve, dashed curve = LEI's discontinuation.



4.1.1 Initiative Internal

The initiative's development was stimulated by strong **motivation** and **commitment** of its members and spokeswoman in particular (C-III_ext.3-poff, #00:13:19) (C-III_ext.2-counc, #00:08:56). They all engaged voluntarily without **compensation** in their free time (C-III_int.1-spokes, #01:01:34). For the spokeswoman it was a balance to usual her work (C-III_int.1-spokes, #00:07:13) and she describes:

„Also, Umwelt ist mir einfach ein Herzensanliegen, ja. Und Energiethema hat mich schon immer interessiert, also ganz früher schon mit Atomkraft!" (C-III_int.1-spokes, #00:05:42)	So, environment is just a matter of heart to me, yeah. And I've always been interested in energy issues, already in the past with nuclear power! [translated verbatim quotation]

The working group stalked its activities when the spokeswoman stepped down (internal **fluctuation**) and nobody was willing to take over. (C-III_int.1-spokes, #00:49:33). She indicates issues in the interaction with the incumbent mayor as reasons for her resignation, which will be discussed below in 4.1.4 (C-III_int.1-spokes, #00:31:55, #00:49:00) (C-III_ext.1-mayor, #00:22:24). The working group members' expertise covered the spectrum necessary for the work. Additionally in situations where, for instance, technical details of specific installations exceeded the internal **knowledge** and **skills**, the working group reached out to appropriate external providers (C-III_int.1-spokes, #00:58:46). The spokeswoman benefited from her **work experiences** as psychologist in her interaction with different actors (C-III_int.1-spokes, #00:07:45). Besides the before mentioned, case III interviewees address no hampering influences related to internal expertise, wherefore, these factors are evaluated as supportive. The spokeswoman's strong engagement was positively linked the internal **cooperation** (C-III_ext.3-poff, #00:13:13). Even though she had to carry out a large part of tasks by herself, she describes the cooperation as good, since she could always rely on her companions (C-III_int.1-spokes, #00:09:15).

4.1.2 Project

The activities of the working group did not require extensive **financing**. However, the public budget allocated by the local council for LA 21 activities, positively influenced the initiative's development. Cost-free access to municipal facilities for meetings and larger events were supportive circumstances (C-III_int.1-spokes, #00:03:52, #01:00:52) (C-III_int.1-spokes, #00:02.47). Three times, the working group hosted large energy fairs in the municipal hall. The contact person at the LA 21 office in the town hall supported the organisation to a decisive extend (**project management, scope**) (C-III_int.1-spokes, #00:20:44) (C-III_ext.3-poff, #00:28:53)

„Ich meine, kleine Aktionen kann man vielleicht schon durchführen ohne hauptamtlichen Part. Aber die Energietage? Das wäre bestimmt nicht möglich gewesen, ja! Da hat die Stadt dann auch die Halle zur Verfügung gestellt!“ (C-III_ext.3-poff, #00:29:07)	I mean, small actions can perhaps be carried out without a full-time part. But the Energy Days? That would certainly not have been possible, yes! Then the city also made the hall available! [translated verbatim quotation]

4.1.3 Community Sector

The general **community interest** for the working group's energy topics was influential. In the first years of activity, this interest was rather weak and some actors questioned the need for such a working group (C-III_int.1-spokes, #00:21:52) (C-III_ext.2-counc, #00:05:17; #00:33:05). Due to the initiative's work the public interest increased continuously (C-III_int.1-spokes, #00:21:52) (C-III_ext.3-poff, #00:14:18). With growing public interest in energy issues (on the local community level as well as nation-wide, especially after Fukushima in 2011), the knowledge and availability of required information increased to such an extent that the relevance of the working groups advice and activities was again questioned (C-III_ext.2-counc, #00:07:29, #00:14:39). Occasionally, the working group looked at ideas on wind energy projects, but discarded them quickly, as they were strongly rejected in the local community (C-III_int.1-spokes, #00:55:24) (C-III_ext.2-counc, #00:39:19, #00:41:26). According to the mayor, the **community** has a **size** in which the people know public figures as, for example, the council members. Such personal relationships can be beneficial as long as the aspirations are compatible; in conflicts of interest (including party affiliation), these relationships can be a hindrance (C-III_ext.1-mayor, #00:15:15). The large number of about 100 local clubs indicates strong **social organising** and volunteer work is highly valued in the local community, which stimulated the working group's development (C-III_ext.2-counc, #00:04:46, #00:11:51).

„Aber das ist schon auch das Schöne in NAME nach wie vor, dass das ehrenamtliche Engagement sehr wertgeschätzt wird in der Bevölkerung […] egal in welchem Bereich dann!“ (C-III_ext.2-counc, #00:33:53)	But that's also still the beauty of NAME that volunteer work is very much appreciated by the population […] no matter in which area then! [translated verbatim quotation]

With growing awareness of energy issues, the number of visitors that attended the working group's events, such as fairs, open house and other public events rose. Concurrently, the spokeswoman describes an increased interest and **community acceptance**, which motivated her and her group-mates (C-III_int.1-spokes, #00:44:26, #00:57:09). As the working group's interaction with community actors was consistently experienced as positive (C-III_ext.3-poff, #00:08:09) (C-III_int.1-spokes, #00:44:26, #00:57:09), its influence is rated as stimulating.

„Also bei unseren Aktionen […] da haben wir immer wieder gestaunt, wie viel die Leute lesen über uns und dass wir so den Eindruck hatten, dass da wirklich Interesse und Wohlwollen auch uns gegenüber in der Bevölkerung weit verbreitet ist!“ (C-III_int.1-spokes, #00:44:26)	So during our actions […] we were amazed again and again how much the people read about us and that we had the impression that there really is widespread interest and goodwill towards us the population! [translated verbatim quotation]

4.1.4 State Sector

The discussed small town and the surrounding region have a strong conservative character[14]. The CDU is continuously strongest party (**party-political power relations**) in the council of the small town in focus. Likewise, in 2004 the mayor from the CDU was replaced after 32 years in office by a mayor of the same party. Even if from the same political party, this change represents a major change for the working group, as discussed below. A local councillor of the CDU describes that energy topics and environmental protection were not of priority in his party in the late 90s, but topics rather affiliated with The Greens (C-III_ext.2-counc, #00:00:55). In spite of this potential barrier, he describes the relationship between the CDU and The Greens in the local council as very close and good, especially for the initiative's later years of activity. According to him, dissociations between the two parties were mainly provoked by the incumbent mayor (C-III_ext.2-counc, #00:31:22, #00:34:09). According to interviewees, the community's remarkable and valued volunteer work or citizen participation like the LA 21 were not of interest to the mayor in office since 2004 (C-III_ext.2-counc, #00:08:05, #00:25:02, #00:41:52) (C-III_int.1-spokes, #00:36:12). According to him the local administration has been pursuing energy issues and environmental protection using state funding programmes since he took office – with and without the working group "energy" (C-III_ext.1-mayor, #00:05:44). His priority though (**subjects of political interest**), was always the modernisation of infrastructure facilities (C-III_ext.1-mayor, #00:27:00). Political context factors with supporting influence were **funding programmes**. The establishment of Local Agenda 21 working groups was supported by state subsidies from 1992 onwards[15]. This prompted the council to initiate a LA 21 programme in the small town (subjects of political interest), from which the working group "Energy" emerged in 1999 (C-III_ext.1-mayor, #00:00:45). Interviewees also indicate the EEG as influential to the working groups development. The

[14] On federal state politics level, Winfried Kretschmann was the first green politician to become minister president of Baden Wuerttemberg in 2011. In 2016, The Greens replaced the CDU as the majority party in the state parliament for the first time. At the community level though, this political change has had no effect, according to the initiative's spokeswoman (C-III_int.1-spokes, #00:51:56).

[15] As results of the United Nations Conference on Environment & Development in Rio de Janerio, Brazil, 3 to 14 June 1992 (UNCED, 1992)

spokeswoman describes it as stimulating (C-III_int.1-spokes, #01:02:58). According to the incumbent mayor on the contrary, such state funding programmes made the working group "Energy" superfluous (C-III_ext.1-mayor, #00:04:37, #00:07:42). Under the former mayor, the city administration itself provided financial support for energy-oriented renovations or installation of private solar systems (C-III_int.1-spokes, #01:03:25).

As a community-based initiative with an advisory role in the local politics, the Local Agenda 21 working group constantly interacted with political actors. The analysis shows that all interviewees in case III address this interaction and describe it as highly influential. Despite their differences, all external interviewees agree with the internals that the working groups contributions were important and of positive effect to local sustainability endeavours (C-III_ext.3-poff, #00:08:09) (C-III_ext.2-counc, #00:02:50) (C-III_ext.1-mayor, #00:04:37). Since the interaction aspects described by the interviewees are multifaceted, the following analysis distinguished individual and organisational actors, as proposed in the *Multi-actor Perspective* (see 3.2.2). Three ***actors*** at the ***organisational*** level are relevant: the working group "Energy" itself, the local council / local government and the political parties. The **cooperation with political actors** was a factor with far-reaching influence. It was the ***local council*** that decided in 1998 to allocate public budget to establish and maintain a Local Agenda 21 (C-III_int.1-spokes, #00:02.47). This is evaluated as a stimulating aspect leading to the working group's establishment in 1999. The financial and non-financial support by the local government (C-III_int.1-spokes, #00:03:52, #01:00:52) (C-III_ext.3-poff, #00:12:03) was stimulating throughout the initiative's development. The local governments decision to set-up a Local Agenda 21 office at the townhall with an administration employee as permanent contact person was another supportive aspect in the cooperation between the initiative and political actors (C-III_int.1-spokes, #00:03:19, #00:20:44) (C-III_ext.3-poff, #00:28:53). In the Local Agenda 21 working groups, voluntary citizens developed thematic proposals and submitted them to the local council in an advisory capacity (C-III_int.1-spokes, #00:37:28) (C-III_ext.1-mayor, #00:02:23). According to the incumbent mayor, this process is subject to **party-political influence**. Thus, the party-political composition of the local council on the one hand, and the working group on the other can determine, if proposals are accepted or rejected – regardless of the proposal's content (see next quotation). He further elaborates that the working group had the self-conception of having the competence to determine the local council's priorities (C-III_ext.1-mayor, #00:26:29, #00:28:20). This party-politically different composition of the local council and working group, in combination with its self-conception and approach, is in his opinion a factor that has hindered the work and development of the working group (C-III_ext.1-mayor, #00:03:34, #16:09:34) .

"Und jetzt kommt im Prinzip so eine kleine Gruppe an Grünen […] die natürlich da jetzt sagen ‚hört mal zu, ihr müsst das jetzt machen!' Jetzt müssen Sie diesen historisch gewachsenen Kontext sehen, dass man einer Mehrheitspartei plötzlich von unten sagt, was zu machen ist. Da fühlen die sich zunächst auf den Schlips getreten […] es gibt neben der sachlich gebotenen Entscheidung, gibt es durchaus in der Politik so softskills, ich darf es mal so nennen, die dazu beitragen, dass vielleicht auch Entscheidungs-prozesse die geboten wären, nicht in der gebotenen Schnelligkeit umgesetzt werden können, einfach weil sie nicht als opportun angesehen werden, nicht als notwendig angesehen werden und es findet sich in der Politik immer eine Begründung dafür, warum man jetzt etwas anderes prioritär macht als gerade das!" (C-III_ext.1-mayor, #00:16:09)	And now there's basically such a small group of The Greens […] who of course now say to 'listen, you have to do this now!' Now you have to see this historically grown context that one suddenly tells a majority party from below what to do. There they feel first stepped on the tie […]there are, in addition to the objectively necessary decision, there are also soft skills in politics, I may call it that, which contribute to the fact that perhaps also decision-making processes that would be necessary cannot be implemented with the required speed, simply because they are not regarded as opportune, are not regarded as necessary, and there is always a justification in politics for why one is now doing something other a priority than just that! [translated verbatim quotation]

On the contrary, the spokeswoman and the interviewed councillor (CDU himself) describe a good and constructive relationship between the working group and the local council. The council had also maintained its support after the election of the new mayor (C-III_int.1-spokes, #01:00:51) (C-III_ext.2-counc, #00:01:10, #00:07:01, #00:25:58, #00:31:22). According to the interviewed councillor, in this relationship and cooperation, political affiliation played no role for anyone, except the mayor (C-III_ext.2-counc, #00:34:09). Consequently, the councillor sees the personal aspects between the acting mayor and the spokeswoman, rather than the council and the working group and its members as a cause for the difficulties (C-III_ext.2-counc, #00:20:32) as will be elaborated in the next paragraphs.

The interviewees mention the following ***individual actors*** as relevant: the spokeswoman (C-III_int.1-spokes), her husband, the incumbent mayor (C-III_ext.1-mayor), the former mayor, the contact person at the town hall's Local Agenda 21 office (C-III_ext.3-poff). Every interviewee, except for the mayor's subordinate employee at the town hall, addresses the matter of personal difficulties between the spokeswoman and the incumbent mayor.

Interviewees besides the spokeswoman and incumbent mayor themselves, describe different hampering aspects, some of which are summarised following. Regarding the factor of **cooperation** between the ***spokeswoman*** and the ***incumbent mayor***, interviewees indicate that both of them have their special, probably incompatible, characters, working-, and communication styles (C-III_int.2-memb, #00:00:20, #00:02:05) (C-III_ext.2-counc, #00:08:24). Additionally, the mayor's difficulties with committees such as the working group, that he cannot control (C-III_ext.2-counc, #00:22:58, #00:24:31). Furthermore, his

inconsistency in promises and support towards the working group and in parts even obstruction of their projects were hindering (C-III_int.2-memb, #00:00:52) (C-III_ext.2-counc, #00:25:58, #00:27:01). Regarding the factor of **personal relation with political actors**, the bad relationship between the ***acting mayor*** and the ***spokeswoman's husband*** (former representative of The Greens in the local council) is indicated. This is believed to have influenced the relationship between mayor and spokeswoman (C-III_ext.2-counc, #00:21:06).

The mutual allegations of the spokeswoman and the incumbent mayor in the interviews are far-reaching. Only a few are summarized below to illustrate this highly influential factor. The ***acting mayor*** describes the following aspects as reasons for his bad **personal relation** and consequently **cooperation** with the spokeswoman. (a) aspects related to the initiative's work and the ***spokeswoman***, such as: different approaches in solving problems (C-III_ext.1-mayor, #00:19:38); that in his opinion, the spokeswoman and her husband are ideologically blinded and unobjective (C-III_ext.1-mayor, #00:36:30, #00:45:47). (b) Purely personal aspects related to the ***spokeswoman***: "[…] that one does not like each other humanly!" (C-III_ext.1-mayor, #00:19:47, #00:39:47, #00:45:35). And (c) Purely personal aspects not directly related to the spokeswoman: such as personal issues between acting mayor and ***spokeswoman's husband*** (who supported the opposing candidate for the mayor's office in 2004) (C-III_ext.1-mayor, #00:37:10, #00:40:55). Although aspects summed under (c) and especially (b) are non-political aspects, they are described in this subsection, as they influenced the interaction with the incumbent mayor as inherently political actor.

According to the ***spokeswoman***, the **cooperation** between the ***incumbent mayor*** and herself, or rather the working group was difficult, due to the following aspects. That, the mayor had the self-conception of having authority to control and direct the working group (C-III_int.1-spokes, #00:37:28), and because of not being able to, he boycotted their work (C-III_int.1-spokes, #00:50:28); that he did not care about content (C-III_int.1-spokes, #00:39:49); that he has censored an article of the working group in the local newspaper (C-III_int.1-spokes, #00:25:43) and later denied her to speak on this issue during a public question time in the local council (C-III_int.1-spokes, #00:32:37). She indicates the last two aspects as critical turning point in the initiative's development:

„Also das war so ein endgültiger Bruch im Verhältnis zu dem Bürgermeister. Also jetzt nicht im internen Verhältnis, sondern im Verhältnis zum Bürgermeister war das eindeutig! Jetzt ist die Toleranz überstrapaziert, dessen was der sich erlauben kann!" (C-III_int.1-spokes, #00:31:55)	So that was a final break with the mayor. So not in the internal relationship, but in the relationship to the mayor it was clear! Now the tolerance of what the mayor can afford is overstretched! [translated verbatim quotation]

All above factors related to the interaction with political actors on the individual level clearly hampered the working group's development. These factors are even considered as having led to the working group's inactivity. The spokesperson relates them to her withdrawal (C-III_int.1-spokes, #00:31:55, #00:49:00) and they are the general conditions the initiative indicates in its discontinuation statement (see next quotation) (C-III_int.1-spokes, #00:31:55, #00:49:00) (C-III_ext.2-counc, #00:28:42). The mayor was aware of the described circumstances, as the working group has communicated this towards him (C-III_ext.1-mayor, #00:19:55, #00:21:34, #00:22:24). Despite the above, the interaction with two other actors on the individual-political level is described as stimulating. First, the **cooperation** with the ***former mayor***. He was in office when the council established the LA 21 programme and supported the working groups in the further course (C-III_ext.2-counc, #00:10:43). And second, the **cooperation** with the ***contact person at the Local Agenda 21 office*** in the town hall. Her contributions are described as very important and good (C-III_int.1-spokes, #00:14:25, #00:20:44).

„Der Arbeitskreis Energie stellt sein Engagement ausdrücklich nur zum jetzigen Zeitpunkt ein und behält sich vor, unter veränderten Rahmenbedingungen möglicherweise wieder weiter zu arbeiten."	The Energy Working Group is expressly discontinuing its commitment only at this point in time and reserves the right to continue working under changed conditions.
(C-III LA 21 Working Group "Energy," 2012)	[translated verbatim quotation]

4.1.5 Market Sector

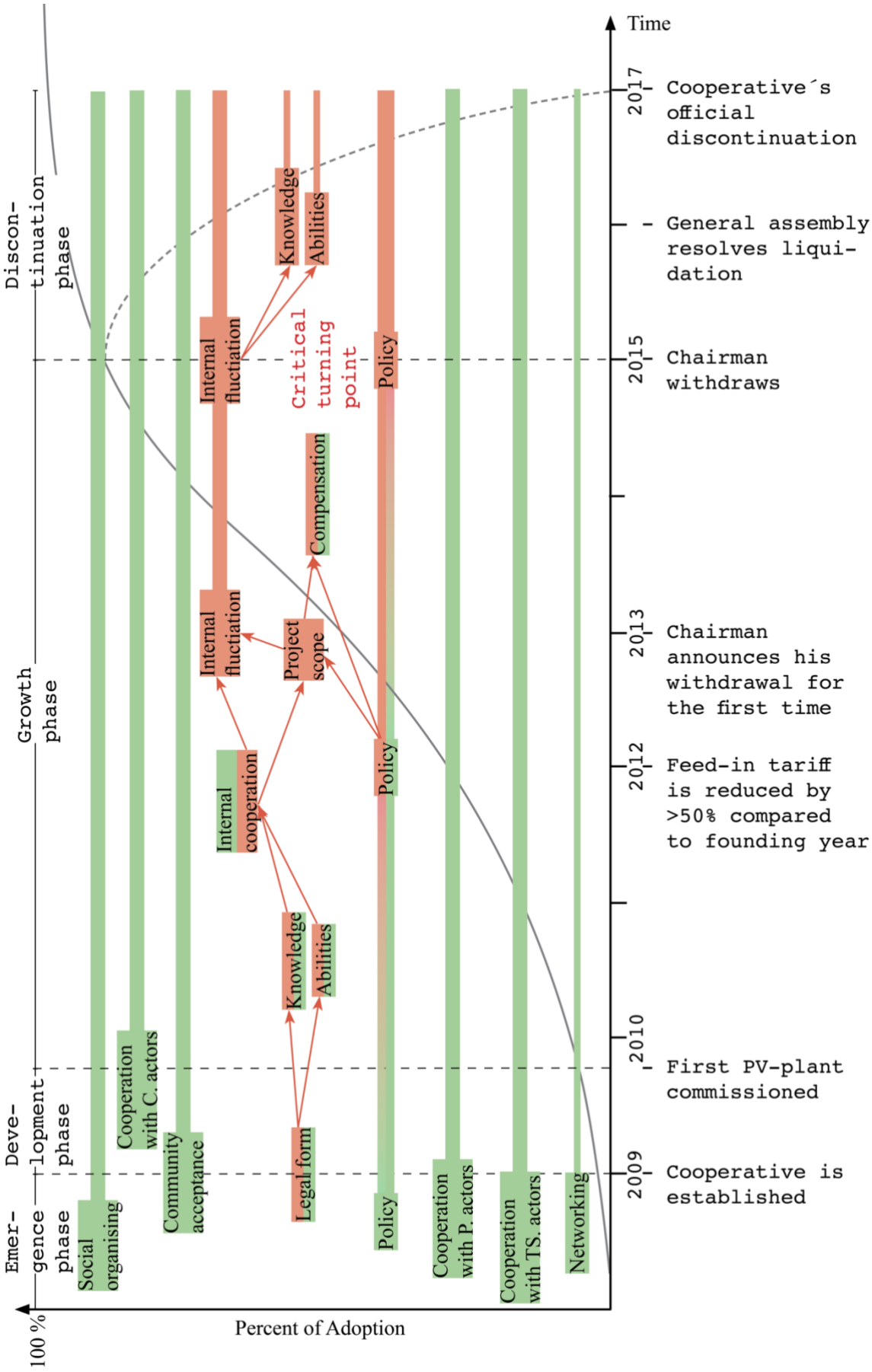
The working group's activities such as the energy fairs or open days aimed at connecting citizens with providers of products and services related to sustainable energy production and consumption. Similar to the local politics and community, the energy and environmental topics were **subjects of** rather weak **market interest** in the late '90s. Interviewees characterise the **cooperation with market actors** in these early years of activity as cautious but positive. Correlating with the described increasing interest in energy topics, this cooperation and feedback improved over the years of activity (C-III_int.1-spokes, #00:21:52, #00:56:43) (C-III_ext.3-poff, #00:11:08) (C-III_ext.2-counc, #00:06:37). Regarding the market context, the working group has always advocated for the establishment of a regional-wide energy agency; that was founded in 2008 (C-III_ext.1-mayor, #00:08:21) (C-III_int.1-spokes, #00:29:28).

4.2 Case IV: A Citizen-Energy Cooperative

In this case (Case descriptions), all factors of interaction with external actors were stimulating, as well as the surrounding context factors. The Renewable Energy Act marks an exception because the influence of this policy became relatively inhibitive in the course of development. The analysis shows that despite the hampering influences of internal and project factors, it was rather their interdependencies that led to discontinuation of the cooperative (see Figure 15).

The cooperative had a flying start. The Citizen-Energy Cooperative Association approached the local mayor with the idea and they jointly realised the founding of the cooperative together with interested community members. This interaction with political and network actors was continuously stimulating until the discontinuation of the cooperative. The legal form of a cooperative enabled an all-encompassing participation of community members, which was credited with strong social acceptance by the socially committed local community and the cooperative soon realised its first PV-project. Running a cooperative is subject to strict regulations. The chairman of the cooperative's board had all required skills, knowledge and experience, due to his professional background. However, he was the only one with this expertise, which made it more difficult to allocate tasks internally and left a lot of tasks up to him. Thus, he had a lot of work with great responsibility and even liability, all honorary and in his free time. It is assumed (he was not available for an interview) that these aspects were at least part of the chairman's reasons to leave the cooperative in 2015. His withdrawal marks a critical turning point in the cooperative's development. Despite an intensive search, no succeeding chairperson could be found, due to the described challenges, and the cooperative finally resolved the liquidation. For the commissioned PV-plants in the cooperative's early days of activity, they received a comparatively high feed-in tariff through the EEG. In just three years, hence, half the time to the critical turning point, this feed-in tariff has been reduced by more than half. At the same time, it was necessary for the cooperative to invest in new projects in order to pay its members a return on the cooperative shares sold. The need to invest, but against the background of both high workload and drastically reduced project revenues, represented a conflict of interest between these intertwined factors. One approach of the cooperative to dealing with this situation was to pay a monetary compensation to the board's chairman, which itself became increasingly infeasible with decreasing feed-in tariffs (C-IV_int.1-board, #00:37:26) (C-IV_int.2-board, #00:36:52) (C-IV_ext.1-assoc, #00:08:32). During the discontinuation phase the association strongly advocated networking with surrounding cooperatives to compensate for the chairman's withdrawal through synergies and cross-cooperative sharing and centralisation of tasks. However, in the end these measures were not implemented and the cooperative was liquidated (C-IV_ext.1-assoc, #00:06:57, #00:08:32).

Figure 15: Case IV development curve with significant factors and their influences over time: green = stimulating, red=hampering, gradient=changing over time, green & red = simultaneous stimulating and hampering aspects; red arrows = hampering interrelations; solid curve = Rogers' s-curve, dashed curve = LEI's discontinuation.



4.2.1 Initiative Internal

The Case IV analysis reveals that internal motivation and commitment factors were of important influence both, partly stimulating, partly hampering the cooperative's development. The cooperative was entirely built on voluntary commitment with no monetary **compensation**. Both internal interviewees state their interest in renewable energies as **motivation** for their engagement (C-IV_int.1-board, #00:03:36) (C-IV_int.2-board, #00:01:47, #00:36:26). In this context, the interviewees described the board members' **commitment** as positive and highlight the extensive commitment of the chairman in particular (C-IV_ext.1-assoc, #00:04:35, #00:15:45) (C-IV_int.2-board, #00:19:00, #00:48:59). Furthermore, the local mayor's contribution, who was chairman of the advisory board, is indicated as supportive (C-IV_int.1-board, #00:13:57) (C-IV_ext.1-assoc, #00:04:35). In contrast the insufficient commitment of other board members in terms of their tasks is indicated (C-IV_int.1-board, #00:12:25). According to internal interviewees the scope of work and associated liabilities were causes for dwindling commitment and even withdrawal of board members as well as for difficulties in finding new people – "It was too much for volunteer work" (C-IV_int.1-board, #00:37:26, #00:44:29) (C-IV_int.2-board, #00:29:46). Therefore, the cooperative reflected on the idea to pay monetary compensations to at least the chairman (C-IV_int.1-board, #00:37:26, #00:39:29) (C-IV_int.2-board, #00:36:52). Internal **fluctuation** inhibited the cooperative's development and is even associated with its discontinuation. The former board member describes, how no successor could be found when he left the initiative in 2013. As a result, his duties were split among two of the other board members (C-IV_int.2-board, #00:22:08, #00:28:31). But when the chairperson resigned in 2015 and his position remained vacant despite an extensive search, did the general assembly resolve the liquidation. This event is emphasised as critical turning point in the cooperative's development (C-IV_int.1-board, #00:10:52, #00:44:29) (C-IV_int.2-board, #00:31:04).

„Der Herr BÜRGERMEISTER hat sogar glaub ich im Gemeindeblatt im Prinzip seinerzeit geschrieben, dass man über eineinhalb Jahre gesucht hat im Prinzip Nachfolger zu finden, und eben nicht geglückt ist und das die Ursache ist, das wir liquidieren müssen!" (C-IV_int.1-board, #00:21:01)	Mr MAYOR even wrote in the parish gazette at the time that, in principle, that one had been looking for successors for over a year and a half, and had not succeeded, and that was the cause that we had to liquidate! [translated verbatim quotation]

Albeit, the external interviewee was surprised by the cooperative's liquidation decision and assumes further influencing factors (C-IV_ext.1-assoc, #00:05:04, #00:13:54). The analysis indicates that the consequence following the chairman's resignation was so ultimate, because his previous commitment had been central, in consequence of his professional expertise. For a

legitimate management of the cooperative it was essential to have the **knowledge** of the corresponding requirements as well as the **ability** to implement them. In the present case, the chairman had both, due to his **work experience** in a cooperative bank (C-IV_int.1-board, #00:10:03) (C-IV_ext.1-assoc, #00:04:56). As he was the only one with this knowledge and abilities, he carries out the majority of the work by himself, which intensified the outlined tension of high workload without compensation (C-IV_int.1-board, #00:10:03, #00:36:47) (C-IV_int.2-board, #00:19:55, #00:27:47).

„Der (Chairman) kam von der Bank, ner genossenschaftlich orientierten Bank. Und hatte dann eigentlich im Prinzip die ganzen - So eine Genossenschaft ist ja gesetzlich orientiert, da gibt es ja Statuten, da gibt's genaue Dinge die sie beachten müssen - Der hat das ja alles mitgebracht! Aber er war der einzige, der das im Prinzip beherrschte! […] und wenn die eine Person ausfällt, dann hängen sie in der Luft und das war dann auch so!" (C-IV_int.1-board, #00:10:03)	The (chairman) came from a bank, a cooperative oriented bank. And in principle he had all of these - such a cooperative is legally oriented, there are statutes, there are exact things you have to consider - He brought all that with him! But he was the only one who was able to do that in principle […] and if that one person resigns, then you hang in the air and that was the case! [translated verbatim quotation]

Partly, other tasks were taken over by board members who did not have the necessary skills. This situation of internal expertise factors has hindered the development of the initiative to such an extent that the internal interviewees suspect a connection to the chairman's resignation (C-IV_int.1-board, #00:09:48, 00:15:45, #00:36:35) (C-IV_int.2-board, #00:29:46). In contrast to that, they describe their respective professional backgrounds (both technical, one also commercial) as expertise factors with stimulating influence (C-IV_int.1-board, #00:06:01) (C-IV_int.2-board, #00:23:41, #00:25:30).

„Die Versammlungen waren sehr gut! Also, ich, wie sagt man, die Mitarbeit unter den Kollegen, jeder hat irgendwo einen kleinen Aufgabenbereich gehabt, um sich einzubringen, und das hat fast blind funktioniert! Weil doch jeder den anderen gekannt hat!" (C-IV_int.2-board, #00:19:00)	The meetings were very good! So, I, as one says, the cooperation among the colleagues, everyone had a small area of responsibility somewhere to get involved, and that worked almost blindly! Because everyone knew each other!
„Es ist ja immer ein guter Dialog gewesen! […] konstruktiv ist da gearbeitet worden!" (C-IV_int.2-board, #00:52:45)	It has always been a good dialogue! […] constructive work has been done there! [translated verbatim quotation]

The two other interviewees describe the **cooperation** within the cooperative as generally good (C-IV_int.1-board, #00:12:22) (C-IV_ext.1-assoc, #00:16:18) and **personal relations** between board members as supportive (C-IV_int.1-board, #00:10:52, #00:03:36). A more detailed analysis shows, however, that the internal interviewee's assessments regarding the internal interaction diverge. C-IV_int.2-board is full of praise for the division of work and the

cooperation between the involved people (C-IV_int.2-board, #00:19:00, #00:52:45). He had a large scope of responsibilities himself, but whenever needed, he could reach out to the other board members for support (C-IV_int.2-board, #00:26:19). Deviating from this, C-IV_int.1-board describes the internal interaction as closely linked to the challenges of internal expertise, motivation and commitment, as illustrated above. In his view, these aspects were reasons, why the reasonable task division between the initially six board members, had gradually needed to be reduced to three and why he ultimately had to carry out the liquidation with just one other board member (C-IV_int.1-board, #00:05:20, #00:13:27). Due to good internal cooperation, he was able to take over parts of the resigned chairman's tasks in the short term, but not in the long term (C-IV_int.1-board, #00:30:15, #00:42:18). Reasons for these divergent narrations can be assumed in the interviewees' different years of engagement. While C-IV_int.2-board was a board member during the emergence and development phase, C-IV_int.1-board was on the board mainly during the discontinuation phase (see Table 5). In summary, internal interaction factors can be regarded as stimulating, however, hampering in connection with other factors.

4.2.2 Project

Planning and installation of the deployed photovoltaic technology need to comply with **technical requirements**. Since the cooperative outsourced the installation to professional companies, this factor had minor influence on the development of the cooperative (C-IV_int.1-board, #00:32:29) (C-IV_int.2-board, #00:23:41). The low required maintenance after the installation is described as positive aspect (C-IV_int.1-board, #00:25:02). The analysis reveals that in case IV financial factors are closely linked to the German Renewable Energy Sources Act (EEG). This Act stipulates the feed-in tariff for renewable energies (see 1.1.2). In short, the cooperative's **financing** model was to invest the shares of its members in renewable energy plants; feed the generated energy into the grid; use the feed-in tariff to cover incurred costs and pay the **profits** to their members as a return (C-IV_int.1-board, #00:22:44). As the feed-in tariffs decreased[16] significantly during the cooperative's years of activity, the tariffs influence change from stimulating to hampering:

„Ja gut, die Fördermittel sind ja drastisch zurück-gegangen! Gut, die Anlagen wurden auch billiger, aber die Rendite war einfach nicht mehr so groß. Ja, man hat sich unheimlich strecken müssen, um überhaupt eine Rendite von zwischen 4 und 6% heraus zu bekommen!" (C-IV_int.2-board, #00:37:09)	Yes, well, the subsidies have drastically decreased! Well, the plants became cheaper too, but the return was simply not so great anymore. Yes, one had to stretch oneself out far, in order to get out at all a return between 4 and 6%! [translated verbatim quotation]

[16] In 2009, founding year of the cooperative, the feed-in tariff was above 40 cents / kWh. In just three years, it fell by more than 50%, settling at around 12 cents / kWh from 2014 onwards (BMWi 2019a)

The initially high returns made cooperative shares an attractive investment in the emergence and development phase, especially compared to low interest rates at banks after the economic crisis in 2009 (C-IV_int.1-board, #00:19:11, #00:22:44) (C-IV_int.2-board, #00:09:23, #00:37:09). The returns, the cooperative could pay its members decreased in line with the feed-in tarrif of the PV-plants commissioned during the growth phase (C-IV_int.1-board, #00:22:44) (C-IV_int.2-board, #00:09:23, #00:37:09) (C-IV_ext.1-assoc, 00:05:49). Accordingly, considerations to pay the chairman for his work in the cooperative became increasingly financially infeasible. The cooperative had reflected on this idea to compensate for the described negative influences from the workload exceeding a scope reasonable for volunteers (C-IV_int.1-board, #00:37:26, #00:39:29) (C-IV_int.2-board, #00:36:52). Since the feed-in tariffs are paid for 20 years from plant's commissioning, the municipalities have gladly taken over the cooperative's plants during its liquidation (C-IV_int.1-board, #00:24:01). This coincides with the assessment of the external interviewee. In her opinion the decreased feed-in tariff has a negative impact on the emergence of new citizen-energy cooperatives; but existing projects are still profitable (C-IV_ext.1-assoc, #00:09:30). Due to the financial dimension of wind power projects, the cooperative discarded their considerations about expanding its activities in this direction (C-IV_int.1-board, #00:21:41) (C-IV_int.2-board, #00:09:14) It can be summarised that the first development phases of the cooperative were stimulated by the financing and profitability factors' influences. With decreasing feed-in tariffs, their influences became a hindrance to the following development phases.

The interviewees describe that the **legal form** "cooperative" has both, stimulating and hampering influences in the initiative's development. Stimulating: based in the civil society and community members can participate in terms of responsibilities and benefits (**project outcome**) (C-IV_int.1-board, #00:02:21) (C-IV_int.2-board, #00:06:57). Hampering: the required knowledge and abilities, as discussed above (C-IV_int.1-board, #00:10:03, #00:11:47); and the associated **liability** of board members (C-IV_int.1-board, #00:37:26).

„Genossenschaft hat nen guten Ruf hier in Baden Württemberg, oder darüber hinaus schon, also eine sichere Sache. Die aber dann impliziert, dass du das tatsachlich auch nach genossenschaftlichen Richt-linien abwickelst! […] Sie haften ja auch als Vorstand mit ihrem persönlichen Eigentum, ne, soweit geht das! Und das sind alles Dinge die dann im Laufe der Zeit eben kamen und man sagt, ‚ja halte mal, du machst das im Ehrenamt! Du bist Bankbeamter, im Prinzip, auf Ehrenamt, das kann ja wohl nicht sein!'" (C-IV_int.2-board, #00:17:03)	Cooperative has a good reputation here in Baden Wuerttemberg or even beyond, so it's a sure thing. This implies, however, that you actually do it according to cooperative guidelines! […] You are also liable as a board member with your personal assets, ne, that's how far it goes! And these are all things that just came up in the course of time and one says, 'yeah wait a minute, you do it as a volunteer! You are a bank clerk, in principle, in honorary office, that can't be!' [translated verbatim quotation]

The high workload and its related aspects were also reasons for the other internal interviewee to withdraw (C-IV_int.2-board, #00:22:08). And both internals assume similar reasons for the resignation of the chairman (C-IV_int.1-board, #00:36:47) (C-IV_int.2-board, #00:27:47, #00:29:46). At the same time, the cooperative would inevitably have had to invest in new projects in order to be able to pay returns on the many shares bought by its members (C-IV_int.1-board, #00:47:53) (C-IV_int.2-board, #00:21:59). However, this growth was limited by several aspects. It became increasingly difficult to find municipal buildings for further projects. The cooperative had built their PV-plants on such buildings (**project location**), because it was simpler in terms of legal and planning conditions (C-IV_int.1-board, #00:07:40, #00:21:29) (C-IV_int.2-board, #00:12:58, #00:21:59, #00:32:22) (C-IV_ext.1-assoc, #00:05:39). Own wind power projects were financially and scope-wise infeasible, but also the investment in shares of larger wind park projects was hampered by the Capital Investment Act[17] (Kapitalanlagegesetztbuch (KAGB)) (C-IV_ext.1-assoc, #00:11:51) (KAGB, 2018).

4.2.3 Community Sector

Two community context factors had an influence on the cooperative's development. First, **social organising** in the community, reflected in strong engagement of community members in various clubs. Furthermore cooperatives enjoy a great reputation in the community (C-IV_int.1-board, #00:17:03, #00:29:49) (C-IV_int.2-board, #00:53:09). Second, the **community's size** of about 1,700 inhabitants, in which the people still know each other personally (**personal relations**) (C-IV_int.1-board, #00:29:28) (C-IV_int.2-board, #00:14:54).

„Man kannte die meisten Leute auch die Mitglieder waren. Das ist ja klar in so einer Gemeinde […] da kennt man einander! Also von der Seite, es war schon eine persönliche Sache, dann im Prinzip schon auch: ‚hast du auch Anteile? Ja, gut! Genossenschaft, alles gut!'" (C-IV_int.1-board, #00:29:28)	You knew most people that were members. That's clear in such a community […] people know each other! So from that side, it was also a personal thing, then in principle: 'do you also have shares? Yes, good! Cooperative, all good!' [translated verbatim quotation]

Accordingly, **community acceptance** was high and the cooperative enjoyed strong support from its ~230 members. An important aspect for the cooperative and the reason why they offered affordable shares (C-IV_int.1-board, #00:14:55) (C-IV_int.2-board, #00:09:53). Furthermore they facilitated a close **cooperation** through constantly keeping their members and the community well informed about their activities and organising joint excursions or public events such as the launch of new PV-plants (C-IV_int.2-board, #00:15:59) (C-IV_ext.1-assoc, #00:15:45).

[17] This act determines the ratio of own operational activity to shareholder participation, infeasible for the coop.

4.2.4 State Sector

On the local political level[18], the mayor initiated the founding of the cooperative (**subject of political interest**) and constantly supported its work, in his role as chairman of the advisory board (**cooperation with political actors**, shaped by good **personal relations**) (C-IV_int.1-board, #00:13:57, #00:44:11) (C-IV_ext.1-assoc, #00:00:41). This cooperation was stimulating and the cooperative enjoyed strong **political acceptance**, which was crucial for executing projects on buildings of the local and some neighbouring municipalities (C-IV_int.1-board, #00:07:40) (C-IV_int.2-board, #00:12:58). Influences of the **policy** Renewable Energy Sources Act (EEG) are already discussed above.

4.2.5 Market Sector

The cooperative's interaction with market actors was largely limited to **cooperation** with service providers for planning, installation and maintenance of their PV plants. In this context, one of the former board members in particular highlights his helpful **personal relations with market actors**, which he had through his professional background (C-IV_int.2-board, #00:23:41).

4.2.6 Third Sector

„Ich war damals unterwegs mit dem Energieversorger EnBW in Baden Württemberg und wir haben einfach die Kommunen angefragt: ‚wie sieht's aus, hätten Sie Interesse vor Ort Energiezukunft zu gestalten? Vielleicht eine Energiegenossenschat zu gründen?'" (C-IV_ext.1-assoc, #00:00:41)	Back then, I was on my way with the energy supplier EnBW in Baden Wuerttemberg and we simply asked the municipalities: 'what do you say, are you interested in shaping the energy future locally? Perhaps to establish an energy cooperative?' [translated verbatim quotation]

Based on these initiatives the first contact between the Citizen-Energy Cooperatives Association and the local mayor was established which led to the founding of the cooperative (C-IV_ext.1-assoc, #00:00:41) (C-IV_int.1-board, #00:01:13). All interviewees describe the continuing **cooperation** between the association and the cooperative as stimulating (C-IV_ext.1-assoc, #00:04:35) (C-IV_int.1-board, #00:30:46) (C-IV_int.2-board, #00:43:38). Anyhow this **networking** activities could not prevent the cooperative's discontinuation (C-IV_ext.1-assoc, #00:13:54)

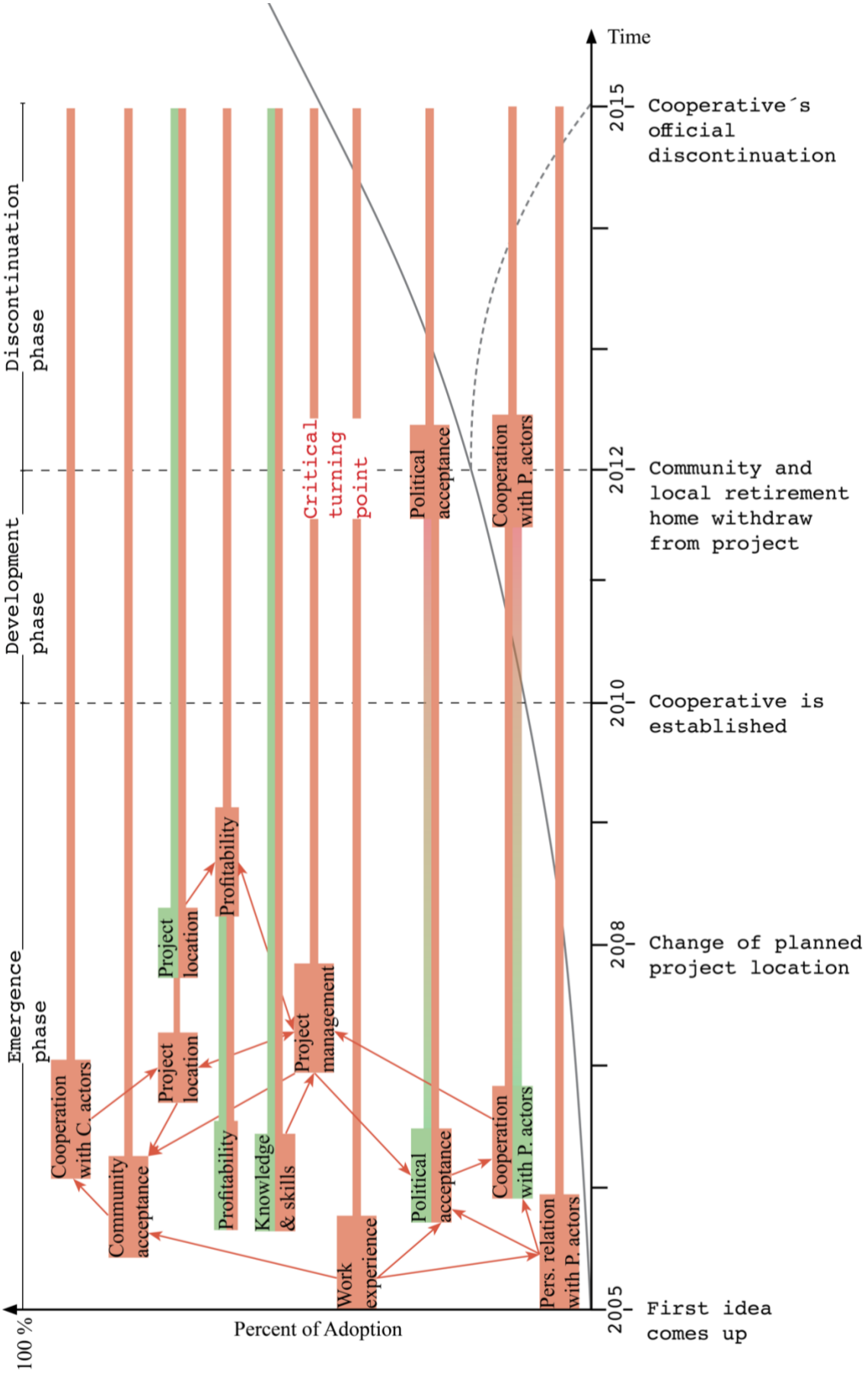
[18] In addition, at the state level: in 2011, The Greens and SPD replaced the former federal government in Baden Wuerttemberg of CDU and FDP; W. Kretschmann from The Greens became new minister president. According to one interviewee, this change in **party-political power relations** has strengthened the awareness of energy transition issues in the community (C-IV_int.1-board, #00:27:00). For another, this influence was not perceivable (C-IV_int.2-board kein Datum, #00:45:59)

4.3 Case V: A Cooperative Local Heating Network

The analysis reveals that the interdependence of influencing factors as illustrated in Figure 16 was decisive in case V (Case descriptions). Internal expertise factors, project management as well as the factors related to interaction with political and community actors were of particularly hampering influence. It is moreover striking that the interviewees describe hardly any factors with supporting influence.

Even before the first idea, to install a woodchip-fired district heating network in the village as a cooperative, the initiators had been involved in projects with similar technology. These previous projects were marked by difficulties and failures and also the companies of the initiators were unsuccessful. These experiences were factors whose hampering influence throughout the time of activity affected other factors and the development of the cooperative as a whole. These bad experiences inhibited acceptance and trust in the local community. They hampered the personal relationship with political actors, as well as the political acceptance present in the beginning. The acceptance by political and community actors was negatively influenced by the cooperative's project management often criticised for the location decision, early promises that were not fulfilled later, or project communication. Dwindling political acceptance made cooperation with political actors more difficult, which in turn had an inhibiting effect on the cooperative's project management (regarding e.g.: permits or compliance with previous statements of intent). The lack of acceptance and trust also hindered cooperation with community actors, who even organised a citizens' initiative and protested against the first location of the incinerator until the cooperative moved it to the fringe of the village. This change of location was the cooperative's strategy to dealing with the local protests (C-V_int.1-board, #00:44.38). Financing and above all profitability of the project were subject of continuous controversially discussions. This was mutually influential with project management and thereby, with location decision and the cooperation with political and community actors, since they crucially determined these financial aspects. After a five-year long emergence phase, the initiators decided to formally establish the cooperative in 2010. Despite the outlined barriers and even internal scepticism but fully relying on their technical know-how and personal motivation. This marks the start of the cooperative's short development phase of two years. In this phase the cooperation with political actors deteriorated which culminated in the local council's decision, against earlier intensions, not to connect community buildings to the cooperative's district heating network. This decision caused the second main customer (a local retirement home) to withdraw from the project, making the hitherto barely feasible profitability of the project now infeasible. This marks the critical turning point in the cooperatives development whereupon the cooperative immediately filed insolvency.

Figure 16: Case V development curve with significant factors and their influences over time: green = stimulating, red=hampering, gradient=changing over time, green & red = simultaneous stimulating and hampering aspects; red arrows = hampering interrelations; solid curve = Rogers' s-curve, dashed curve = LEI's discontinuation.



4.3.1 Initiative Internal

The analysis reveals that aspects of internal expertise are central in case V, as they are closely linked to various other factors and partly determined their influence. All three board members had professional **experience** in relevant areas. The internal interviewee was an architect and indicates his professional experience as useful for project and financial planning (C-V_int.1-board, #0:36:41). Another board member was even active with his heating company in the same business field as the cooperative. Also, the external interviewees acknowledge the board member's general technical **skills** (C-V_ext.2-poffs, #00:35:18), but:

AdminEmp: „Der Herr NAME 1 hat schon mal einen Betrieb in die Insolvenzgesetzt. Der Herr NAME 2 im Übrigen auch!" DepMayor: „Ja, also beide! Beide führenden Menschen waren dort schon mal insolvent gegangen!" AdminEmp: „Nem Unternehmer kann das immer mal passieren, das muss man ihm jetzt nicht persönlich ankreiden! Aber, das war natürlich auch ein bisschen im Hinterkopf der Leute drin!" (C-V_ext.2-poffs, #00:09:06)	AdminEmp: Mr. Name 1 has already put a company into bankruptcy. The Mr. NAME 2, by the way, also! DepMayor: Yes, both of them! Both leading people had gone bankrupt there before! AdminEmp: This can always happen to an entrepreneur, you don't have to personally chalk it up to him now! But, of course, that was also a bit in the back of people's minds! [translated verbatim quotation]

Furthermore, the aforementioned heating construction company and the interviewed former board member were both involved in previous wood chip heating projects in the municipality. Execution of these projects as well as operation of the installed heating systems were difficult and characterised by failures (C-V_int.1-board, #00:38:13) (C-V_ext.2-poffs, #00:18:03). In this case, experience with similar projects, which can generally be regarded as supportive, has been hampering, as the resulting reputation has had a negative impact on the interaction with internal and external actors (C-V_int.1-board, #00:21:19) (C-V_ext.2-poffs, #00:18:03). According to the external interviewees, the cooperative board could not convince the people that they had learned from their earlier projects (**abilities**). They generally emphasise a lack of project management **knowledge** and skills (C-V_ext.2-poffs, #00:05:50, #00:13:05). Nonetheless the interviewed board member, driven by environmental goals (**motivation**), was convinced of the project and accordingly **committed** (C-V_int.1-board, #00:52:55, #01:24:45). However the **internal cooperation** was burdened (C-V_int.1-board, #00:17:33) as even members of the cooperative expressed their concerns about the project's chances of success:

„Aber da, diese Dinge, die sind also auch, wie gesagt, in der Genossenschaft bisschen diskutiert worden! ‚Ja, guck da! Guck da an, da funktioniert es auch nicht! Da haben die auch, müssen so viel Geld investieren bis das mal klappt!'" (C-V_int.1-board, #00:40:16)	But there, these things, as I said, have also been discussed a little bit in the cooperative! 'Yes, look there! Look there, it doesn't work there either! They have to invest so much money until it works out!' [translated verbatim quotation]

4.3.2 Project

According to the external interviewees, the cooperatives project **management** had multifaceted influences that largely hampered the development of the project and the initiative as a whole (C-V_ext.2-poffs, #00:05:50, #00:27:53). In order to make the project **profitable**, the cooperative at least needed 200 households to agree to connect to their planned district heating network and to purchase their heat energy (**project scope**). Although the cooperative got some oral statements of intent, the number of actual members grew only slowly over time and their bought shares could only cover the running costs (C-V_int.1-board, #00:03:33. #00:17:53, #00:52:09). Decisive for the project planning were the two main customers of the heat energy, namely the community (connection of the kindergarten buildings and village hall) and a local retirement home (C-V_int.1-board, #00:30:18, #00:33:36). When the cooperative was formally established in 2010, they had oral statements of intent from these actors (C-V_int.1-board, #00:03:33, #00:24:22) (C-V_ext.2-poffs, #00:11:39). Furthermore, they had the **financing** confirmation of a bank, which the internal evaluates as positive signal (C-V_int.1-board, #00:14:37). But as the following discussion illustrates, project management and financial planning were complicated by further factors. According to the former board member, little mature data for planning the technical layout of the wood chip heating system was available, due to the novelty of such systems (**level of maturity**). Besides the planning, this also impaired the perception of this technology by external and internal actors (C-V_int.1-board, #00:34:15, #00:41:04, #01:08:21). In addition, the cooperative planned the system with a site for the incinerator directly in the village (**location**), right next to the main customer, the local retirement home. But out of concerns for exposure to noise and fumes (**project outcome**), residents protested and cooperative eventually moved the location to the fringe of the village (C-V_int.1-board, #00:44:38, #01:04:32). For the new location the project got more expensive, because longer pipes were needed to cover the distance (C-V_int.1-board, #00:34:15) (C-V_ext.2-poffs, #00:10:48, #00:36:12, #00:51:32). The cooperative had to change their plans, including first contracts. According to the external interviewees, the cooperative had difficulties in meeting its early promises also related to other aspects (C-V_ext.2-poffs, #00:06:31, #00:14:13, #00:35:44). In order to cope with financial uncertainties[19], the cooperative decided on a flexible energy price (C-V_int.1-board, #00:04:04). This in turn posed planning

[19] According the interviewed board member, renumerations through the EEWärmeG (Erneuerbare-Energien-Wärmegesetz / Renewable Heat-Energy-Sources Act) which supports renewable heat since its enactment in 2009 (EEWärmeG, 2008), were not considered in the profitability calculations (C-V_int.1-board, #00:48:15). On the contrary, the external interviewees describe that it was included and had a supporting influence, but still did not lead to a convincing financial viability (C-V_ext.2-poffs, #00:37:24)

uncertainties for potential customers and is indicated as cause for their hesitance to invest in the cooperative (C-V_ext.2-poffs, #00:30:53). Furthermore, statements of the internal and external interviewees differ widely when it comes to the costs interested households had to expect when connecting to the planned local wood chip heating network. The internal indicates these factors as supportive. According to his description, the planned system of the cooperative could be connected easily and with little financial expense to the existing heating system of the households (C-V_int.1-board, #01:09:55). On the contrary, the externals describe these factors as greatly hampering. According to them, the cooperative called for the dismantling of the old and installation of a new heating system which then was connectable to their local wood chip heating network (C-V_ext.2-poffs, #00:07:30). In the external interviewees' perspectives, the multifaceted financial aspects were some of the main barriers for the cooperative's development (C-V_ext.2-poffs, #00:12:50). Finally, the municipality withdrew from the project in 2012 which caused also the retirement home to resign (C-V_int.1-board, #01:27:46) (C-V_ext.2-poffs, #00:23:27). This represents the critical turning point and beginning of the discontinuation phase.

4.3.3 Community Sector

„Also, es gibt sehr viele Leute die in diesem Thema (Erneuerbare Energien) auch gerne ihr Geld anlegen würden und da aktiv sind! Es gibt in GEMEINDE auch sehr viele Bürger die selbst aktiv sind, jetzt losgelöst von Energiegenossenschaften, die also Photovoltaik- und Solaranlagen gebaut haben!" (C-V_ext.2-poffs, #00:49:03)	Well, there are a lot of people who would like to invest their money in this topic (renewable energies) and are active there! There are also many citizens in MUNICIPALITY who are active themselves, now independent of energy cooperatives, which have built photovoltaic and solar systems! [translated verbatim quotation]

This thematic **interest** and commitment of community members (**social organising**) are generally considered supportive. The village has 1,600 inhabitants (Community's size) and the people know one another (C-V_int.1-board, #00:23:39). The local community knew about the board members business and project history described above. (C-V_int.1-board, #01:04:32). The interviewed former board member describes:

„Wir haben natürlich über diese Dinge vieles an Ärger mit in die Genossenschaft reingekriegt! Weil das eben halt diskutiert wurde. Wie gesagt, BÜRGER-MEISTER kriegt das mit, die Gemeindemitglieder kriegen das mit und alle waren am Ende von dem Projekt nicht mehr überzeugt!" (C-V_int.1-board, #00:41:04)	Of course we got a lot of trouble into the cooperative because of these things! Because that has been discussed. As I said before, MAYOR knows about it, the members of the community know about it and at the end everyone was no longer convinced of the project! [translated verbatim quotation]

According to him, the lack of **community acceptance** and **trust** were main barriers for the cooperative's development (C-V_int.1-board, #01:04:32). Community members have even formed a citizens' initiative to protest against the construction of the wood chip incinerator at the first planned location for fear of noise and fumes (C-V_int.1-board, #00:10:19) (C-V_ext.2-poffs, #00:05:41). The board members' approach to **cooperating with community actors** is indicated as hampering by external interviewees. They describe the interaction as emotional and often gruff in the manner they dealt with worries and criticism of community members, which they, again, knew personally (**personal relations**) (C-V_ext.2-poffs, #00:33:01).

4.3.4 State Sector

In the context of the municipality, environmental protection and renewable energies are described as **subjects of political interest**. Already in the early 90s they had a **funding programme** for solar collector systems (C-V_int.1-board, #01:18:14) (C-V_ext.2-poffs, #00:49:03). In addition funding programmes from the wider political context, such as the German Renewable Energy Heat Act (EEwärmeG), were potentially influencing factors (C-V_ext.2-poffs, #00:37:24).

Regarding the interaction, the analysis shows interrelated influences of various actors. Therefore, the analysis is structured along the actors on the three levels of the Multi-actor Perspective (see 3.2.2). At the ***organisational level*** three actors were relevant: the cooperative itself, the municipal council, and the municipality (comprising the entire local administration including local council and mayor). All interviewees describe that the actors have made their decision about supporting or rejecting the cooperative not only dependent on content, but on the **party-political** affiliation of themselves and that of the cooperative, or rather its board members (C-V_int.1-board, #00:23:39) (C-V_ext.2-poffs, #00:09:58). That the political affiliation of the individuals was known, is again linked with the factor 'community's size' (C-V_int.1-board, #00:23:39). As discussed above, the **cooperation with the *municipality*** was decisive for the development of the cooperative (C-V_int.1-board, #00:33:36) (C-V_ext.2-poffs, #00:23:27). In the beginning the administration in the municipality as well as in the village supported the project (C-V_ext.2-poffs, #00:11:39). Nonetheless did the municipality withdraw from the project after a voted decision in the ***municipal council*** in 2012, which marks the critical turning point in the cooperative's development and the beginning of its discontinuation. This change in opinion is again associated with the board members' experiences, as the last direct quote illustrates (C-V_int.1-board, #00:41:04) (C-V_ext.2-poffs, #00:18:03). As a consequence of different reasons this factor of cooperation with political actors reveals in the analysis not only as highly influential, but, as stated by all interviewees,

the decisive and most evident reason for the discontinuation of the cooperative (C-V_int.1-board, #01:27:46) (C-V_ext.2-poffs, #00:23:27). On the ***individual level*** various actors where involved: different members of the cooperative's board, the local mayor, the village leader, and political group leaders. Regarding the **personal relation** between the ***local mayor*** and his ***fellow board member*** the internal interviewee states:

„Der BOARD MEMBER hatte einen schlechten Namen als Firma gehabt. Und weil er da mit eingebunden war, hat der mit dem Bürgermeister, hat der oft Diskussionen gehabt, die haben sich richtig gehasst!" (C-V_int.1-board, #00:21:19)	The BOARD MEMBER had had a bad name as a company. And because he was involved, he had with the mayor, he often had discussions, they really hated each other! [translated verbatim quotation]

In addition to the personal difficulties the internal interviewee assumes the ***mayor's*** role as chairman of the local energy provider's advisory board as another reason for his rejective stance towards the cooperative and its projects (C-V_int.1-board, #00:21:47). When asked about this issue, the external interviewees respond that they see no conflict of interest, as the energy provider does not sell gas in the concerned village, hence no market shares were at stake (C-V_ext.2-poffs, #00:40:50). For the first years of activity, the former board member describes the cooperation with ***leaders of political groups*** as good. The group leaders gave positive feedback about the project and signalled their support. Nonetheless, it was the same group leaders that voted in the council for the municipal's withdrawal from the project (C-V_int.1-board, #00:21:47, #01:25:49). Furthermore, the internal interviewee describes the cooperation with the ***village leader*** as hampering, whose actions were in his opinion influenced by **personal** and **party-political interests** (C-V_int.1-board, #00:27:16).

4.3.5 Market Sector

From the wider market context, the **oil price** had an influence on the cooperative's development, as it was reference value for their variable energy price. Thus, the strong fluctuations in the aftermath of 2009s economic crises posed a threat (C-V_int.1-board, #00:54:33). The cooperative planned a **cooperation** with the local retirement home as one of their two main customers. As outlined above, the retirement home retracted its oral statement of intent after the municipality resigned from the project (C-V_int.1-board, #00:24:22).

4.3.6 Third Sector

Occasionally, the cooperative visited other LEIs with similar projects. But even though the internal interviewee describes that these visits led to learning effects and motivation, they could not compensate for the negative examples in the municipality itself (C-V_int.1-board, #00:34:15, #00:41:04) (C-V_ext.2-poffs, #00:18:03).

5 Discussion: Lessons from Discontinued Local Energy Initiatives

The following discussion comprises a cross case analysis and a comparison with literature findings. The cross-case analysis answers sub-questions I & II, which investigate the factors that initiatives describe as influential to their development and as causal for their discontinuation. These results are compared with results from the literature in order to analyse whether this research on discontinued LEIs expands the understanding of influencing factors derived so far from continued LEIs and thus answers sub-question III.

5.1 Cross-Case Analysis

After the preceding detailed analysis of the three individual cases III-V, the cross-case analysis includes all relevant[20] cases for a comprehensive view and discussion. This cross-case analysis provides insights about factors that discontinued LEIs highlight as particularly influential to their development (both inhibitory and supportive), the factors decisive for their discontinuation, and how these narratives of the individual cases resemble or differ from that of others. Figure 17 lists all influencing factors revealed in the analysis of the conducted interviews and color-codes significant factors according to their influence on the development of each case study.

5.1.1 Overview

Figure 17 presents an overview from which the following, summarising conclusions can be drawn regarding this study's results of factors that influence LEIs' developments. It shows that a variety of influencing factors stimulated or inhibited the development of the initiatives. Thereby, the analysis reveals that the discontinuation of local energy initiatives is not monocausal but is triggered by a complex interplay of various factors. Almost all factor groups of the IF-framework are relevant, as at least one contained factor had a significant influence on the development of at least one initiative. Exceptions are the groups *interaction with market actors* and *third sector context factors*, whose factors did not particularly influence LEIs' developments. Factors of only three out of fifteen factor groups had a substantial influence in every case, which are *internal commitment & motivation factors*, *financial factors* and *interaction with political actors factors*. Furthermore, there is only one single factor that significantly influenced the development of every studied LEI, namely, **cooperation with political actors**. Moreover, the cross-case analysis shows that only three factors highlighted by

[20] Relevant are the cases II-VI, not relevant is case I as discussed in 'Case descriptions'

more than one initiative are consistently described as either supportive or inhibitory. Namely, the LEIs describe the influence of the factors **internal fluctuation** and **party political influence** solely as hampering, **social organising** in the local community as purely stimulating. The influence of all other factors (if described by more than one initiative, partly even within one case) are described by the LEIs with both inhibitory and supportive influence, revealing a case- and time-dependency of these influences. This means that the same factor can have both inhibitory and supportive influences depending on the case and time or even simultaneously. This supports the approach taken in this thesis to rather investigate factors and their specific influences and not opportunities and barriers, as the same influencing factor can be both.

5.1.2 Initiative Internal

Internal factors influenced the development of every studied local energy initiative. Topics such as climate- and environmental protection as well as the energy transition were **motivations** of interviewees and **visions shared** in their initiatives. Additional aspects included local value creation, socially fair organising as well as experiences with, and interest in energy technologies and systems. In each case, it was key individuals pushing the initiative and its projects forward (**commitment**), which was stimulating while it lasted. But the resignation of key individuals (**internal fluctuation**) or loss of motivation as consequence of other factors, such as workload and various factors related to interaction with political actors (see below) contributed to the decision to discontinue the LEI in three cases (II, III, IV). The analysis of case V shows that, above all, the bad experiences of initiators with similar projects had far-reaching and interrelated inhibitory influences (see Figure 16), and are therefore associated with the discontinuation. All LEIs mention certain expertise as necessary to pursue their endeavours. Three of them (C II, III, VI) had the required expertise (**knowledge**, **experience**, **abilities**) available internally, or could easily obtain it from personal contacts or their networks, which is why they did not highlight these factors as particularly influential (Such factors are indicated in Figure 17 with a ‘X’ and are not described in the following analysis). Internal expertise factors, such as **experience** with respective technologies, project management, or legal requirements for cooperatives had a noteworthy influence in two cases, but contrary to case V these were stimulating in case IV. However, it was above all one person that had the necessary expertise in case IV, which hampered the **internal cooperation**, and made the cooperative particularly dependent on this key figure. Accordingly, his withdrawal marks the critical turning point in the initiative’s development. Though overshadowed by the unequal distribution of internal expertise as well as high workload, interviewees in case IV describe internal cooperation as mostly supportive; in case II and VI it was solely stimulating.

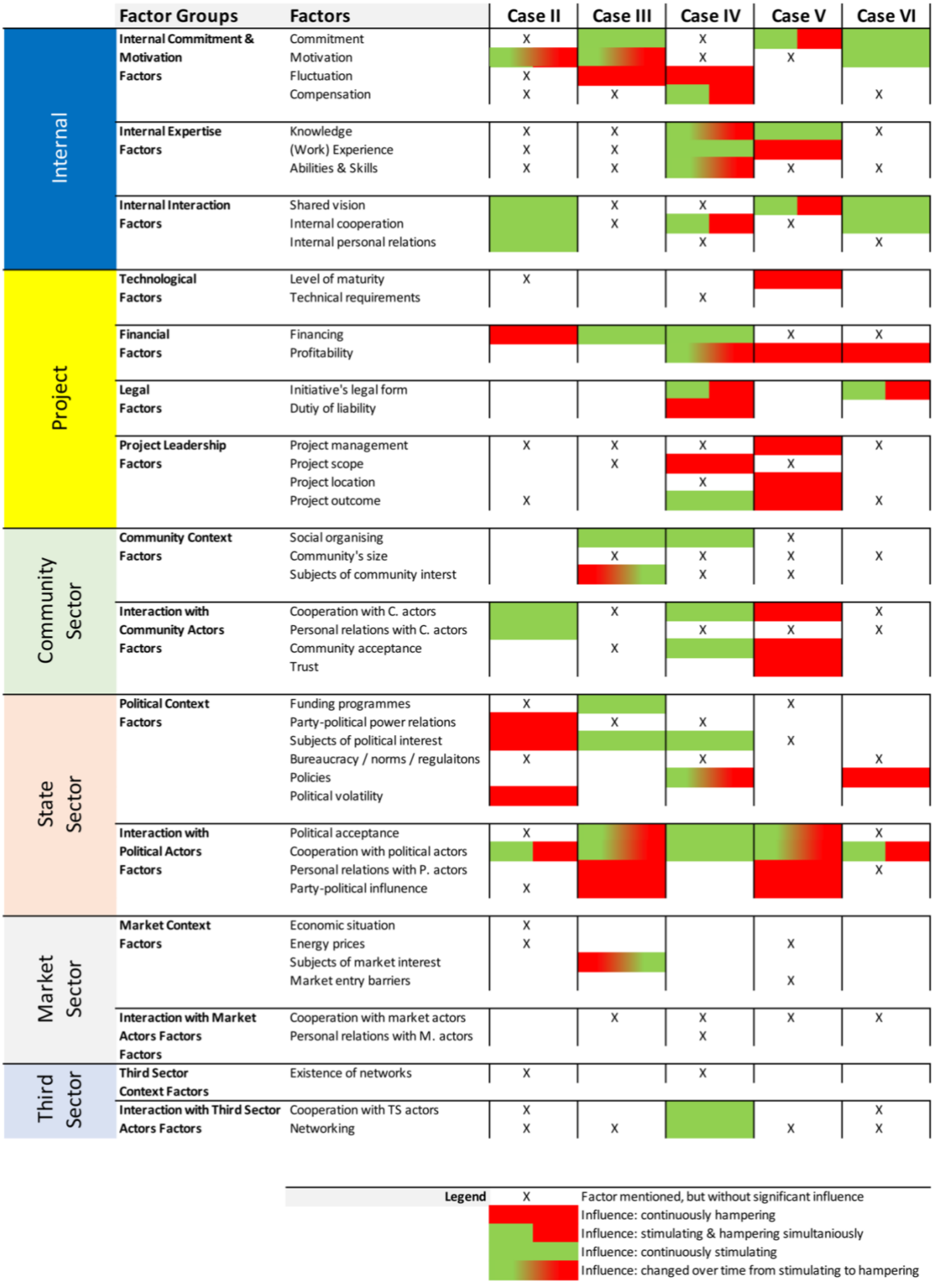


Figure 17: Cross-case analysis results (own illustration)

Project

Financial factors had an influence on the development of every studied LEI. The two non-cooperative initiatives (case II and III) emphasise that they, although time-consuming and tedious, found ways to pursue their projects despite tight budgets (**financing**). For the cooperative cases, however, that project's **profitability** had a decisive influence on their development. The citizen-energy cooperative (case IV) had a strong business case with high profitability during the development and parts of the growth phase. Its profitability declined in correlation with the reduction of the feed-in tariffs (for a thorough analysis, see 4.2.2). As analysed in 4.3.2, the profitability of the cooperatively organised wood-chip fired local heating system (case V) was always a matter of controversial discussions. The regional energy efficiency cooperative (case VI) was a pilot project funded for 3 years by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. For their services (their business model is introduced in 3.1.1), the cooperative asked for 6.5% interest from its customers, 4% were paid as return to the members of the cooperative and 2.5% used to cover internal costs. However, the low interest rate policy at the time of the pilot project (2015-2019) thwarted their business model, as clients had to pay less interest on bank loans than the 6,5% to the cooperative. Interviewees describe this as main cause for their decision to liquidate the cooperative:

„Also wir haben eben einen relativ festen Zinssatz gehabt, der so von PROJEKT-PARTNER und anderen ausgerechnet war, wo wir davon ausgingen, diese Zinshöhe benötigen wir für dieses Projekt, oder für diese Projekte, die da kommen könnten! Und die Zinsentwicklung, die hat natürlich dann, ja, uns praktisch, hat dagegen gearbeitet. Also Draghi hat eigentlich das Projekt kaputt gemacht!" (C-VI_int.2-board, #00:02:50)	So we just had a relatively fixed interest rate, which was calculated by PROJEKTPARTNER and others, where we assumed, we need this interest rate for this project, or for these projects, which could come there! And the interest rate development, which of course has then, yes, us practically, has worked against it. So Draghi actually ruined the project! [translated verbatim quotation]

The **legal form** of a cooperative had similar, ambivalent influences on the LEIs IV and VI. On the one hand, cooperatives offer the opportunity to involve external actors as members and to share both costs and benefits. On the other hand, cooperatives are subject to many complex rules and requirements for which board members are **liable**. Project leadership factors were significantly influential in case IV and V and are already described in detail in the individual case analyses. Comparing the two cases, however, shows that the influence of the **project outcome** factor is stimulating in case IV and hampering in case V. Both cooperatives have promised their members a return on their cooperative shares. This project outcome was realised in case IV and was accordingly supportive. In case V the project, and corresponding the returns,

were never realised. Residents of the village, however, feared negative project outcomes in form of noise and fumes, which even contributed to the initiation of a citizens' initiative protesting against the planned project. The studied LEIs mention hardly any technological factors. Only in case V the novelty of the proposed technology (**level of maturity**), as well as the associated uncertainties regarding the technical and financial planning hampered the LEI's development.

5.1.4 Social Sector

The local communities of cases III and IV are characterised by strong **social organising**, which is indicated by the variety of voluntary associations, among other factors. The interviewees of both cases emphasise that this had a positive effect on the acceptance and support of their initiative in the local community. Established in 2001, the Local Agenda 21 working group (case III) was confronted with weak interest in their energy topics from local community members during the first few years of activity. This **community interest** grew over time and developed into a supportive influence (one of two IF with significant influence changing over time from hampering to stimulating). As three out of five LEIs highlight, the development of their initiatives was influenced by factors of interaction with their local communities. The **cooperation** with community actors stimulated the local energy initiatives II and IV. This is linked to supportive **personal relations** (case II) with community actors and **community acceptance** (case IV). Community acceptance as well as community actors' **trust** in the cooperative's board members, and accordingly their project, were missing in case V. These factors are linked in a mutually dependent manner to the cooperation with community actors, which was a major hindrance in case V.

5.1.5 State Sector

Political context factors had significant influence on the development of four of five local energy initiatives studied. For example, the LA 21 working group (case III) received financial support through a **funding programme**. **Policies** influenced cases IV and VI, with the first being supported to a decreasing extent by the EEG and the business model of the latter being jeopardised by the low interest rate policy. Political context factors were mainly hampering in case II. As the chairwoman describes, the work of her initiative was constantly impeded by a lack of **interest** in energy transition topics from actors at all political levels (local, regional, national, European); as well as a lack of consistency in the political energy transition agenda (**political volatility**). This was repeatedly reinforced by (changing) **party-political power relations** in the political institutions they had to work with. The chairwoman of the initiative

describes the cooperation with political actors, as well as the general political situation, as reasons for the discontinuation of their association:

Immer wieder diese gesamten politischen Veränderungen die dadurch [Wahlen] zustande gekommen sind. Dann hier ein neuer Bürgermeister, dort ein neuer Ortsvorsteher, da ein neuer Ortsbeirat. Dann mussten die sich erstmal finden, wie es so schön heißt, dann müssen die erst mal die Unterlagen sichten. Dann merken sie auch, dass das Thema bei denen nicht mehr im Fokus ist, weil die Bürgermeister dann auch von einer anderen Partei waren. Beschlüsse die mal gefasst wurde, ‚ja, da müssen wir erst mal gucken, ob das alles so richtig war.' So, da merkten sie, dass das immer vager wurde. Und dann die Kraft zu haben, wieder von neuem anzusetzen ist wahnsinnig schwer. (C-II_int.1-chair, #01:08:33)	Again and again all these political changes that came about through [elections]. Then here a new mayor, there a new village leader, there a new local advisory council. Then they had to find each other first, as the saying goes, then they first have to look through the documents. Then they also notice that the topic is no longer in focus for them, because the mayors were then also from another party. Decisions that were once made, 'yes, we first have to see whether all that was done right!' So, then you realise that it was becoming more and more vague. And then to have the strength to start again from scratch is incredibly difficult.
Und die Sinnfrage stellt man sich dann, ja. Macht das alles noch einen Sinn? Wollen wir noch mal von vorne anfangen oder nicht? Bringt das überhaupt noch was? Oder ist das Thema gar verbrannt? Haben wir uns verbrannt? (C-II_int.1-chair, #01:13:12)	And then one asks oneself the question of meaning, yes. Does all this still make sense? Do we want to start all over again or not? Does that still bring anything at all? Or is the topic even burned? Have we burned ourselves? [translated verbatim quotation]

All interviewed local energy initiatives directly interacted with political actors: through cooperation with political actors on their advisory boards (all cooperatives, hence, cases IV-VI), through projects that required cooperation with their local administrations for e.g. permits or collaborative projects (all cases), or by directly addressing their energy issues to political actors from local to national levels (non-cooperatives, hence, cases II and III). All mentioned LEIs highlight at least one factor related to this interaction as significantly influential. That makes this factor group one of the three only ones mentioned in every case study. Furthermore, the factor **cooperation with political actors** is the only single factor emphasised by interviewees of every case study. In case III and IV, the first impulse to initiating the civil societal initiatives came from the local administration (**subjects of political interest**) and in case V, local politicians at least **accepted** the initiative by the civil founders from the local community. Accordingly, the **cooperation with political actors** was stimulating for these initiatives during their initial periods. In case IV, this support mainly came from the local mayor, who was in office the entire time of the cooperatives existence and maintained his support. This differs from case III, where the support for the LA 21 working group mainly came from the local council and was accepted by the former mayor. During the initiative's activity, a new mayor was elected who disagreed with the initiative's activities. As a result, cooperation

between the initiative and the mayor deteriorated and political acceptance declined, even though the local council was trying to maintain support (for a detailed analysis of these dynamics see 4.1.4). Similar for case V, in which the initial political acceptance and facilitating cooperation developed hampering influences over the course of the cooperative's activities. In this case however, the change in influence was not caused by a change in political actors, but is described as related to the cooperative's project management and internal expertise factors (as analysed in 4.3.4). For case II and VI, cooperation with some political actors was stimulating and with others hampering at the same time. Chairwoman of case II describes the cooperation with local administration as stimulating, the cooperation with political actors on regional, national or European level, however, as hampering. Case VI was supported by the local mayor, but describes the cooperation with other individual actors in the local administration as hampering. The cross-case analysis reveals a factor of **personal relation** between LEIs' participants and political actors as influential, independent from the initiatives' contents. The good personal relation between the local mayor and initiative's participants in case IV stimulated the cooperatives development. The exact opposite occurred in case V, where the difficult personal relation between some of the cooperative's board members and local political actors (first of all the local mayor) hampered development. In case III, hampering **party-political influences** came into play once a new mayor had been inaugurated. Interviewees in case III and V describe this as a permanent hindrance throughout the cooperative's activity (see 4.1.4 and 4.3.4.)

5.1.6 Market Sector

Interviewees in case III describe the development of the **interest of market actors** in their energy topics similar to that of the community actors (thus, this is the second of two IF with considerable influence changing over time from hampering to stimulating).

5.1.7 Third Sector

Of the five case studies, only the citizen-energy cooperative (case IV) actively engaged in an established network of cooperatives. The casual **networking** as well as the tangible **cooperation** with this association had a stimulating influence on the LEIs' development. The other cases maintained loose networks with other initiatives or supporting actors. In a few instances, these LEIs address network activities in the interviews, describing them as support albeit not significantly influential.

5.2 Comparison with Literature Findings

The following section presents an analysis comparing influencing factors identified in the empirical case studies and those described in the user innovation (UI) and grassroots innovation (GI) literature. This analysis answers the sub-question III and is the opportunity, which has been missing in the scientific discourse so far, to compare results from studies on continued initiatives with those of discontinued initiatives and thus to increase the robustness of these research results. (cf. Boon & Dieperink, 2014; Nielsen et al., 2016; Ornetzeder & Rohracher, 2013). The influencing factors revealed in the case studies are largely consistent with those described in the literature, both in terms of factors as well as described influences (stimulating or hampering). Beyond that, the present study uncovers first empirical results on the influencing factors that lead to the discontinuation of local energy initiatives. These new insights, as well as remarkable details and differences to the literature, are discussed below.

As described in the literature, the LEIs' **shared visions** and their members' **motivations** were stimulating - and hampering, where they decreased over time. Likewise, the variety of topics and aspects associated with motivation is confirmed. In all studied LEIs, however, conventional UI assumptions of user innovators being motivated by personal benefits (Lüthje & Herstatt, 2004; von Hippel, 1988) are exceeded (see 5.1). Furthermore, their motivations go beyond the free innovation paradigm, according to which free innovators still innovate for themselves, but are willing to share their innovations for free (von Hippel, 2016). This is because all LEIs included in this study are motivated to make a contribution to sustainability in general and the energy transition in particular. The greater the dissemination of their innovations, no matter from which area of the socio-technical spectrum, the greater the impact they strive for. To this end, it is in their interest to invest in overcoming the *market failures* related to the diffusion of free innovations described by von Hippel (2016). Thus, the case study results strengthen the appeal by Nielsen et al. (2016)[21] to broaden these conventional UI notions and to consider social and sustainability motivations when studying bottom-up innovations such as local energy initiatives.

The decline in active engagement of members in bottom-up initiatives, and the withdrawal of key figures (**fluctuation**) in particular, is described in the literature as a challenge for LEIs (among others: Centgraf, 2018; Seyfang & Smith, 2007). This led to the discontinuation of two of the five local energy initiatives studied. Thereby, the withdrawal of the spokeswoman in case III is associated with difficult interaction with political actors (see 4.1 and Figure 14). As the chairman in case IV could not be interviewed, the causal link between his resignation and the

[21] They propose notions of a „sustainable user innovator" (Nielsen et al., 2016)

liquidation of the cooperative could not be confirmed. It is however certain that further factors led to the cooperative's liquidation (see 4.2 and Figure 15). The factors of expertise (**knowledge, skills, experiences**) are extensively elaborated in UI and GI literature (see 2.4.1). Likewise, all LEIs studied address these factors. However, the analysis of case V reveals a phenomenon in this context which is associated with the cooperative's discontinuation and which is not described in this way in the examined literature. The initiators of the cooperative were previously involved in projects with the same technology and these projects and the installed systems were characterised by difficulties and failures. In combination with other factors (that these failures were publicly known (community's size), how the initiators dealt with it (project management, convincingly learning from previous difficulties)), this **experience** had far-reaching inhibitory influences (see Figure 16).

Conventionally, user innovations deal with technical innovations of products and services and the related literature therefore extensively addresses technological factors (among others: Braun & Herstatt, 2007, 2008; Pieper, 2018). The innovations of the studied LEIs cover a wide span on the socio-technological innovation spectrum. They are what de Vries et al. (2015, p. 51) call "configural user innovations": "[…] creating user-designed arrangements of loosely related sets of components [.]" which "[…] combine[s] off-the-shelf technologies with novel technical and non-technical ideas […]". In case of the studied LEIs, only few technological factors were influential. The internal interviewee in case V, for example, associates the novelty of their applied technology (**level of maturity**) and the resulting uncertainties regarding technical and financial planning with the discontinuation of its cooperative. In line with the literature, the present study found sufficient financial resources to have a stimulating influence, while insufficient financial resources were found to be hampering (among others: Boon & Dieperink, 2014; Braun & Herstatt, 2007; Seyfang et al., 2013). This proves particularly decisive for the three cooperatives (cases IV-VI), for which **profitability** is connected to their discontinuation (the profitability in turn is influenced by interest rate policy, feed-in tariffs, energy prices, etc.). Besides stimulating aspects of the legal form "cooperative", such as the possibility to involve community actors, the legal requirements call for a high degree of expertise (among others: Becker et al., 2017; Herbes et al., 2017). In case IV, the widely ramified influences of the necessary expertise are associated with their discontinuation. This was also of significant influence in case VI. Grassroots innovation literature extensively deals with topics of interaction with community actors which are also addressed in the user innovation literature, albeit less prominently (among others: Braun & Herstatt, 2007; Devine-Wright et al., 2009; Pieper, 2018; Wüstenhagen et al., 2007). In agreement with this, the LEIs studied show that **acceptance in the community** had a supportive influence and provided the basis for

stimulating **cooperation with community actors**. The cooperative in case V could not gain acceptance and **trust** in their community nor develop a positive cooperation with affected residents. Here, these factors were mutually influential with factors such as project management and expected project outcomes, as well as the experience of the cooperative's board members, as outlined above. Case V interviewees identify this as reasons for the cooperative's discontinuation.

The UI literature deals intensively with network activities between user innovators: in user and peer communities, in physical places like FabLabs, and virtually in fora and other online communities (among others: Hyysalo & Juntunen, 2018; Pieper, 2018; von Hippel, 2005, 2016). Likewise, GI literature explores in detail how initiatives connect with each other: through network organizations, associations, other intermediary actors or informally between independent initiatives (among others: Sekulova et al., 2017; Seyfang et al., 2014, 2013). Both research fields illustrate how individuals or initiatives connect for single projects or long-term interaction. And they do so to receive and share tangibles (parts, tools) and intangibles (information, experiences). Thus, literature emphasises such networking as stimulating. Of the five LEIs studied, only one (case IV) was active in an established **network**. As illustrated in 4.2, this network has made efforts to provide assistance and work out solutions together during the cooperative's discontinuation phase. The other cases had private and casual contacts with people and organisations outside of their LEIs, but did not engage in systematic exchanges nor describe that they approached networks during their discontinuation phase to seek advice or support. The literature describes the active participation in networks as supportive, which suggests that such participation could also have helped the local energy initiatives studied to overcome the hurdles along their developments.

The comparison of the results of this empirical research and the UI and GI literature shows the most significant differences with regard to influencing factors in connection with the state sector. The individual case analyses and the cross-case case analysis show that **political context factors,** and above all **factors of interaction with political actors,** had a significant influence on the development of the examined LEIs. All five case studies address these factors and associate at least one of them with the discontinuation of their initiative: **policies** (case IV and VI), **subjects of political interest** and **political volatility** (case II), **political acceptance** and **party-political influence** (case III and V), **personal relations with political actors** (case III and V, though, stimulating in case VI), and importantly, **cooperation with political actors** (became over time an unresolved hurdle in case III and V, continuously stimulating and hampering at the same time in case II and VI, and solely stimulating in case IV). These research results reflect what the literature describes about the influence of policies and their changes

(amongst others: Beermann & Tews, 2017; Centgraf, 2018; Wierling et al., 2018). They are widely in line with descriptions of political agendas and the volatility of these, influenced by party politics, among other factors (amongst others: David & Schönborn, 2018; Kooij et al., 2018). Beyond that, UI and GI Literature examines little about the actual, personal interaction between LEIs' members and political actors. Some authors highlight the influential roles of local administrations in sustainability endeavours. However, the descriptions remain on an abstract level and are limited to aspects of general political acceptance and divergence or coherence between the themes and narratives of the LEIs and political actors (amongst others: Centgraf, 2018; David & Schönborn, 2018; Haggett et al., 2013; Hoppe & Coenen, 2011; Wittmayer et al., 2016). Thereby, this literature does not reflect the intensity with which the interviewees describe the influence of party politics in this context:

„Wie gesagt, in so einem kleinen Dorf gibt es ja auch Parteien. Der eine ist SPD, der andere CDU, der andere FDP. Und wenn die ihre Versuche machen da sich durchzusetzen, ne, um auch bei den Wählern, eben halt gute Stimme zu gewähren, das gibt natürlich dann immer so Zwiespalt! ‚Kann ich jetzt für die Genossenschaft sein? Kann ich für die sein?' Das hat also, wie gesagt, uns sehr geschadet!" (C-VI_int.2-board, #00:23:39)	As said, there are parties in such a small village. One is SPD, the other CDU, the other FDP. And if they make their attempts there to assert themselves, he, to get a good vote also with the voters, that gives of course then always such conflicts! 'Can I be for the cooperative now? Can I be for them?' That has thus, as said, harmed us very much! [translated verbatim quotation]

In terms of cooperation, the literature describes how political actors act as catalysts and can support LEIs through means ranging from provision of contacts or physical facilities to consideration, or even advocacy of LEIs' work in political agendas (amongst others: Boon & Dieperink, 2014; Hoppe & Coenen, 2011). These descriptions correspond with the narratives of case IV and the early development phases in cases III and V. The examined literature does, however, lack a description of the possibly devastating consequences that can follow when political actors do not take on these roles and activities, or when their roles and activities oppose the efforts of the LEIs. This is supported by all cases, except case IV.

The present study shows that these discrepancies between LEIs and political actors are not solely due to content-related and political differences. Four out of the five investigated LEIs describe personal relationships with political actors as influential in this context, three cases highlight this as significant and two express a direct link to the discontinuation of their initiatives (cases III and V). Hagget et al. (2013) is the only publication of the reviewed UI and GI literature indicating that personal relations between political actors and members of local energy initiatives can influence the initiatives' developments. Described is, however, only the positive case in which good personal relations can boost permission processes.

6 Conclusion

Civil participatory contributions to the energy transition in form of bottom-up innovations of various socio-technical characteristics motivated all six local energy initiatives (LEIs) studied; and all but case V were successful to some degree before their discontinuation. This thesis endeavoured to mobilise the lessons we can learn from discontinued LEIs regarding factors influencing their developments, in order to understand conditions and processes that enable successful mobilisation of embodied sustainability potentials. Thus, the study is a first step towards filling the gap in research, which to this day almost exclusively examines continued local energy initiatives ("success cases"). Therefore, three sub-questions guided the research, investigating (SQ I) the IFs that influence LEIs developments, (SQ II) the IFs leading to their discontinuation, (SQ III) the extension of previous understanding of influencing factors through these empirical insights into discontinued LEIs.

In-depth individual analyses for every LEI studied and a comprehensive cross-case analysis answer SQs I & II. The result overview (Figure 17) illustrates the revealed factors and their influence on LEIs' developments. The analyses reveal that factors *of internal motivation and commitment, financial factors* and above all factors of *interaction with political actors* contribute to the discontinuation of local energy initiatives. However, the discontinuation is not monocausal but triggered by a complex interplay of various factors. The developed IF-Framework (Figure 9) is a comprehensive synthesis of influencing factors described in the UI and GI literature, which has been continuously refined by the results of the study. The framework was developed to benefit practitioners and is a contribution to research that deals with influencing factors but often restricts its analyses to certain factors. It proves to be profitable to combine the distinct research perspectives of UIs and GIs and bridge the research silos in order to include their differing and complementary perspectives on influencing factors. Comparing the results of the present study on discontinued LEIs with those of continued LEIs studied and described in the literature so far, shows that the results are largely consistent. The factors relating to interaction with political actors were significantly influential in all examined cases and even associated with the discontinuation of two LEIs. However, these factors have hardly been described in LEI literature thus far.

6.1 Research Limitations

6.1.1 Collection of Empirical Data

All initiatives studied were formerly active in Germany, which represents a research limitation. For a large part of the results a transferability into contexts of other countries can be argued.

This applies only conditionally to factors related to the political system in Germany (political context and interaction with political actors factors), or to political visions and policies specific for the German energy transitions. As other authors point out (among others: Boon & Dieperink, 2014; Haggett et al., 2013), it proved difficult to recruit discontinued LEIs for the study, especially against the resource-limited background of this master's thesis (time, network contacts, money). Accordingly, the selection of cases was limited to including all initiatives in the study that were willing and met the criteria.

6.1.2 Analysis of Research Findings

The theoretical basis of this study is formed by the research strands of user innovations and grassroots innovations, as their notions reflect the bottom-up innovation approach as well as the wealth of socio-technical innovations of local energy initiatives. The IF-Framework, which was used for analysis, was developed on the basis of these literature strands. Although this framework was refined with results from this research and discussed with practitioners regarding its practical benefits, it should be critically reflected with influencing factors described in other literature strands, such as social entrepreneurship or niche innovations. In addition, some particularly significant influences stem from interaction factors: internally, with community actors and, above all, with political actors. Since this was a result of the presented research and not its focus, the chosen analytical perspectives only reflect these interaction dynamics to a certain extent.

6.2 Recommendations

„Engagiert euch! […] Bürgerschaftliches Engagement ist unglaublich wichtig! Ja, es ist wichtig für unsere Gesellschaft, für unsere Umwelt und es ist trotz alledem 'ne persönliche Bereicherung! Auch wenn man das nicht in jedem Moment (*lacht) so einordnen kann!" (C-III_int.1-spokes, #01:30:46)	Get involved! […] Civic commitment is incredibly important! Yes, it is important for our society, for our environment and, despite all, it is a personal enrichment! Even if one cannot classify it in every moment (*laughs) in such a way! [translated verbatim quotation]

The following subsections formulate recommendations based on the results of the study. The recommendations address local energy initiatives, supporting actors and academia. Regarding the lessons we can learn from discontinued LEIs, the interviewees formerly engaged in such initiatives gave recommendations themselves, some of which are cited here.

6.2.1 Recommendations for Local Energy Initiatives

Dependency on internal key individuals or goodwill and supporting means of external actors endangers the resilience of LEIs (Parkhill et al., 2015; Seyfang & Smith, 2007). Accordingly, initiatives should invest in capacity building regarding both, internally required expertise,

motivation and commitment, and cooperation and communication with external actors (Middlemiss & Parrish, 2010; Parkhill et al., 2015). Here, the capacities framework developed by Middlemiss & Parrish (2010) and their described approaches for capacity building could be promising starting points. Internal distribution of tasks and a constructive debate regarding fluctuation and succession issues are needed for continuity and longevity of initiatives (Middlemiss & Parrish, 2010; Sekulova et al., 2017). Cooperative LEIs in particular can benefit from research on sustainable entrepreneurship such as the process described by Belz & Binder (2017) which offers tools to develop long-lasting models. Active participation in any type of network or community is recommended for LEIs in addressing the above issues as they can offer, amongst others, information, support, synergies or an overarching coordination structure (Avelino et al., 2019; Hyysalo & Juntunen, 2018; Nielsen et al., 2016; Pieper, 2018; von Hippel, 2005, 2016).

6.2.2 Recommendations for Supporting Actors

„Die Energiewende gelingt nur zusammen: Sie ist eine Gemeinschaftsaufgabe. Sie betrifft nicht nur alle politischen Ebenen, sondern auch Kernbereiche von Wirtschaft und Gesellschaft." (BMWi, 2019b)	The "Energiewende" can only succeed together: It is a common task. It concerns not only all political levels, but also core areas of the economy and society. [translated verbatim quotation]

Market Actors

A dialog with LEIs provides insights into user needs, local requirements and corresponding socio-technical innovations of energy technologies and services developed by LEIs (Gamser, 1988; Hyysalo et al., 2013; cf. Lüthje et al., 2006; Nielsen et al., 2016; Pieper, 2018). These insights are important for respective companies (Gamser, 1988; Herstatt & Hippel, 1991; von Hippel, 1988) and can be integrated into companies' innovation processes to the benefit of all involved, through means of e.g. the Lead User Method (Lüthje & Herstatt, 2004). Aside from technical novelties, LEIs' innovations comprise the novel configuration and adaptation to local needs of existing technologies (De Vries et al., 2015; Hyysalo & Juntunen, 2018; Nielsen et al., 2014). Furthermore, companies should not only regard users as potential innovators, as they take on further roles in the context of the energy transition which could potentially be profitable for companies (roles like "user-producer", "user-legitimator", or "user-intermediary" as described by Schot et al. (2016)).

Political Actors

The study confirms the many descriptions of LEIs' various contributions to the energy transition (amongst others: Beermann & Tews, 2017; Hoppe et al., 2015; Hyysalo et al., 2018; Nielsen et al., 2016). At the same time, the results of the study show that interaction with

political actors has a significant influence on the development of LEIs. Although this influence can be supportive, it was mainly inhibiting in the analysed cases. Not least against their own political vision (previous quote), political actors should open their development processes to LEIs' civil participatory contributions. Thereby, governance approaches like Transition Management offer methodologies for participatory processes that enable co-creation of approaches to sustainability challenges (Loorbach & Rotmans, 2010). Furthermore, political actors should promote the contributions of local energy initiatives worthy of support through the means at their disposal, such as: provision of facilities, contacts and knowledge, financial support, or facilitation of the indicated capacity building in LEIs (Haggett et al., 2013; Hoppe et al., 2015).

6.2.3 Recommendations for Research

The case studies show that in addition to personal interest and benefits, a variety of sustainability issues are driving local energy initiatives. This exceeds conventional notions of UI research (Lüthje & Herstatt, 2004; von Hippel, 1988) and should be taken into account when examining user innovations in the context of sustainability. Recent developments of the concepts towards a *sustainable user innovator* as proposed by Nielsen et al. (2016) proved to be expedient in this thesis. In order to achieve their sustainability goals, LEIs invest in the diffusion of their innovations, as greater dissemination brings them closer to their goal. Therefore, sustainability motivations can be worth considering in the concept of open innovations when it comes to overcoming related *market failures* (von Hippel, 2016). In this research on factors influencing bottom-up innovations, notions and insights of the two research areas of UIs and GIs have complemented each other fruitfully. It can also be profitable for other studies to bridge the silos of the two research areas (Hyysalo et al., 2013; Nielsen et al., 2016; Seyfang et al., 2013). As analysed in detail, the dynamics of interaction between political actors and members of the initiatives have a significant influence on the development of LEIs. As also shown, such dynamics are described only superficially in the studied literature. Investigating the nuances of these dynamics seems to offer topics for informative future research.

6.3 Concluding Remark

„Die ersten Reaktionen waren außerordentlich ermutigend. Wir haben auch tolle Beteiligung gehabt in den Gesprächen die wir dann, auch in den Meetings die wir dann einberufen hatten. Da kamen auch völlig fremde Leute die wir nie vorher kannten, die sich auch dann sogar finanziell beteiligt haben, sind Mitglieder geworden […] Das war sehr schön! Und die Stadt hat das auch wirklich prima gemacht. Die hat uns dann Räumlichkeiten für die Gespräche zur Verfügung gestellt. Da hat das Umweltamt wirklich prima reagiert, also da konnten wir immer sehr gut tagen. Das war sehr schön, das war sehr erfreulich, richtig motivierend!“ (C-VI_int.2-board, #00:52:00)	The initial reactions have been extremely encouraging. We also had great participation in the conversations we had, also in the meetings we convened. There were also completely strangers who we never knew before, who even then made a financial contribution, became members […] That was very nice! And the city really did a great job. It then provided us with facilities for the talks. The environmental office reacted really well, so we could always hold meetings there very well. That was very nice, that was very pleasing, really motivating! [translated verbatim quotation]

This is just one of many interview extracts that show that cooperation between actors from civil society and state (as well as market) can work in the interests and for the benefit of all participants and the energy transition. However, the study also shows that this cooperation and further factors can hinder the development of local energy initiatives. Today, we see stagnating expansion figures for renewable energies in Germany, which are associated with issues such as acceptance by civil society (AEE, 2019a; DWG, 2019). Not least against this background, this thesis would like to recall the vision of the *Energiewende* as a joint task that can only be realised in cooperation between actors from state, market and civil society. It hopes to have contributed to a better understanding of factors that hinder, but can also stimulate, the diversity of socio-technical innovations of bottom-up citizen participation.

7 References

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8 Appendix

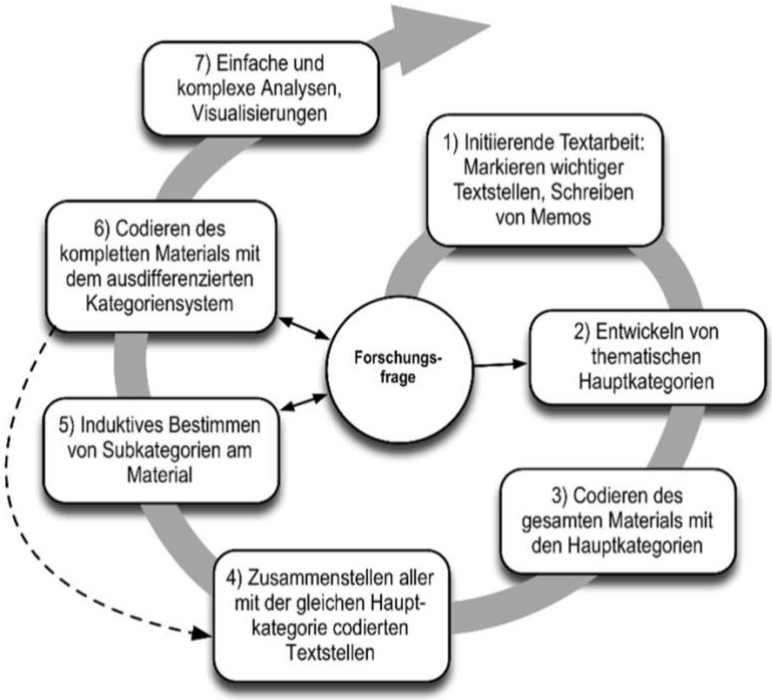
Table of Appendices

8.1 Scopus Search Query

(TITLE-ABS-KEY(local* OR communit* OR "civil society" OR initiativ* OR user* OR niche OR cooperat* OR co-op* OR associat* OR lokal OR gemeinschaft* OR zivilgesellschaft* OR bürgergesellschaft* OR nutzer* OR kooperat* OR verein*) AND TITLE-ABS-KEY(renewabl* W/2 energ* OR "energy transition" OR efficienc* OR sav* OR "climat* chang*" OR sustainab* OR carbon OR (reduc* AND (emission* OR CO2 OR greenhous W/2 gas*)) OR erneuerbar* W/2 energ* OR "energietransition" OR energiewende OR effizien* OR *spar* OR "klimawandel" OR nachhaltig* OR co2 OR kohlen*dioxid* OR (*spar* AND (emission* OR CO2 OR Treibhausgas*))) AND TITLE-ABS-KEY((influen* W/5 (aspect* OR factor*)) OR challeng* OR opportunit* OR threat* OR driver* OR barrier* OR motivation* OR stimulat* OR hamper* OR elicit* OR problem* OR fail* OR difficult* OR *succes* OR *condition* OR (einfluss* W/5 (aspekt* OR faktor*)) OR herausforder* OR chanc* OR möglichkeit* OR gefahr* OR förder* OR hindernis* OR motivation* OR stimulat* OR auslös* OR problem* OR *scheiter* OR schwierig* OR *erfolg* OR *bedingung*) AND TITLE-ABS-KEY(grassroot* OR innovation* OR transition*)) AND (EXCLUDE (SUBJAREA,"COMP") OR EXCLUDE (SUBJAREA,"CENG") OR EXCLUDE (SUBJAREA,"MATE") OR EXCLUDE (SUBJAREA,"MATH") OR EXCLUDE (SUBJAREA,"PHYS") OR EXCLUDE (SUBJAREA,"CHEM") OR EXCLUDE (SUBJAREA,"MEDI") OR EXCLUDE (SUBJAREA,"ARTS") OR EXCLUDE (SUBJAREA,"BIOC") OR EXCLUDE (SUBJAREA,"NEUR") OR EXCLUDE (SUBJAREA,"NURS") OR EXCLUDE (SUBJAREA,"HEAL") OR EXCLUDE (SUBJAREA,"IMMU") OR EXCLUDE (SUBJAREA,"PHAR")) AND (LIMIT-TO (LANGUAGE,"English") OR LIMIT-TO (LANGUAGE,"German"))

8.2 Flowchart of a structuring Qualitative Content Analysis

Illustration by Kuckartz (2012, p. 78)



8.3 One-page bulletin

Front and back of the information sheet that was handed out during the search for interview partners

Interviewpartner für Masterarbeitsstudie gesucht!

Was können wir aus den Erfahrungen eingestellter lokaler Energieinitiativen (LEI) lernen?

- Haben Sie sich allein oder in einer gemeinschaftlichen Initiative im Bereich erneuerbarer Energien, Energieeffizienz oder Einsparung von Treibhausgasen engagiert?
- War dabei Ihr lokales Umfeld Ausgangspunkt Ihres Engagements?
- Ist die Initiative heute inaktiv oder offiziell eingestellt und eine Wiederaufnahme ist nicht konkret geplant?

Dann freue ich mich, Sie für ein Interview im April / Mai 2019 zu gewinnen!

"Was hat Ihnen geholfen?"
"Was hat Sie gehindert oder frustriert?"
"Was hätten Sie gebraucht?"

Ihre Erfahrungen werden benötigt, um zu verstehen, welche Bedingungen für das Gelingen lokaler Energieinitiativen nötig sind! (Wenn Sie wünschen: Interviews anonym / ggf. spätere Vernetzungsveranstaltung)
Bitte nehmen Sie Kontakt zu mir auf oder leiten Sie diesen Aufruf an interessierte Personen weiter.

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Nicht entscheidend für eine Teilnahme an der Studie ist die Organisations- oder Rechtsform der Initiative, sondern bloß, dass nennenswert Ressourcen (Zeit, Mühen, Kosten, etc.) investiert wurden.

Potentiale & Herausforderungen

Initiativen, die sich in ihrem Umfeld für die Nutzung erneuerbarer Energien, Energieeffizienz oder Einsparung von Treibhausgasemission engagieren, stecken voller nachhaltiger Potentiale[i] - wie persönliche Vorteile für die beteiligten Personen, oder auch positive Beträge für die lokale Gemeinschaft und weit darüber hinaus.[ii] Denn lokale Energieinitiativen spielen eine entscheidende Rolle in der Energiewende.[iii]

Jedoch stehen lokale Energieinitiativen im Laufe ihrer Entwicklung immer wieder vor Herausforderungen unterschiedlicher Art.[iv] Um diesen Initiativen sowie fördernden Akteuren* eine Grundlage für ihr Planen und Handeln zu bieten, werden die unterstützenden und hemmenden Einflussfaktoren wissenschaftlich untersucht.[v]

* z.B.: politische Akteure, Netzwerke, Gemeinden, Unternehmen, Bildungseinrichtungen.

Forschungsstand & Forschungslücke

Der Fokus dieser Forschung lag bisher auf Initiativen, die zum Forschungszeitpunkt aktiv waren[vi], d.h., die Wege zur Bewältigung der Herausausforderungen gefunden haben. Auf die gefundenen Bedingungen des Gelingens beziehen sich heute Initiativen und Akteure in der Energiewende.[vii]

Fraglich ist, ob das Fehlen dieser Gelingensbedingungen zur Einstellung lokale Energieinitiativen geführt hat, oder, ob andere Faktoren ursächlich waren. In diesem Fall wären die aktuellen Planungs- und Handlungsgrundlagen verzerrt.[viii]

Der Fokus auf aktive Initiativen betrachtet nur einen Teil der wertvollen Erfahrungen, sodass andere Initiativen und Akteure nicht von den eingestellten lokalen Energieinitiativen lernen können.[ix]

In meiner Masterarbeit möchte ich darum den Erfahrungsschatz eingestelter lokaler Energieinitiativen erforschen, um das Verständnis über Gelingensbedingungen zu verbessern.

Ziel der Studie ist es, erste Antworten auf die folgenden Fragen zu finden:

- Welche Faktoren haben unterstützend bzw. hemmend auf die eingestellten lokalen Energieinitiativen gewirkt und was hat schließlich zur Einstellung des Engagements geführt?
- Entsprechen die von eingestellten lokalen Energieinitiativen benannten Einflussfaktoren jenen von aktiven Initiativen, die bisher untersucht wurden?
- Was können andere lokale Energieinitiativen und Akteure in der Energiewende aus den Erfahrungen eingestellter lokaler Energieinitiativen lernen?

TUHH Technische Universität Hamburg
Technology and Innovation Management at Hamburg University of Technology
drift for transition
Erasmus University Rotterdam

[i] vgl.Tineke van der Schoor and Bert Scholtens, "Power to the People: Local Community Initiatives and the Transition to Sustainable Energy," Renewable and Sustainable Energy Reviews 43 (2015): 666-75, https://doi.org/10.1016/j.rser.2014.10.089.

[ii] vgl. Gill Seyfang, Jung Jin Park, and Adrian Smith, "A Thousand Flowers Blooming? An Examination of Community Energy in the UK," Energy Policy 61 (2013): 977–89, https://doi.org/10.1016/j.enpol.2013.06.030;
M. Ram et al., "Global Energy System Based on 100% Renewable Energy – Energy Transition in Europe Across Power, Heat, Transport and Desalination Sectors" (Study by LUT University and Energy Watch Group, Lappeenranta, Berlin, 2018).

[iii] vgl. Michael Ornetzeder and Harald Rohracher, "Of Solar Collectors, Wind Power, and Car Sharing: Comparing and Understanding Successful Cases of Grassroots Innovations," Global Environmental Change 23, no. 5 (2013): 856–67, https://doi.org/10.1016/j.gloenvcha.2012.12.007;
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[iv] vgl. Frank Pieter Boon and Carel Dieperink, "Local Civil Society Based Renewable Energy Organisations in the Netherlands: Exploring the Factors That Stimulate Their Emergence and Development," Energy Policy 69 (2014): 297–307,https://doi.org/10.1016/J.ENPOL.2014.01.046.

[v] vgl. Seyfang, Park, and Smith, "A Thousand Flowers Blooming? An Examination of Community Energy in the UK."

[vi] vgl. Giuseppe Feola and Richard Nunes, "Success and Failure of Grassroots Innovations for Addressing Climate Change," Global Environmental Change 24 (2014): 232–50, https://doi.org/10.1016/j.gloenvcha.2013.11.011 T4 - The case of the Transition Movement.

[vii] vgl. Ornetzeder and Rohracher, "Of Solar Collectors, Wind Power, and Car Sharing: Comparing and Understanding Successful Cases of Grassroots Innovations."

[viii] vgl. Boon and Dieperink, "Local Civil Society Based Renewable Energy Organisations in the Netherlands: Exploring the Factors That Stimulate Their Emergence and Development";
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[ix] vgl. Claire Haggett et al., "Community Energy in Scotland : The Social Factors for Success," ClimateXChange (2013): 1–25, https://doi.org/10.1016/j.freeradbiomed.2018.01.012;
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8.4 Interview protocol

Abschnitt	Angestrebter Informationsgewinn (Influencing factors (IF)	Nr.	Frage (Themen für spez. Nachfragen)
Überblick über LEI *Infomationen aus sekundären Dokumenten überprüfen*	Name der Initiative *Fallbeschreibung / Interviewgestaltung*	1	Offizieller Name? Bezeichnung im Arbeitsalltag? (#NAME)
	Organisationsform	2	Inoffizielle / Private Initiative? Genossenschaft? Verein?
	Zeitraum der Aktivität *Fallbeschreibung / Interviewgestaltung*	3	Wann: erste Idee? Wann: erste konkrete Schritte / Gründung? Wann: letzte Schritte / Einstellung
	Größe *Fallbeschreibung /*	4	Wieviele Menschen intern beteiligt?
	Interne Organisation (internal organisation)	5	Wie war #Name intern organisiert? (Generalversammlung / Vorstand / Aufsichtsrat //
	Rolle der Befragten >	6	Welche Rollen hatten Sie in / Verbindung zu #Name?
	Ziele (internal values / project	7	Was waren die Ziele von #Name? Wissen Sie, welche Ziele #Name hatte?
	Aktivitäten *Fallbeschreibung /*	8	Was waren Aktivitäten von #Name?
Strukturierter Einblick in LEI Internes	Persönliche Motivation (personal motivation)	9	Was waren Ihre Motivationen, sich bei #Name zu engagieren?
	Persönliche Fähigkeiten (personal skills)	10	Was waren Ihre Aufgaben bei #Name? (persönliche Fähigkeiten eingesetzt?)
	Beteiligte Personen (internal values / diversity)	11	Was für Menschen haben sich typischer Weise bei #NAME engagiert?
	Interne Verhältnisse (internal relations)	12	Beschreiben Sie die interne Zusammenarbeit (Vertrauensvoll, kooperativ)
	Interne Organisation / Lernen (internal organisation and learning / project organisation)	13	Gab es feste Themen, zu denen Sich die Gruppe getroffen hat? Wenn ja, welche, wie regelmäßg und wo? (Erfahrungsaustausch, Lernen, Organisation, etc)
	Kontakt zu Netzwerk (Interaction: Network)	14	War #NAME in einem (in)offiziellen Netzwerk? (neben dem Verband bei Koops. Dachorganisation / (online) community / privates Netzwerk)
Offener Einblick in LEI	Was erzählen interne und externe Befragte über die Entwicklung der	15	Bitte erzählen Sie mir aus Ihrer Perspektive von den Geschehnissen zwischen der ersten Idee und der
Entwicklungsmomente & Entwicklungsphasen	… phase (Serendipity)	16	Beschreiben Sie die Zeit der … phase *(Nur, wenn im narrativen Teil noch gar nicht drauf*
	… phase (Influencing factors)	17	… die Phase war also stark durch XY beeinflusst? Nennen Sie 1-3 Faktoren, die diese Phase stark beeinflusst haben
	… phase (dealing with Influencing factors)	18	Wie ist #NAME mit diesen Einflussfaktoren umgegangen?
erst "ganz am Ende" fragen. Um Ihre Antworten für die nächsten Momente / Phasen nicht zu beeinflussen	… phase (technological factors)	19	Gab es technische Aspekte, die diese Phase unterstützt oder gehemmt haben? (benötigtes Spezialwerkzeug, Materialprobleme, Komplexität der technischen Mittel, offene Schnittstellen, open Source, etc)

Abschnitt	Angestrebter Informationsgewinn (Influencing factors (IF)	Nr.	Frage (Themen für spez. Nachfragen)
erst "ganz am Ende" fragen. Um Ihre Antworten für die nächsten Momente / Phasen nicht zu beeinflussen	… phase (legal factors)	20	Gab es rechtliche Aspekte, die diese Phase unterstützt oder gehemmt haben? (Patente, Garantie, Haftung, Eigentum, etc.)
erst "ganz am Ende" fragen. Um Ihre Antworten für die nächsten Momente / Phasen nicht zu beeinflussen	… phase (financial factors)	21	Gab es finanzielle Aspekte, die diese Phase unterstützt oder gehemmt haben? (fin. Förderung, hohe Investition, Amortisationszeit,
	… phase (Interaction - actors)	22	Welche externen Akteure waren maßgeblich in diese …phase involviert? (nachfragen: entsprechend IF-framework)
	… phase (Interaction - actors)	23	Beschreiben Sie den Austausch mit diesen Akteuren (unterstützend / hemmend, offen, vertrauensvoll?)
	… phase (Interaction - actors)	24	Hätte der Austausch mit diesen Akteuren besser sein können? Wenn ja, was hätten Sie sich gewünscht?
	… phase (social context)	25	Hatte das (Ihr) soziale Umfeld (lokale Bevölkerung) von #NAME Einfluss auf diesen Entwicklungsmoment? Wenn ja, welchen? (Akzeptanz, Ablehung (Wahrnehmung für
	… phase (political context)	26	War die Phase durch das politische Umfeld beeinflusst? ((sich ändernd) Lokale, nationale pol. Themen (Energiewen., EEG), Wahlen)
	… phase (market context)	27	War die Phase durch Markt Aspekte des Umfeldes beeinflusst? (Infrastruktur, Markteinfluss, Wirtschaftskriese)
	… phase (Influencing factors)	28	Welche internen oder externen Aspekte in Bezug auf diese …phase hätten Sie gerne geändert und wie? (Wie hätte #NAME bei diesem Moment besser unterstütz werden können?)
Abschluss	Einflussfaktoren und Umgang mit diesen / Empfehlungen	29	Welche Rahmenbedingungen braucht es / welche müssen sich Ihrer Meinung nach ändern, damit Initiativen wie #NAME ihr volles Potential entfalten
	Erfahrungen / Empfehlungen	30	Zusammenfassend, was haben Sie aus den Geschehnissen gelernt?
	Motivation / Konsequenzen	31	Können Sie sich vorstellen #NAME wieder aufzunehmen? / sind Sie anderswo engagiert?
	Einflussfaktoren und Umgang mit diesen / Empfehlungen	32	Welche Nachricht haben Sie an andere Initiativen?
	Einflussfaktoren und Umgang mit diesen / Empfehlungen	33	Welche Nachricht haben Sie an Akteure mit denen Sie im Austausch standen?
	Themen, die in den Interviews mit internen Befragten	34	*Themen, die in den Interviews mit internen Befragten aufkommen*
	Einflussfaktoren	35	Welche 1-3 Aspekte (Ihrer Meinung nach) haben #NAME besonders unterstützt / gehemmt? (aus IF-Framework Dimensionen und darüber hinaus)
	Umgang mit Einflussfaktoren	36	Wie ist #NAME (Ihrer Meinung nach) mit diesen Aspekten umgegangen?
	Erfahrungen / Empfehlungen	37	Was haben Sie aus den Geschehnissen gelernt?
	Einflussfaktoren und Umgang mit diesen / Empfehlungen	38	Welche Nachricht haben Sie an #NAME / ähnliche Initiativen?

8.5 Coding Framework of Influencing Factors

ATLAS.ti Report

FG1 Internal Commitment & Motivation Factors

Linked Codes:
- ← is part of – ○ F1 Believes
- ← is part of – ○ F1 Commitment
- ← is part of – ○ F1 Compensation
- ← is part of – ○ F1 Internal Fluctuation
- ← is part of – ○ F1 Motivation
- ← is part of – ○ F1 Values

FG2 Internal Expertise Factors

Linked Codes:
- ← is part of – ○ F2 (work) Experience
- ← is part of – ○ F2 Knowledge
- ← is part of – ○ F2 Skills & Abilities

FG3 Internal Interaction Factors

Linked Codes:
- ← is part of – ○ F3 Diversity
- ← is part of – ○ F3 Internal Cooperation
- ← is part of – ○ F3 Internal Learning
- ← is part of – ○ F3 Internal Personal Relations
- ← is part of – ○ F3 Shared Vision

FG4 Technological Factors

Linked Codes:
- ← is part of – ○ F4 Complexity
- ← is part of – ○ F4 Innovation Prevention Means
- ← is part of – ○ F4 Level of Maturity
- ← is part of – ○ F4 Material
- ← is part of – ○ F4 Modularity / Interfaces
- ← is part of – ○ F4 Reliability
- ← is part of – ○ F4 Specialised Tools
- ← is part of – ○ F4 Technical Requirements

FG5 Financial Factors

Linked Codes:
- ← is part of – ○ F5 Financing
- ← is part of – ○ F5 Profitability

FG6 Legal Factors

Linked Codes:
- ← is part of – ○ F6 Duty of Liability
- ← is part of – ○ F6 Initiative's Legal Form
- ← is part of – ○ F6 Ownership
- ← is part of – ○ F6 Right for Compensation

FG7 Project Leadership Factors

Linked Codes:
- ← is part of – ○ F7 Project Location
- ← is part of – ○ F7 Project Management
- ← is part of – ○ F7 Project Outcome
- ← is part of – ○ F7 Project Scope

FG8 Community Context Factors

Linked Codes:
- ← is part of – ○ F8 Alternative Cultures
- ← is part of – ○ F8 Community's size
- ← is part of – ○ F8 Social Organising
- ← is part of – ○ F8 Subjects of Community Interest

FG9 Interaction with Community Actors Factors

Linked Codes:
- ← is part of – ○ F9 Community acceptance
- ← is part of – ○ F9 Cooperation with Community Actors
- ← is part of – ○ F9 Personal Relation with Community Actors
- ← is part of – ○ F9 Trust

FG10 Political Context Factors

Linked Codes:
- ← is part of – ○ F10 Bureaucracy / Norms / Regulations
- ← is part of – ○ F10 Funding Programmes
- ← is part of – ○ F10 Party-political Power Relations
- ← is part of – ○ F10 Policies
- ← is part of – ○ F10 Political Volatility
- ← is part of – ○ F10 Subjects of Political Interest

FG11 Interaction with Political Actors Factors

Linked Codes:
- ← is part of – ○ F11 Cooperation with Political Actors
- ← is part of – ○ F11 Party-political Influences
- ← is part of – ○ F11 Personal Relations with Political Actors
- ← is part of – ○ F11 Political Acceptance

FG12 Market Context Factors

Linked Codes:
- ← is part of – ○ F12 Economic Situation
- ← is part of – ○ F12 Energy Prices
- ← is part of – ○ F12 Market Entry Barriers
- ← is part of – ○ F12 Subjects of Market Interest

FG13 Interaction with Market Actors Factors

Linked Codes:
- ← is part of – ○ F13 Attitude towards Diffusion
- ← is part of – ○ F13 Cooperation with Market Actors
- ← is part of – ○ F13 Personal Relations with Market Actors

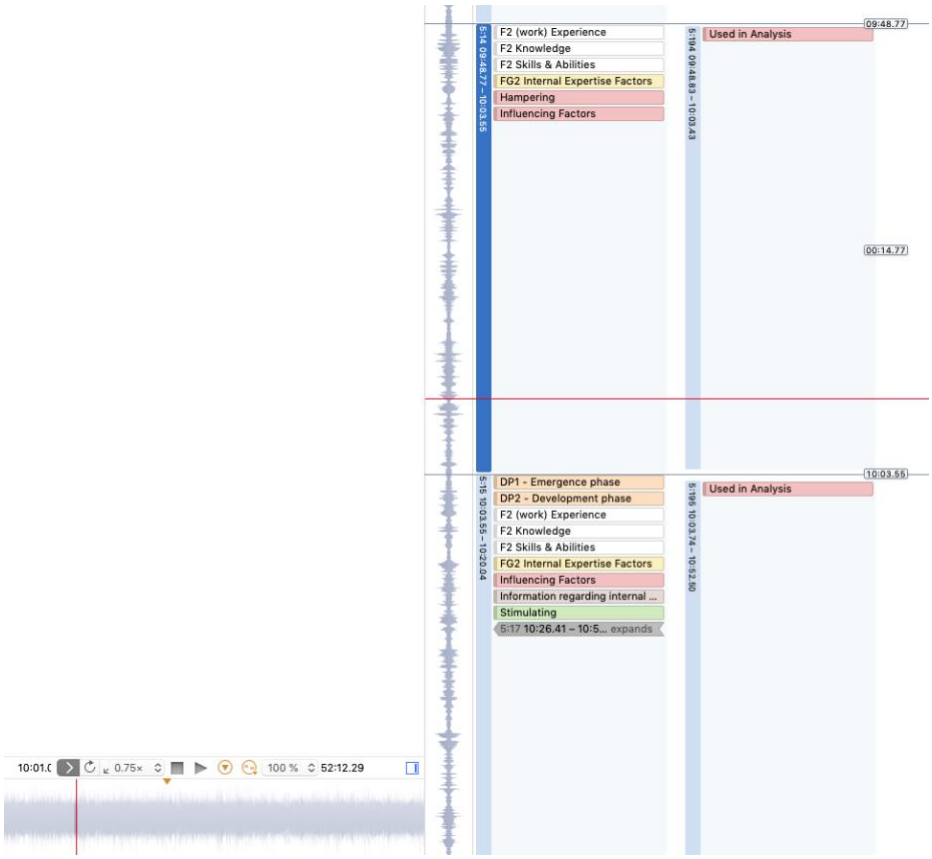
FG14 Third Sector Context Factors

Linked Codes:
- ← is part of – ○ F14 Availability of Networks

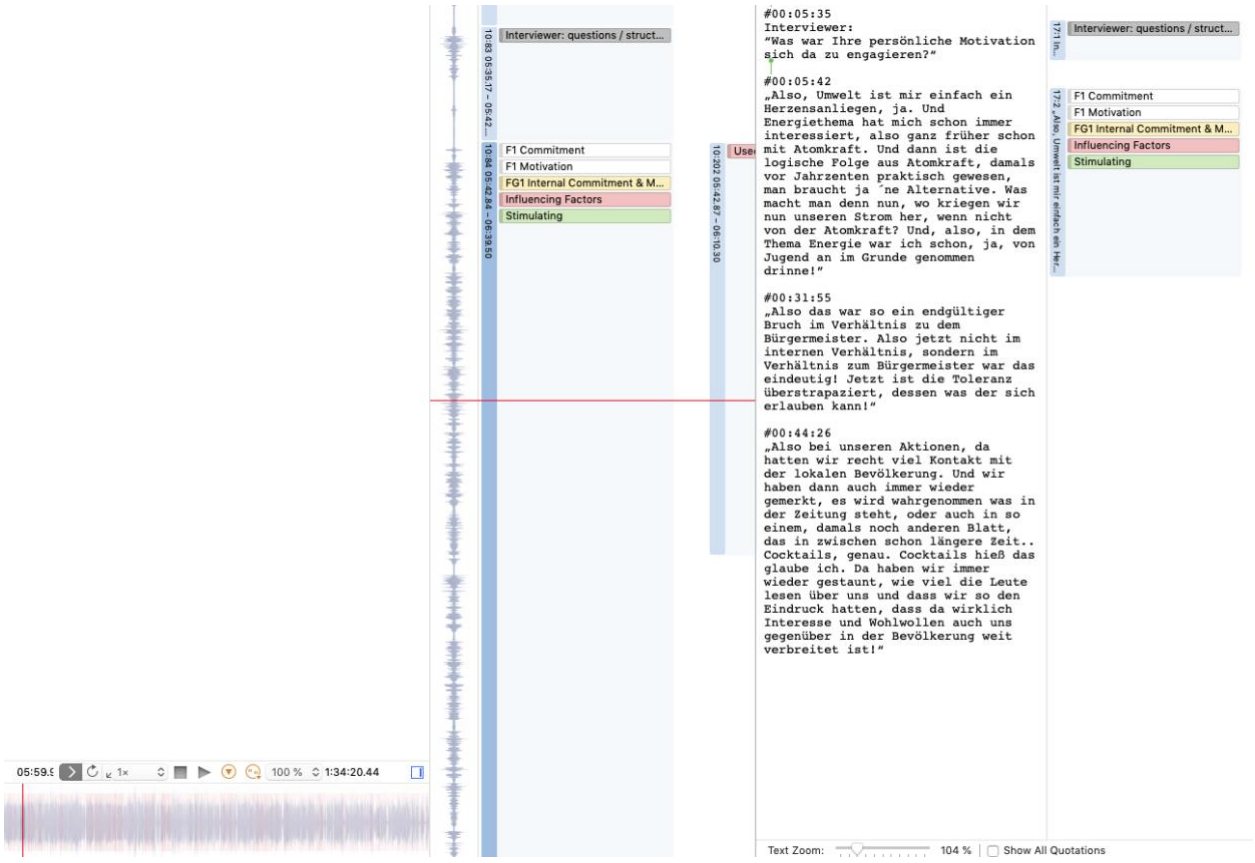
FG15 Interaction with Third Sector Actors Factors

Linked Codes:
- ← is part of – ○ F15 Cooperation with Third Sector Actors
- ← is part of – ○ F15 Networking

8.6 Exemplary illustrations of audio files coded in Atlas.ti



Audio file with related transcript



8.7 Exemplary illustrations of coded verbatim quotations

Partial Transcript: C-III_int.1-spokes

#00:05:35
Interviewer:
"Was war Ihre persönliche Motivation sich da zu engagieren?"

17:1 I... Interviewer: questions / struct...

#00:05:42
„Also, Umwelt ist mir einfach ein Herzensanliegen, ja. Und Energiethema hat mich schon immer interessiert, also ganz früher schon mit Atomkraft. Und dann ist die logische Folge aus Atomkraft, damals vor Jahrzenten praktisch gewesen, man braucht ja ´ne Alternative. Was macht man denn nun, wo kriegen wir nun unseren Strom her, wenn nicht von der Atomkraft? Und, also, in dem Thema Energie war ich schon, ja, von Jugend an im Grunde genommen drinne!"

17:2 „Also, Umwelt ist mir ein...
- F1 Commitment
- F1 Motivation
- FG1 Internal Commitment & M...
- Influencing Factors
- Stimulating

Partial transcript: C-III_ext.1-mayor

#00:16:09
"Und jetzt kommt im Prinzip so eine kleine Gruppe an Grünen, dieser Arbeitskreis hat vorwiegend auch jetzt Leute vom BUND oder von den Grünen da rekrutiert, die natürlich da jetzt sagen ‚hört mal zu, ihr müsst das jetzt machen!' Jetzt müssen Sie diesen historisch gewachsenen Kontext sehen, dass man einer Mehrheitspartei plötzlich von unten sagt, was zu machen ist. Da fühlen die sich zunächst auf den Schlips getreten. Das ist das was ich ansprechen will, es gibt neben der sachlich gebotenen Entscheidung, gibt es durchaus in der Politik so softskills, ich darf es mal so nennen, die dazu beitragen, dass vielleicht auch Entscheidungs prozesse die geboten wären, nicht in der gebotenen Schnelligkeit umgesetzt werden können, einfach weil sie nicht als opportun angesehen werden, nicht als notwendig angesehen werden und es findet sich in der Politik immer eine Begründung dafür, warum man jetzt etwas anderes prioritär macht als gerade das!"

16:4 "Und jetzt kommt im Prinzip so eine kleine Gruppe an Gr...
- F10 Party-political Power Rela...
- F11 Cooperation with Political ...
- F11 Party-political Influences
- FG10 Political Context Factors
- FG11 Interaction with Political ...
- Hampering
- Influencing Factors

Partial transcript: C-IV_int.1-board

#00:10:03
„Der Anfang war relativ, ja, würde ich mal so sagen, relativ moderat. Weil der (Chairman) kam von der Bank, ner genossenschaftlich orientierten Bank. Und hatte dann eigentlich im Prinzip die ganzen - So eine Genossenschaft ist ja gesetzlich orientiert, da gibt es ja Statuten, da gibt's genaue Dinge die sie beachten müssen - Der hat das ja alles mitgebracht! Aber er war der einzige, der das im Prinzip beherrschte! […] und wenn die eine Person ausfällt, dann hängen sie in der Luft und das war dann auch so!"

18:1 „Der Anfang war relativ, ja...
- DP1 - Emergence phase
- DP2 - Development phase
- F2 (work) Experience
- F2 Knowledge
- F2 Skills & Abilities
- FG2 Internal Expertise Factors
- Influencing Factors
- Stimulating

#00:20:50
Interviewer:
„Aber es gab jetzt nicht irgendwie Gegenwind irgendwann aus der Bevölkerung?"

18:2 I... Interviewer: questions / struct...

#00:20:54
„Ne, ne, absolut nicht! Im Gegenteil, ne! Die waren alle tief traurig, im Prinzip, als wir sagen mussten, ‚wir müssen das Ding liquidieren'!"

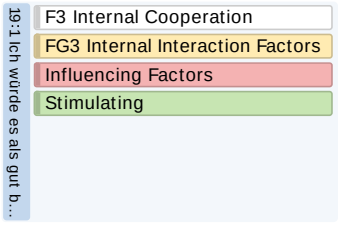
18:3 „Ne...
- F9 Community acceptance
- F9 Cooperation with Communi...
- FG9 Interaction with Commun...
- Influencing Factors
- Stimulating

#00:21:01
"Ohne im Prinzip einen Hehl daraus zu machen weshalb das so war. Der Herr BÜRGERMEISTER hat sogar glaub ich im Gemeindeblatt im Prinzip seinerzeit geschrieben, dass man über eineinhalb Jahre gesucht hat im Prinzip Nachfolger zu finden, und eben nicht geglückt ist und das die Ursache ist, das wir liquidieren müssen!"

18:4 "Ohne im Prinzi...
- F1 Internal Fluctuation
- FG1 Internal Commitment & M...
- Hampering
- Influencing Factors

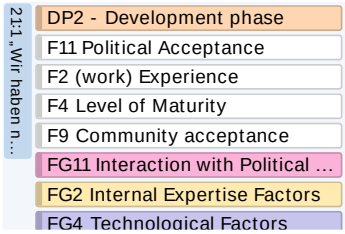
Partial transcript: C-IV_int.2-board

#00:19:00
„Ich würde es als gut bis sehr gut bezeichnen! Es sind nicht immer alle anwesend gewesen bei den Sitzungen, weil sie durch Krankheit oder berufsbedingt verhindert waren. Aber ansonsten… Die Versammlungen waren sehr gut! Also, ich, wie sagt man, die Mitarbeit unter den Kollegen, jeder hat irgendwo einen kleinen Aufgabenbereich gehabt, um sich einzubringen, und das hat fast blind funktioniert! Weil doch jeder den anderen gekannt hat!“



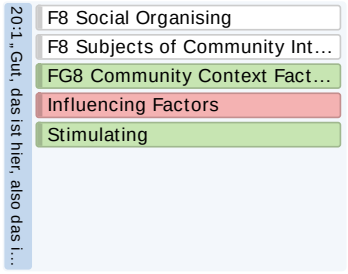
Partial transcript: C-V_int.1-board

#00:41:04
„Wir haben natürlich über diese Dinge vieles an Ärger mit in die Genossenschaft reingekriegt! Weil das eben halt diskutiert wurde. Wie gesagt, BÜRGERMEISTER kriegt das mit, die Gemeindemitglieder kriegen das mit und alle waren am Ende von dem Projekt nicht mehr überzeugt!“



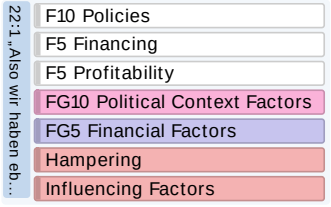
Partial transcript: C-V_ext.1-poffs

#00:49:03
„Gut, das ist hier, also das ist sehr, wird hier sehr positiv gesehen! Die Bürgerenergiegenossenschaft (NICHT DIE UNTERSUCHTE) könnte wesentlich mehr Anteile zeichnen als sie Projekte hat. Also, es gibt sehr viele Leute die in diesem Thema (Erneuerbare Energien) auch gerne ihr Geld anlegen würden und da aktiv sind! Es gibt in GEMEINDE auch sehr viele Bürger die selbst aktiv sind, jetzt losgelöst von Energiegenossenschaften, die also Photovoltaik- und Solaranlagen gebaut haben!“



Partial transcript: C-VI_int.2-board

#00:02:50
„Also wir haben eben einen relativ festen Zinssatz gehabt, der so von PROJEKTPARTNER und anderen ausgerechnet war, wo wir davon ausgingen, diese Zinshöhe benötigen wir für dieses Projekt, oder für diese Projekte, die da kommen könnten! Und die Zinsentwicklung, die hat natürlich dann, ja, uns praktisch, hat dagegen gearbeitet. Also Draghi hat eigentlich das Projekt kaputt gemacht!“



Ehrenwörtliche Erklärung

Ich erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit selbständig angefertigt habe. Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde weder einer anderen Prüfungsbehörde vorgelegt noch veröffentlicht.

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Ort, Datum, Unterschrift: Ole Heins