

CRESSI Working papers

The CRESSI project explores the economic underpinnings of social innovation with a particular focus on how policy and practice can enhance the lives of the most marginalized and disempowered citizens in society.

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Comparative report on historic examples and similar recent social innovations in an early stage

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Editorial

Gudrun-Christine Schimpf

Introduction

If we understand how social innovations (SI) evolve, what they need to flourish or what hinders them from becoming successful and produce social impact we will be able to adopt the right measures and support social innovators and their projects to scale and become a success.

This is the basic idea guiding work package (WP) 5 of the CrESSI project. The intention is to ascertain the general conditions supportive for SI and to research their lifecycles, to find out about actor types and constellations as well as about the economic underpinnings. In revealing the resources, actor strategies, barriers and advantageous circumstances of different SI of divergent contexts and at various stages it should become possible to come up with proposals for policies favourable for SI CrESSI Consortium, p. 21.

While the task of deliverable 5.1 was to analyse the ecosystems and lifecycles of SI using the Extended Social Grid Model (ESGM) (Scheuerle *et al.*, 2016a) and deliverable 5.2 dealt with the economic underpinnings for SI and innovative ways of financing them (Houghton Budd and Naastepad, C. W. M., 2016), the topic of the present deliverable 5.3 is the comparative case analysis. Therefore, historic cases from the long-term research will be compared with contemporary SI at an early stage. Results from research (Scheuerle *et al.*, 2016a) will be applied to current circumstances to see if a transfer of ideas is possible and if historic SI can be or already are inspirational for SI of the present. Thus, the preparation of the foundation for policy recommendations in deliverable 5.4 will be further advanced.

Structure of the report

This report consists of three parts written by CrESSI partners of the Austrian Institute of Technology in Vienna and the Centre for Social Investment at the University of Heidelberg.

In Part 1, entitled “Comparative case analysis – learning from historic case studies for current social innovations in social housing, fresh water supply, and beyond”, Thomas Scheuerle and Gudrun-Christine Schimpf from the University of Heidelberg build upon their former research on social housing and fresh water supply from the 19th to the 21st century (Scheuerle *et al.*, 2016b) and develop potential scenarios for the future of (social) innovations of today. Paying special attention to the social forces (Beckert, 2010) and applying the Extended Social Grid Model (ESGM) (Nicholls and Ziegler, 2015), the case analysis is supported by material and country perspectives provided in WP 2 (Scheuerle *et al.*, 2015; Schimpf *et al.*, 2015).

In the subchapter on social housing, an overview of recent developments and challenges is given. Also, the role of technological developments in social housing is considered. Then, lessons from social housing in history are presented and a set of models suggested both derived from the long-term case studies. The subchapter on fresh water supply first turns to present and future challenges as well as solution approaches. Then fresh water supply as an infrastructure development is compared with the situation of broadband internet today. Potential analogies are researched and the role of technological developments underlined. Furthermore, findings from the fresh water supply study can be transferred to the handling of the broadband internet setup today.

Finally, the research findings are discussed and seven general lessons, taken up from the past, are compiled. Central is the insight that SI are never completed but do constantly develop further in a permanent process of adaptation. Context factors in the social grid change, but similar patterns reoccur and even solutions found resemble each other.

In Part 2, the deliverable is augmented by a case study on the relation between technological and social innovations. Gudrun Haindlmaier from the Austrian Institute of Technology presents insights from her studies on an innovative housing project called “Rosa Zukunft”, based on interviews and desktop research. In “The relation between social and technological innovation in housing projects – the example of ‘Rosa Zukunft’, Austria”, she pursues the relationship and balance of social and technological innovations. Another concern is the impact of sustainability of the measures taken in the project. Haindlmaier introduces the project “Rosa Zukunft”, an energy efficient housing project combining decentralised power generation and smart homes with cross-generational housing. Applying Beckert’s social grid approach (Beckert, 2010), she analyses the institutions, social networks and cognitive frames involved. Analogies to social housing approaches of the 19th century turn up when current attempts to change the energy consumption behaviour of the inhabitants are compared with introducing hygienic behaviour and living standards in social housing endeavours of the past. While the chosen community approach and the solidarity among the residents of the housing project can be considered a success only minor energy savings were achieved by the smart home technology and the measures had to be adjusted. Most interesting is the finding that the relationship and balance between social and technological innovation has not been fostered by “Rosa Zukunft”. Even though both could have been going hand in hand the linkage was not conceptualised.

In Part 3, Susanne Giesecke from the Austrian Institute of Technology analyses the establishing of Participatory Health Research (PHR) in Germany. In “Social Innovation at the Cross Roads of Public Health and Action Research: Participatory Health Research” she introduces the field of PHR as a SI and analyses its development by focusing on two temporary social grids, first on the period between the 1920s up to post-WWII, and second on the period from the 1960s to the present. In PHR, research is done in cooperation between professionals and lay persons. Thus, patients are no passive objects but play an active role in gathering information on their health condition, the impact of their treatment, and on improving their lives. Mostly based on desktop research, Giesecke applies the multi-level perspective and the social grid approach. She demonstrates how the social innovation led from one regime to another, and how changes on the landscape level resulted in changes in the interplay of institutions, cognitive frames, and social networks. She also points out where elements of the old social grid still exist and how PHR could be furthered by more institutional support.

Concluding Remarks

The comparative case analysis turned up interesting results. Applying the findings from the long-term case studies and comparing present developments and SI with past ones, analogies have been unveiled. The transfer of findings offered new perspectives and resulted in insights, models or lessons for current and future SI.

Part 1

Comparative case analysis – learning from historic case studies for current social innovations in social housing, fresh water supply, and beyond

Gudrun-Christine Schimpf, Thomas Scheuerle, Georg Mildenberger

1. Introduction

1.1 Background and purpose of the study

Learning from history might be a helpful perspective for learning for today's Social Innovations (SI). At first sight this might seem to contravene the idea of social innovation research which is more concerned with the present and the future. However, we think that looking backwards could open up new potentials. As many social innovations of our days do not have a long history to look back upon, one might investigate history and learn from social innovations of the past. In the CrESSI project, we understand SI as (CrESSI Consortium, 2013, p. 3): "The development and delivery of new ideas and solutions (products, services, models, markets, processes) at different socio-structural levels that intentionally seek to change power relations and improve human capabilities, as well as the processes via which these solutions are carried out."

In this paper, a more micro perspective as compared to the macro perspective in D 5.1 (Scheuerle *et al.*, 2016a) will be adopted. Among the cases discussed are

- in Social Housing: examples like Krupp, the Garden City movement, participatory approaches, self-help communities, etc.
- in Fresh Water Supply: examples like Michal Kravcik and the "Programme of landscape revitalization and integrated river basin management in the Slovak Republic", the Berlin Water Table, privatisation experiences in the UK and others.

The paper aims at examining how certain elements of the core SI develop or reoccur, and where current SI could profit from lessons of the past. Thus, historic cases are compared with current SI at an early stage and potential scenarios for the future of recent (social) innovations are developed, depending on *resource flows*, *social networks*, *institutions* and *cognitive frames*. We built these analyses on earlier research carried out within the CrESSI project. First results of our long-term case studies have already been published (Scheuerle *et al.*, 2016a). The results of this report and the other reports of work package (WP) 5 will feed into concrete policy recommendations in D 5.4.

1.2 Methodological approach and structure of the report

By comparing social housing in history with current situation of social housing we intend to find out whether specific circumstances given in the ecosystem (economic crisis, availability of resources etc.) can explain the stage of an SI lifecycle at which we find ourselves (again) today. With regard to sustainability of the design of solution approaches we also consider the role of technological developments. Therefore, we first provide an overview of recent developments and challenges (chap. 2.2) and then turn to models and lessons from social housing in history (chap. 2.3). The argument is supported by examples from the data collection and country perspectives of WP 2.¹

In the case of fresh water supply we consider challenges and solution approaches against the backdrop of findings from our long-term case study. We revisit the current debates on the character of fresh water as a public good, as well as experiences and debates on privatisations, and citizen participation in the water sector (chap. 3.2). Doing so, we draw on material and country perspectives provided in WP 2. We also compare fresh water supply (as infrastructure development) in history with the current situation of broadband internet. We look for potential analogies and likewise pay attention to the role of technological developments (chap. 3.2). By this we transfer the findings of the fresh water supply case study to modern infrastructure projects.

¹ On data collection see Scheuerle *et al.* (2016a, p. 17).

Following the underlying research approach of the CrESSI project, we pay special attention to social forces (Beckert, 2010). This means looking at *cognitive frames, institutions, and social networks*. We use the conceptual foundation of the project, the extended social grid model (ESGM) (see Nicholls and Ziegler, 2015, reviewed in Scheuerle *et al.*, 2016a, pp. 18–21), as a special lens through which the material is analysed. We do so with an extra focus on affected *marginalised groups or beneficiaries* and their *capabilities*.

The material mainly consists of secondary data such as literature, statistical data, and desktop research. Different problem backgrounds as well as different solution approaches in EU countries will be considered when investigating policies, interests, and providers. The interplay of the different social forces and their interrelatedness are discussed. Economic underpinnings and marginalisation are not analysed separately but will be considered as preconditions and reasons of SI.

In a final chapter (chap. 4) we discuss the central research findings and general lessons. It became obvious during our research that social problems are never completely solved. They turn up again when the frame or context is changing, when one or several of the social forces alter, or when a consensus reached is questioned by new developments. In some cases, historic solution approaches are taken up again, knowingly or unknowingly. In other cases, we point out the lessons that could be learned from historic predecessors.

This approach has of course its advantages and limits. While history offers lots of examples for ideas and approaches – successful as well as unsuccessful ones –, each situation and setting remains unique in a certain way. We therefore do not recommend merely replicating historic examples but aim to offer insights and suggestions to support modern SI.

2. Lessons from historic examples for challenges of social housing today

2.1 Introduction

In the course of history the (social) housing market has strongly diversified and is characterised by a variety of different national and local traditions (Scheuerle *et al.*, 2016b). Recently, major global events are about to mark a new turning point in social housing. The unexpected shock of the *economic crisis* resulting from the *financial debt crisis* starting in 2008 had considerable effects on the demand for affordable housing and social allowances in the majority of European countries, as well as on the financial resources available for social housing (Whitehead and Scanlon, 2007; Pittini and Laino, 2011; IZA, 2013, pp. 14ff; Parlasca, 2013). Even more, the current *asylum crisis* with millions of people coming to Europe from Syria, Afghanistan, Somalia and other Asian and African countries has heavily aggravated the housing problem (Institut der deutschen Wirtschaft Köln, 2015; frontex, 2015). *Work-related migration* also within the European Union (eurostat, 2015c; United Nations High Commissioner for Refugees, 2015) and *gentrification* (Beck *et al.*, 2013; Kennedy and Leonard, 2001) are further developments that currently put the housing topic also on the middle class agenda again.

Beyond these issues, *sanitary conditions* and *overcrowding* have still not been solved and remain a threat to health conditions particularly in some Eastern European countries (WHO, 2012). Also, implementing higher *energy efficiency* in newly constructed and existing (social) housing facilities to mitigate climate change is still a crucial topic (EUR-Lex, 2012; The Scottish Government, 2014; cf. also the ROSA case study in this report). Accordingly, the housing market is in dynamic flux or even – in some countries and areas – under considerable stress in most European countries. This makes social housing an extremely relevant topic this day. As a social innovation, it still faces continuous challenges and need for adaptation (Whitehead and Scanlon, 2007, pp. 51f; IZA, 2013, pp. 27f; Tutin, 2008, p. 54) (for a comprehensive overview table showing the social housing situation in all EU member states see IZA, 2013, pp. 51ff.).

Taking a social innovation perspective, in this paper we aim to analyse how current approaches to solutions might learn from or are inspired by their precursors in history. We therefore describe the status quo of recent developments in social housing (SH) first by analysing it – analogous to the report of SH history (Scheuerle *et al.*, 2016b) as seen through the lens of the *Extended Social Grid Model (ESGM)* (Nicholls and Ziegler, 2015) (*Chapter 2.2*). Following this, we draw lines to developments of SH in history that serve or can potentially serve as ‘lessons learned’ or even models for SH today (*Chapter 2.3*) and finally conclude with a short outlook (*Chapter 2.4*).

2.2 Overview of recent developments and challenges (through the ESGM)

2.2.1 Initiating agency: motives for engagement

Various developments brought social housing back on top of the public agenda. The *economic and financial crisis in 2008* caused an increased demand for social housing across different countries in Europe. A significant increase in poverty rates, rising rents, and mortgage arrears led to housing exclusion by means of re-possession and evictions. Affected were also groups that had previously not been seriously afflicted with the housing shortage: middle class and key workers holding temporary contracts or facing unemployment, single parent families, young couples, or the elderly. Waiting lists for social housing quickly filled up² (Pittini and Laino, 2011; IZA, 2013; Parlasca, 2013; Pogliani, 2011; Propersi *et al.*, 2012). Further, the *asylum crisis*³ that since 2014 has accelerated due to rising numbers of refugees from regions of war and dictatorship has been lifting the shortage of affordable housing to a much higher level in countries such as Germany (Institut der deutschen Wirtschaft Köln, 2015). This is topped further by additional *migration* also within the European Union, for instance due to labour-market inequalities, a more open internal market, or climate change (United Nations High Commissioner for Refugees, 2015).

Two related developments reinforce the problem. First, as another consequence of the crisis, investors seeking for secure harbours increasingly put their funds in real estate, often destroying older and thus affordable houses and building new dwellings with higher rents for higher returns. In parallel, *gentrification* is increasingly crowding out lower income groups from attractive neighbourhoods (Beck *et al.*, 2013; Kennedy and Leonard, 2001). As a result, 11.4% of the EU population in 2014 were confronted with housing cost surcharges, meaning that they had to spend more than 40% of their disposable income for their accommodation. The recorded housing cost surcharge rate was highest in Greece, lowest in Malta (Housing Europe, 2015; eurostat, 2015a).

What is more, *quality of housing condition* had not reached a sufficient level in all European countries even before the crisis hit, so in 2014, the overcrowding rate stood at 17.1% in the EU (highest rate in Romania and Latvia with over 50%, lowest rate in Belgium) (Housing Europe, 2015). Statistics also show that substandard living conditions including inadequate water supply and

² E.g. in Ireland, the number of people in need of local authority housing has increased by 75% since 2008 (from 56,000 to 98,000 applicants). In England, housing waiting lists from 1997 to 2011 constantly increased from 1 to 1.8 million households. In France, 1.2 million and in Italy 630,000 applicants were registered on waiting lists for social housing in 2012 Whitehead and Scanlon (2007); IZA (2013, p. 14).

³ The number of first time asylum applicants increased by more than 150% in the third quarter of 2015 compared to the same quarter of 2014 and almost doubled compared to the second quarter of 2015. Overall, the number of persons seeking asylum from non-EU countries in the EU-28 during the third quarter of 2015 reached 413,800 (430,600 total asylum applicants including repeat applicants). Citizens of 149 countries sought asylum for the first time in the EU in the third quarter of 2015, with Syrians (138,000; + 98,000 compared to third quarter 2014), Afghanis (56,700; + 46,700) and Iraqis (44,400; +4, 400) being the largest groups. The highest number of first time asylum applicants in the third quarter of 2015 was registered in Germany and Hungary (both with slightly over 108,000 applicants, or 26% each of total applicants in the EU Member States), followed by Sweden (42,500, or 10%), Italy (28,400, or 7%) and Austria (27,600, or 7%) frontex (2015); eurostat (2015c).

absence of flush toilet and shower are far from being defeated and seriously affect health conditions particularly in the new member states in the EU, but also in the old ones (WHO, 2012). In both cases, most affected (although not exclusively) are people living below the relative poverty level in Eastern European countries (Pittini and Laino, 2011, p. 16). Also, particularly social housing estates had originally been built where industries developed, and later on in the suburbs of cities. However, the greatest demand for affordable housing today is concentrated in pressure areas within cities. Moreover, considerable parts of the housing stock are now becoming dilapidated. This mismatch needs to be solved – amongst others by means of (re)construction activities. Particularly in the UK or Germany, but also Sweden or Finland, this question currently emerges (Whitehead and Scanlon, 2007, p. 31).

A further issue relates to the *poor reputation* of social housing. Despite financial incentives and penalties, some municipalities in France for instance have flatly refused to build social housing dwellings (Droste *et al.*, 2008). The “Not in my backyard” syndrome (NIMBYism) complicates the building of new social housing in prosperous areas. Labelling the settlements ‘key worker housing’ brings some mitigation, yet the problem is increasing steadily, thereby also complicating the maintenance and/or achievement of a *social mix*.

Table 1: Social grid elements in the status quo of social housing

	Cognitive frames	Social networks	Institutions
Preconditions/consequences of marginalisation (normal style); <i>preconditions/consequences of SI (italic style)</i>			
<i>Natural</i>			
<i>Artefactual</i>	- <i>Innovating in energy efficiency</i>		
<i>Cultural</i>		- Demographic changes and migration/asylum seeking - Gentrification - <i>Decreasing middle-class income with rising demand for SH</i>	
<i>Economic</i>	<i>Neo-liberal attitude: best return for money</i>	- <i>Public-private partnerships and provision schemes</i> - <i>Providers in partnership with specialist stakeholders</i> - <i>Re-emergence of cooperative solutions</i>	- <i>Low quality SH estates require further urban renewal</i> - <i>Increasing ownership share on housing market</i> - <i>Non-landlord services and community building emphasised</i>
<i>Security-related</i>	SH considered to be problematic with regard to security		
<i>Political</i>	- <i>Residualisation fostered by EU policies</i> - <i>Housing need depending on asylum policies</i>		- <i>Higher investments in SH</i>
Resulting Capabilities (+ = <i>achieved</i> ; - = <i>deprived</i>)			
(+) Generally access to secure, affordable housing, but lowering standards in asylum seeker crisis (+) Access to education levels (+) Social inclusion co-management as a means of participation (+) Improved barrier-free mobility (-) Stigmatisation of SH (deprived social recognition)			

Finally, there also are challenges to social housing markets in Europe due to *EU guidelines and legislation*⁴ (see also Houghton Budd and Naastepad, C. W. M., 2016). Particularly countries with a universalist tradition of social housing are increasingly coming into conflict with EU rulings on the permissibility of state subsidies. In 2005 the EU defined social housing as ‘housing for disadvantaged citizens or socially less advantaged groups’ who for financial reasons could not get access to market housing (Boccardo, 2008; Ghékière, 2008). Further, EU law states that only *Services of a General Economic Interest* (SGEI) may receive such subsidies. Universalist approaches that sought to achieve a social mix and foster heterogeneity within urban regions simultaneously support middle- and higher income groups, which does not qualify as an SGEI (Whitehead and Scanlon, 2007). Generally, this leads – together with the effects of the crisis – to an increase of targeting at the most vulnerable population.

2.2.2 Shaping agency: influences of social forces

Societal responsibility and governance of solution. The split of responsibilities in encountering the current situation is only emerging by now. First activities indicate, however, that *the public-private structures (economic social networks)* which developed from progressive decentralisation and privatisation of the previous period will be upheld, albeit with higher financial subsidies from the government and a lowering of legal obligation to allow for faster construction activities of private companies and housing associations (Pittini and Laino, 2011, p. 58; IZA, 2013, p. 27). For example, recently the *European Investment Bank* gave loans for housing which “include €120 million to the Federal State of Brandenburg to deal with housing implications of the refugee influx, € 1 billion for the construction of new social housing in partnership with *The Housing Finance Corporation* in Britain, €400 million via the *European Fund for Strategic Investment* (EFSI) for energy efficiency refurbishment in private residential buildings in France and €180 million to the municipalities of Sweden for infrastructure investment including housing⁵”. **Among the recipients are also private or non-profit intermediaries for financing housing. For example, *The Housing Finance Corporation in England (THFC)*** is a non-for profit finance company with the purpose to fund housing associations. According to its plans, it will deliver up to £1.5Bn (€1.89Bn) of EIB lending under the UK wide *Affordable Housing Guarantee Scheme*.

Recently there also is an increasing tendency towards *provision schemes*. Public funding and loans are warranted to commercial developers and private landlords in exchange for the rights of use for the municipalities or for receiving the qualification as protected dwellings to provide social housing. This can be observed e.g. in Germany, Italy, Spain, or the Czech Republic (IZA, 2013, p. 10; Whitehead and Scanlon, 2007, 2008). Similar developments are so called *re-let systems*, as adapted for example in the *PAAVO* program in Finland between 2008 and 2015. To effectively prevent social segregation, this program helped to acquire decentralised supported accommodation for homeless people in rented accommodation from private owner-occupied housing companies by the Finnish Government. For example, the *Y Foundation*⁶, established in 1985, and other similar organisations let small flats to local authority social services, which re-let them to those in need of accommodation. Thereby, around 30,000 apartments in 2009 became available (Tainio and Fredriksson, 2009, p. 184).

⁴ With regard to the handling of asylum applications, the EU Member States apply different asylum and migration policies. Though refugee and subsidiary protection status are defined by EU law, humanitarian reasons are specific to national legislation.

⁵ <http://www.housingeurope.eu/resource-747/eu-invests-in-social-housing-eib-loans-in-practice>

⁶ The Y-Foundation was founded in 1985 by the cities of Helsinki, Espoo, Vantaa, Turku and Tampere, the *Association of Finnish Local and Regional Authorities* (then known as Suomen Kaupunkiliitto), the *Church Council*, The Finnish Red Cross, the *Confederation of Finnish Construction Industries*, *The Finnish Construction Trade Union*, Alko and *The Finnish Association for Mental Health* (<http://www.ysaatio.fi/in-english/>).

Another interesting and innovative funding scheme is the Portuguese programme *Rehabilitate to Rent*. This refurbishment loan is available for individuals and private companies on the condition to rent the apartment after the rehabilitation works. The loan covers 90 % of the operations. Buildings accepted should be older than 30 years, and should preferably be in urban rehabilitation areas. Also, the conditions of work are set out in municipal legislation which follows the historic protection rules of buildings (Housing Europe, 2016). Such self-renovation approaches of beneficiaries are adopted in further countries (IZA, 2013, p. 33).

Nevertheless, in many countries private investments amount for significant portions of government spending, for instance in Sweden, Germany, or Eastern-European transition countries⁷. In the Netherlands, financing of new housing in the housing association sector is entirely private. Accordingly, the *social networks* around social housing provisions increasingly incorporate private market actors. There, new organisations arise too, such as in Germany where the *Wohnraumgesellschaft* acts as a private project developer and investor explicitly targeting affordable housing for middle class populations (Branco and Alves, 2015). In some countries, municipalities still own much of social housing dwellings, e.g. in Hungary or Sweden, so public provision will mostly remain higher here. Generally, a high rate of owner occupation in various countries⁸ leaves little flexibility for social housing provision today (Harloe, 1995; Murie, 2008). Short term measures like emergency shelters are often set up provisionally or in public facilities such as at sports facilities, schools, barracks, or empty commercial buildings (Müller, 2013).

Innovative action is also taken by social housing organisations. For example, in **Sweden**, one of the countries in Europe receiving the highest proportion of asylum seekers in comparison with its population (over 160,000 asylum applications in 2015⁹), most municipalities lack both temporary and permanent housing solutions. *SABO*, an interest and industry organisation with around 300 members, has managed through framework agreement on procurements of *Kombohus* to cut construction costs while reducing energy demands¹⁰.

Design of solutions. As the following table shows, social rental is present and dominant in most countries. The added shares of social and private rental go up to almost 50% in most countries, in Germany even beyond. The only exception are Eastern-European countries such as Hungary, where both the social and private rental sectors are similarly small because of the privatisation of former public housing that started in the early 1990s after the end of the soviet bloc. This has led to a very high share of home-ownership here (Whitehead and Scanlon, 2007, p. 11; Pittini and Laino, 2011, p. 10). But also in other countries, privatisation policies since the 1970s have allowed the sale of dwellings to permanent tenants. The share of owner occupation is particularly high in the UK, Italy, Ireland or Sweden. Some countries (including the Mediterranean ones such as Cyprus, Greece and Spain) have also provided low-cost housing for sale as a means of social housing. Shared ownership is very present in some countries (e.g. Germany, Sweden), but without a particular geographical

⁷ The social housing sector is actually seen as a risk free (and therefore attractive) investment for lenders due to its specific features: high level of regulation, significant explicit or implicit guarantees, and long-term, stable and predictable cash flows.

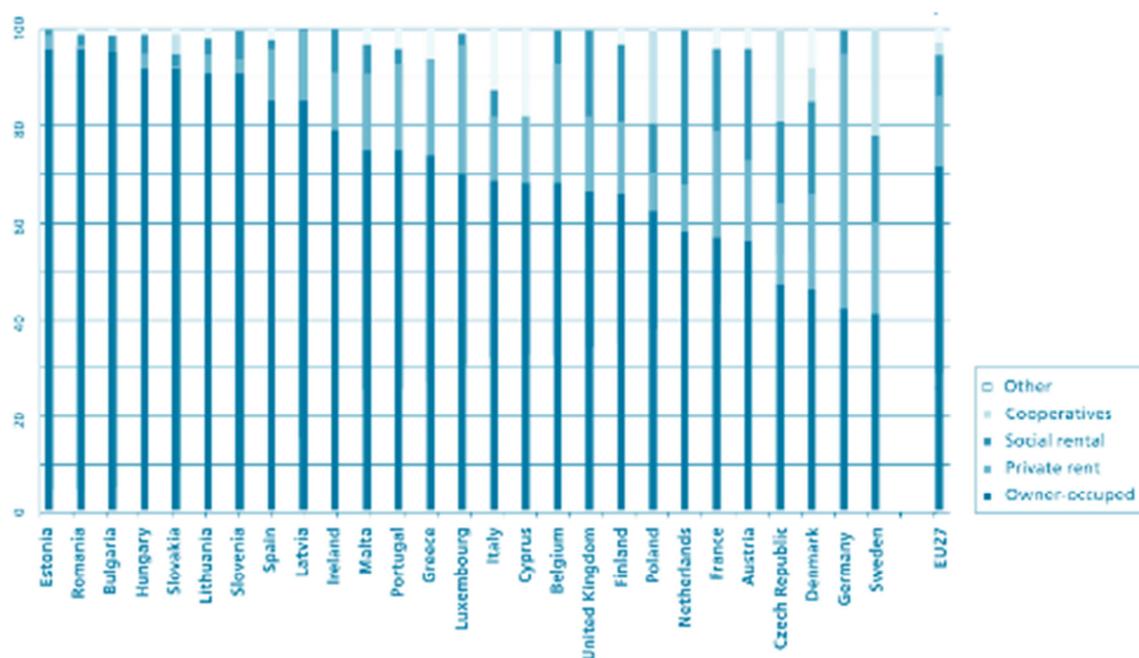
⁸ In the larger national social housing sectors however, e.g. in England, there is a 50/50 split between municipalities and housing associations; in France almost 2/3 are owned by housing associations, and in the Netherlands close to 100% Whitehead and Scanlon (2007, p. 12). In other countries, cooperatives play important roles (Austria, Belgium, Estonia, Germany, Hungary, Italy, Poland, Portugal, Spain, and Sweden). While non-profit housing associations and cooperatives are usually part of the social sector that uses private funds and subsidies (e.g. in England, the Netherlands or Ireland), in some countries, also purely private developers and construction firms are significantly involved in development and ownership (e.g. in Germany and Austria) Pittini and Laino (2011, pp. 32f.); Whitehead and Scanlon (2007, p. 13).

⁹ <http://www.migrationsverket.se/English/About-the-Migration-Agency/Facts-and-statistics-/Statistics.html>

¹⁰ <http://www.housingeurope.eu/resource-479/sabo-s-kombohus-proves-that-reduction-of-construction-costs-is-possible>

pattern (IZA, 2013, p. 10; Pittini and Laino, 2011). In the UK *arm's-length management organisations* (ALMO) were introduced as not-for-profit companies that provide housing services on behalf of local authorities, which keep the ownership of the housing stock by themselves (NFA *et al.*, 2009).

Table 2: Tenure Split in the 27 EU Member States as a Percentage of the Total Housing Stock (Pittini and Laino, 2011, p. 10)



Source: Housing statistics in the European Union 2010, updated by national correspondents

Furthermore, the need for a multidimensional approach to the issue of housing, addressing the real estate components together with social and other intangible components, is getting stressed increasingly (Pittini and Laino, 2011) and will gain even greater importance regarding the integration of asylum seekers. As this case study shows however, this *cognitive frame* is not new and can be traced back to Utopist thoughts in early phases of social housing, e.g. in the Red Vienna (Scheuerle *et al.*, 2016b), but might find a window of opportunity now to become (even more) *institutionalised*. Construction projects are thus flanked by programs to support, guide and facilitate community development, with the overarching objective of enhancing social inclusion and the sustainability of local communities through diversity (as contemporary *cultural cognitive frames* about societal development). A typical example of these are *non-landlord services* (Brandsen *et al.*, 2011) that increasingly get linked with measures to address individual problems such as lack of language skills, unemployment or loneliness among the elderly (IZA, 2013). New *social networks* emerge around this increasing demand or social need situation, since it puts pressure on private developers and landlords to expand their role expertise (Whitehead and Scanlon, 2007, p. 32). Thus inhabitants with special needs are often served in *partnership with specialist stakeholders*, e.g. in Scandinavia, the Netherlands, and France.

Also, virtually in all of the countries there is a concern about segregation of society through social housing. It is therefore an objective to establish mixed tenures and a mix of beneficiaries within a geographic area of social housing or to mix social with regular housing. More and more, demands are voiced to carry out the (sometimes contradictory) missions of fulfilling the right to housing whilst also fostering the *social mix* in urban planning and renewal processes (Whitehead and Scanlon, 2007, p. 32). Even in response to the refugee crisis, creative solutions address this issue: In the Netherlands,

municipalities that are responsible for housing licensees together with housing associations such as *Aedes*, *De Key*, or *De Bossche Zayaz* and other stakeholders set up an action plan **in Amsterdam, Eindhoven or Den Bosch**. In Amsterdam, housing associations and the city deliver 1,000 additional homes in temporary locations together intended for young people, students and refugee status holders in order to strengthen community building. In Eindhoven, a minimum of 800 additional social homes is planned until 2018 that are meant to host refugees without excluding people already on the waiting lists from the housing market. The measures include splitting bought and built houses so that more people can live in one house¹¹. The *De Bossche Zayaz* housing corporation transforms its former headquarters to 70 temporary apartments, with a maximum of 30 for refugee status holders and 40 for ‘regular’, single tenants¹².

Also, participatory models where residents are given significant control over the design and management of new or refurbished social housing continue to be on the rise (Knorr-Siedow, 2008). In Vienna, the democratically elected representation of the municipal housing for each complex is supposed to equally represent the interests of the different groups of tenants (age, gender, ethnicity, etc.). In Lyon, there was an *open consultation process* with inhabitants of deprived areas. Residents were asked about the atmosphere of their neighbourhood, with questions designed to reflect precise details, such as the condition of individual staircases in housing blocks, or the cleaning of communal areas (*Enquete Ecoute Habitants*, Lyon) (Open Society Foundations, 2014).

A further response to the crisis is the laxation of different social housing regulations and constructions standards. In Germany, for example, different pressures are played off against each other such as when recently the roof tile industry in the Bavarian part of Germany lobbied against energy efficiency standards with the argument of thereby creating more affordable living space for refugees (Schultz, 2015).

Finally, the increasing importance of sustainability requirements (as an overarching *cognitive frame* with associated *institutions* and *social networks*) also for housing imposes a new mission to the social rental sector as a pioneer in technical and social experiments. New dwellings are obliged to meet the highest environmental energy efficiency standards (“zero emissions”). This is a topic of particular relevance in Germany, France, The Netherlands, Denmark, or the UK, and the discussion is underpinned by arguments of strong economic efficiency (Tutin, 2008, p. 54). Recently, energy efficient construction has become a mandatory element at least for some social housing construction or renovation (e.g. IZA, 2013, p. 29; cf. also¹³).

Targeted beneficiaries. Significant variation still occurs with regard to the eligibility criteria of potential *beneficiaries*. Countries including Austria, France and Germany set the highest income ceiling amount, high enough to guarantee for an income mix among beneficiaries, whereas such ceiling amounts are set at very low levels in other countries (such as Italy). Social housing waiting lists are open to anyone in some countries (Denmark, Sweden and the UK), in order to promote a social mix in social housing communities and to avoid social segregation. However, despite the absence of an income ceiling, strong correlation exists with income conditions here as well (IZA, 2013, p. 11; Whitehead and Scanlon, 2007, p. 18). Although there often is a difference between formal policy and actual practice, there is a general, convergent trend across the EU social sector to increasingly target towards the most vulnerable population (IZA, 2013, p. 25). The asylum crisis will most likely reinforce this process.

Already today, beneficiaries of social housing disproportionately often belong to *ethnic minorities*.

¹¹ This is stated in the Action Plan 2016-2017 of the Urban Region Eindhoven (SGE)

¹² <http://www.housingeurope.eu/resource-718/more-homes-in-the-netherlands-due-to-the-flow-of-refugees>

¹³ <http://www.powerhouseeurope.eu/>

Three main reasons may account for this: They tend to have lower incomes, to live in cities (where social housing is more widespread than in rural areas and cheap accommodation is more difficult to get) and to prefer living in communities (which is easier in social housing). As a result, ethnic minorities are often concentrated very much in urban social housing areas and/or in peripheries of the cities (Whitehead and Scanlon, 2007, pp. 26f.), such as in the “banlieues” in France.

What is more, an increasing part of newly built social housing is set up for special-needs. Definitions somewhat differ here but include housing for the elderly, the disabled (physically and mentally), or sometimes large families (Whitehead and Scanlon, 2007, p. 11).

Recently, another sub-section emerged in the field of people earning less than income thresholds or who do not match other eligibility criteria for social housing. Those most vulnerable groups are accommodated in the *very social housing* sector which targets, among others, homeless people, asylum seekers, ex-psychiatric patients, ex-addicts or victims of domestic violence. Speaking more generally, very social housing “is aimed at housing as well as incorporating those people excluded from or marginalised in the labour market.” (Reinprecht and Levy-Vroelant, 2008, p. 210). Very often it is provided by municipalities, but also by charities concentrating on the respective vulnerable group and welfare organisations (Whitehead and Scanlon, 2007, p. 20; also see Levy-Vroelant *et al.*, 2008). Very social housing draws on special construction standards which typically are lower, and use temporary and often short-term tenure contracts. There is access control by social workers, and often dwellings are in disadvantaged locations (Levy-Vroelant *et al.*, 2008).

For example, in Finland there was a program called PAAVO (in Finnish: *Pitkä Aikais Asunnottomuuden Vähentämis Ohjelma*, English: *Program to Reduce Long-Term Homelessness*) which was run between 2008 and 2015 to reduce long-term homelessness. It was launched by the Finnish government and can thus be seen as a top-down implementation of an innovative idea that had been around before. The basic idea of PAAVO was to acquire rental housing for the homeless in housing units linked with social care services specified to meet the resident’s needs. Previous research had shown that this is key to address long-term homelessness (Kaakinen *et al.*, 2006). Residents live in their apartments on tenancy agreements. The key underlying concept is to provide housing services in line with the *Housing First* principle (Aro, 2016)¹⁴.

2.2.3 Capabilities of marginalised groups

As part of a multidimensional approach with increasing non-landlord services, social housing increasingly targets the overall situation of the tenants and aims to *improve education levels, social inclusion or also involvement in steering processes as a means of participation*. Accordingly, it addresses a variety of capabilities. What is more, the proposed European Accessibility Act (2015) is about to give a legal frame for building barrier-free for people with special needs such as those with physical and mental disabilities (Whitehead and Scanlon, 2007, p. 11), increasing the mobility and participation of this group, too. On the other hand, the additional stress put on the social housing sector through economic crisis and migration is about to lower living standards in social housing dwellings again, and particularly asylum seekers are often not free to choose their place of living. Furthermore, the image of (very) social housing and its residents is worsening, which not only compromises their social recognition, but also their opportunities for social upward mobility. (*cognitive frame*)

¹⁴ According to an international review panel, between 2008 and 2015 the long-term homelessness decreased by 37% (1345 persons), making the program a success. After PAAVO, the work to prevent homelessness and to reduce the risk of long-term homelessness is continued with a new AUNE programme, which started in spring 2016.

2.3 Models and lessons from SH in history

Lessons from historic examples can provide helpful insights for SI today. Although context factors including the surrounding social grid continuously change, some patterns in problem situations (e.g. after wars or economic crises) resemble each other, and also solutions do. However, given that every time and local context has its own specific preconditions, lessons from the past have a rather general character.

Drawing on the material from the embedded case studies and country perspectives from data collection during WP2 (Scheuerle *et al.*, 2015), we thus present lessons from SH in history and propose a set of models. These are not to be understood as a panacea for current housing problems, but meant to stimulate thinking in new ideas, and are therefore highly normative.

Create a movement

The shortage of affordable houses is constantly increasing today. Gentrification processes (e.g. Harloe *et al.*, 1992) driven by the growth of small, dual-earner households with well-paid jobs and investors seeking for investment opportunities in times of low interest rates make it difficult even for middle class families to find a suitable accommodation in attractive cities and regions, whilst on the other side there are rural areas (and some cities or parts of cities) where there is plenty of vacancy. At the same time, social housing today has some image problems. As along with this often social tensions arise, some communes have flatly refused to build social housing dwellings despite financial incentives and penalties (Droste *et al.*, 2008), which particularly makes it difficult to take influence on the social mix. The “Not in my backyard” syndrome (NIMBYism) is currently becoming particularly visible with regard to the accommodation of refugees.

The *Garden City movement* that spread across Europe influenced by the ideas of stenotypist Ebenezer Howard emerged under the impression of industrialisation and overcrowding in most dwellings, but also under the impression of people getting deprived of their capability to influence or even form their environment (Kampffmeyer, 1908). The core idea was to create decentralised, independent entities instead of mere suburbs that should be placed in the countryside and contain living estates besides industrial, business and cultural facilities. Howard also connected social reform thinking to his Garden City idea. Not only should the Garden City cope with the socio-economic, hygienic, aesthetic and infrastructural problems of urbanisation, but also with the lack of control, participation, and city management (Fishman, 1977, p. 30). A key problem for the creation of real garden cities was the access to work in such new settlements, although the influence of the movement and its principles is still visible today in some Garden City settlements. Financing of the model project, according to Howard, was to be obtained by what would nowadays be coined as an impact investing approach: For building the city, like-minded wealthy individuals should be convinced to invest funds which would pay a modest rate of return (*ibid.*). Once the cheap agricultural land would have been turned into an attractive Garden city, land prices would rise and investors were to be paid off (Fishman, 1977, p. 46).

Another example of a movement is the *settler's movement* in Vienna that started to build houses on their own outside Vienna. Some 50 cooperatives emerged representing more than 80 local groups (Kampffmeyer, 1926, p. 131). They also were in charge of the organisation of the housing construction and infrastructure which was usually done by the municipality, which acknowledged and supported the movement later on (Frei, 1991, p. 172; Novy and Förster, 1991, p. 90).

Setting up one or several international movement(s) that do not only focus on providing accommodation, but carry more general principles of today's living and working might strengthen and improve the image of social housing as a whole. Initiatives such as *Mietshäuser Syndikate* in

Germany¹⁵, and other self-help approaches already provide first steps in this direction and share knowledge about financing options, project development etc. New forms of mobility, living and working might even provide a chance to redistribute the demand from current centres to other areas.

Develop and test new, aesthetic solutions

Despite the periodic trend to build cheaply and functionally, social housing has also very often been an impression of contemporary architectural thinking, and it also was a field to test new ideas of living.

For example, Amsterdam was a city with particularly bad living conditions for the marginalised during industrialisation. The Housing Act of 1901 addressed the quality as well as the quantity of proper (social) housing. Under guiding national government policies, from then on the municipality had the obligation to make plans for the expansion of the city, including plans for roads, canals, squares, and sewerage (Acker *et al.*, 2008, p. 7). Also, the Act organised the establishment of housing associations and allowed the government to grant advances and subsidies to these private non-profit organisations so that they could build housing that met certain quality standards for the common good. During this time, the *Amsterdam School* of architecture evolved in the Netherlands. (Later) well-known architects and planners such as Michel de Klerk (1884-1923), Hendrik Petrus Berlage (1856-1934) and Piet Kramer (1881-1961) embraced social housing in their work. They cooperated with the housing associations to receive funding for their aesthetically artful buildings. Some of the most prominent examples of social housing of this time (such as *Het Schip*, a complex of houses for industry workers in the *Spaarndammerbuurt* quarter of Amsterdam) can still be visited today. Other examples are the *Familistère* in Guise, FR, where *Jean-Baptiste André Godin (1817-1888)* build after principles of social utopism and invented early ownership schemes (Scheuerle *et al.*, 2016b), or the massive wave of broad-scale electrification and the widespread introduction of electronic household devices after WW II (Scheuerle *et al.*, 2016b).

It seems important in this respect to resist short term pressures, which are arising e.g. due to migration crises. History shows that in times of crisis and resource scarcity, the likelihood is very high to develop quick solutions that might cause new problems in the middle and long run, e.g. due to problematic social constellations or problematic quality standards of the set up infrastructure. Ideas for innovative solutions such as the *cluster* or *quadruple house*¹⁶ or multigenerational and mixed housing concepts are often available in niches. Even if their realisation takes longer or is a bit more expensive to realise, it might make sense to respond to urgent needs with temporary solutions and test which of such concepts do make most sense in the long run.

In general, these buildings and projects were prestigious for the architects or developers, and to some scale, also other parts of society benefited from these developments. SH could provide such a chance today, too. Also, such buildings and projects (a recent example is a social housing project in the Allerød Municipality north of Copenhagen in Denmark where the new settlement will intensely be integrated into the natural environment¹⁷), most likely increase the confidence of its inhabitants, thus contributing to the ambition of including workers in society. Perceiving social housing as chance for innovation could also improve the image of SH in general. Adjusting certain regulations, such as the separation of living and working areas, might further contribute to developing or enabling new ideas

¹⁵ <https://www.syndikat.org/de/>

¹⁶ In the wake of the London World Exhibition in 1851, architect Henry Roberts designed a prototype of a two-storey workers house with four dwellings, arranged in pairs around a common staircase (*Prince-Albert-House*, named after Prince Albert, the co-organiser of the Exhibition). Thus, four families could live privately under one roof in such cottage style houses without interfering Eger (2010); Frampton (2002), Roberts (1850, 1859, 1862).

¹⁷ <http://www.archdaily.com/790889/white-arkitekter-blurs-the-line-between-built-and-natural-in-housing-project-design>

and solutions.

Involve company owners

High housing costs even might distract qualified workers from living at the place where they are actually needed. This holds for low income jobs, but also for more skilled workers. Already during the first phase of industrialisation, different company owners understood the necessity to provide accommodation for getting and keeping skilled employees. Amongst the most prominent industrialists that built settlements and even entire communities were *Jean Dollfus* (1800-1887; Société Mulhousienne des Cités Ouvrières, Mulhouse, FR), *Alfred Krupp* (1812-1887; Essen, GER) or *Jean-Baptiste André Godin* (1817-1888; Familistère, Guise, FR).

For example, Alfred Krupp built and rented small houses in his *Arbeitersiedlungen* to (non-unionised) workers. He was driven by economic and social motives, and paternalistic “care” for “his” workers was one of Alfred Krupp’s constant motivators (Kieß, 1991; Krämer, 2013, pp. 3–11). He also offered affordable daily goods in so-called *Konsumanstalten* (consumption institutions). Krupp wanted to include workers into the ‘bourgeois’ society (not the upper, capitalist class, of course, but the productive and civil parts of society) (Fuhrmann *et al.*, 2008). The Krupp company “promoted” its social engagement through PR channels (Krämer, 2013).

Today, company owners could address the housing shortage again by providing resources or even building facilities to support their employees in the search for accommodation and thereby gaining and creating a competitive advantage in fight for talents. But also finding low-skilled workers for municipal services is an increasing problem, as renting levels in cities are rising. Certain initiatives in this direction are already evolving (Regio Kontext, 2016)¹⁸. Employers could build new houses on their own properties, access new building grounds through partnerships, or collaborate with housing providers. Tax incentives for such solutions and a proactive political support would provide important help here.

3. Lessons from the historic development of fresh water supply for challenges of fresh water supply and other infrastructure developments today

3.1 Introduction

Even today, after more than a century and a half, the SI of fresh water supply has still not reached its end. As we showed in D 5.1 (Scheuerle *et al.*, 2016b), nowadays the supply per se is being taken for granted by many people in Europe. However, we also showed that questions which once and for all seemed to be settled such as those concerning provision, quality, and transparency, to name just a few, turned up again or emerged in the first place.

In this chapter, we will first turn to some *future challenges* in the field of fresh water supply in Europe in the 21st century (Chapter 3.2). We will draw lines between fresh water supply in history that serve or could serve as lessons learned or models for current and coming challenges in fresh water supply. Using the extended social grid model (ESGM) (Nicholls and Ziegler, 2015) like in 5.1 (Scheuerle *et al.*, 2016a), we will describe and analyse these challenges.

In a further step, we turn to questions of infrastructure development today, especially to the questions of *broadband extension* in Europe (Chapter 3.3). Again we will look for models and lessons here

¹⁸ <http://www.greatbusinessdebate.co.uk/opinion/does-business-have-a-responsibility-to-support-its-employees-with-housing/>

which we can take from the historic case studies and which can be applied to modern infrastructure projects. Then we will analyse the situation with the ESGM. Comparing them with each other, there are several parallels between the set-up of technical infrastructure and the introduction of information technology. First of all there is the phenomenon of networks. Like the set-up of supply and disposal systems created the ‘original network’ of the city in the 19th and early 20th century, a spatially inclusive and comprehensive network of broadband cables (or other devices) currently is the decisive infrastructural prerequisite for the spreading of new information and communication technologies. Second there is the point of acceleration. The ‘original network’ led to a big potential of rationalisation and acceleration. Saving time through new information technologies and global connectedness in trade and economy, in research and development, in communication and mobility by data bases, through e-mail and social media, offers similar possibilities and risks (Schott and Skroblić, 1987, pp. 74–76). Finally, questions comparable to the set-up of the first technical infrastructures emerge again: whom to include in the network and how fast to include them, by which means and on which pre-conditions, as well as who is responsible and how provision is organised.

3.2 Overview of recent developments and challenges (through the ESGM)

As already mentioned in our contribution to D 5.1, there are diverse challenges in the area of fresh water supply which have to be met in the nearer future (see Scheuerle *et al.*, 2016b): climate change, demographic change, the change of consumption patterns, as well as the maintenance of water and waste water infrastructure have to be dealt with. New, more decentralised developments in the field of water catchment and waste water treatment may offer solutions (Sedlak, 2014). These challenges will be further accelerated by rapid urbanisation as a consequence of rural-urban migration and other forms of migration world-wide (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). While some cities and countries are already acting, more still needs to be done. As Koop and van Leeuwen point out, even the new EU policy on smart cities¹⁹ does not include all areas and intersections which should be integrated (2016). The challenges mentioned will shortly be described in this chapter and at the end will be analysed through the lens of the ESGM.

3.2.1 Climate Change

Probably the most important challenge that fresh water supply in Europe and world-wide is facing is *climate change*. It will inevitably lead to fresh water scarcity on the one hand and flooding after weather extremes on the other. Marine and fluvial flooding poses real risks for many cities in this context. “It is predicted that the frequency, intensity and duration of extreme precipitation events will increase, as well as the frequency and duration of droughts” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). Heavy thunderstorms will bring more water than the sewers can handle, which will result in flooding, overflowing sewers and high financial damage. Unfortunately, “the real costs of flooding in cities are seriously underestimated” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). Also, sewage plants will have problems to deal with the sudden increase in water to be treated. If the plants are not prepared for such situations, part of the water will flow back into the rivers untreated. For the city of Berlin, for example, this is expected to happen about 40 times a year (Scheuerle *et al.*, 2016b, p. 147). A solution would be to have separate systems for rain water (grey water) and sewage (black water), with the former needing much less treatment than the latter (Sedlak, 2014, p. 180; Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016).

An interesting social innovation concerning the role of the small water cycle for flood prevention is the new water paradigm by Michal Kravcik and the “Programme of landscape revitalization and

¹⁹ See European Commission (2013a, 2015).

integrated river basin management in the Slovak Republic” (PLRIRB)²⁰. This prevention approach builds upon a network of retention systems – small catchments usually made out of wood, stone or earth. These small water holdings and dams serve for water retention, prevent matter loss and support local cooling. As a social innovation the programme also aimed for local empowerment in rural communities by relying on local labour (on those who were unemployed before the programme took off) and for landscape revitalisation as well as at advising rural municipalities which were responsible for the implementation of the programme in regaining political power. It was possible to scale the social innovation during a window of opportunity between 2010 and 2012, when the newly elected Slovak government was supportive of the approach. Unfortunately, the programme could not be transferred to water retention in the urban context as it was stopped due to a further government change in 2012 (Lodemann, 2015).

Fresh water scarcity will result from a decrease in precipitation and increase in evaporation. It will worsen even more where infrastructure maintenance is not high on the list of priorities. With leakage rates above 40% in some European cities there still is room for improvement which shows that “upgrading and renewing existing infrastructures remain a challenge” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016) (see more below on infrastructure maintenance).

Municipalities (*social networks*) are called upon to face this challenge as it is their responsibility (*cognitive frame*) to “protect their citizens against water-related disasters (e.g. droughts and floods), to guarantee water availability and high-quality groundwater, surface water and drinking water” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). Experts (*social networks*) warn that the “window we have for solutions is narrow and rapidly closing” (ibd.), but that citizens can support municipal policies by adaptation processes and revising their water use.

3.2.2 Demographic Change, Population Dynamics, and Rapid Urbanisation

A second field affecting fresh water supply results from *demographic change, population dynamics, and rapid urbanisation* following rural-urban and other forms of migration. More and more people in Europe and the world move from the countryside to the cities (eurostat, 2015b, p. 33). This leads to less demand for fresh water in the countryside and growing demand for fresh water in the urban areas. In both cases the infrastructure has to be adapted to the changing situation. Already, as the large amounts of refugees and migrants at the doorsteps of Europe remind us, people migrate from more arid countries, countries with less rainfall and increasing evaporation, to countries with fewer problems in water supply. This trend will accelerate with the progression of climate change (Baker and Aryn, 2015) and an increase in the number of water-related conflicts.

It is forecasted that in the future most people will live in cities. Projections state that by 2050, 86% of the population in more developed countries will be urbanites (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). This urbanisation creates pressure on water supply, solid waste recycling and waste water treatment. Also, cities become more and more dependent on their rural surroundings for their supply with water, food, building material, and energy as well as the removal of waste (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). It is necessary to adapt early to these changing circumstances in order to find and implement viable solutions. Therefore, it is necessary to come to a societal consensus on how to deal with this challenge.

3.2.3 Changing Consumption Patterns

Connected to these developments and in particular to climate change are *changing consumption*

²⁰ This passage relies on material collected by Justus Lodemann in WP 2 of the CrESSI project in 2015 Lodemann (2015). See an article on the topic: Lodemann and Ziegler (2014) as well as the central publication on the theoretical basis of this approach Kravčík *et al.* (2007).

patterns as a third area of future challenges. With temperatures rising due to climate change, water will evaporate faster; less water will flow into reservoirs or groundwater. Therefore, more water will be needed to irrigate the fields to produce enough food (Sedlak, 2014, p. 180). At the same time, agricultural water consumption (according to estimations making up more than 90% of water withdrawal) needs to be decreased to leave more drinking water (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016) as the water demand of urban areas and industry will be increasing.²¹ Thus, competition in the usage of water become apparent and priorities need to be set.

One way to deal with this problem might be to improve the water use efficiency in rain fed and irrigated agriculture. While water scarcity is already a reality in Mediterranean countries, it also becomes a serious concern in Northern European countries. Water restrictions either are already effective or will be introduced in the future to mediate between agricultural, urban and industrial water demands. Bringing together experts from different areas, an international research consortium led by INRA²² developed an innovation which is based on decision support software to estimate irrigation needs and water demand, and an assessment of reuse water schemes management identifying also technical, economic and social constraints.²³ “AGADAPT develops and deploys methods to reduce and optimize the water usage of rainfed and irrigated agriculture by combining knowledge-based innovative technologies, modelling and transfer of technologies and innovative practices.”²⁴

3.2.4 Maintenance of water and waste water infrastructure

In the fourth place, climate change poses problems for the fresh and waste water infrastructures. There is still a lot to be done and to be improved in the *maintenance and costs of water and waste water infrastructure*, and time is getting short. Yet, history “teaches us the importance of crisis as a catalyst for change” (Sedlak, 2014, p. 276), and we should take advantage of it.

Generally speaking, urban freshwater supply is a success story in Europe, with massive benefits to the marginalised as well as to everyone else. It shows that SI of the past still matter for today and the future, as we often continue to build upon them. However, we should not forget that the current infrastructure is something that has developed over time (and may fall apart), even if it is now taken for granted (compare United Nations Development Programme, 2006). In concrete terms, this implies to closely focus on the maintenance and further adaptation of a SI that contributes to meeting central *capabilities* and human rights.

Municipalities need to prepare their infrastructure “in response to climate, demographic and economic trends” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). At first sight the investment is high, but it will pay off. Studies come to the conclusion that “between 1.8 and 2.5% of the annual global GDP is needed for implementation of water-related sustainable development goals” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). On the other side, these investments would lead to social, environmental and economic advantages and improvements. (*social networks dealing with different cognitive frames*). Sedlak even argues that what he calls water revolution 4.0 will be started as costs for the maintenance of the existing system are rising. Not only will this rise come from increases in personnel costs and energy costs. Climate change and stricter treatment requirements (*new institutions*) will be part of this cost increase too. Instead of maintaining the existing system by investing lots of money, he sees more chances in investing in “a less

²¹ <http://www.climate-kic.org/projects/agadapt-adapting-water-use-by-the-agriculture-sector/>, accessed 25 October 2016.

²² Project partners: INRA (French National Institute for Agricultural Research), Suez Environnement, TNO, Forschungszentrum Jülich GmbH, Météo-France, Alterra Wageningen UR, Wageningen, Ecole des Mines de Paris, Commissariat à l’Energie Atomique (CEA, Saclay), Universidad Politécnica de Valencia, Spain (UPV).

²³ More information: <http://www6.inra.fr/agadapt/>, accessed 21 November 2016.

²⁴ <http://www.climate-kic.org/projects/agadapt-adapting-water-use-by-the-agriculture-sector/>, accessed 25 October 2016.

expensive and more sustainable alternative” (2014, p. 170). The example of the City of Copenhagen shows that smart adaptation to climate change costs € 1.3–1.6 billion, but saves around € 3 billion when compared to the costs of inactivity (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016).

The task of infrastructure maintenance and adaptation could be facilitated by modern devices. An international research consortium led by TU Delft²⁵ developed a prototype for Enterprise Service Busses to provide a platform for the generation and shaping of data on urban water management. The innovative Smart Urban Water (SUW) project helps local authorities to collect and analyse data on the current and future state of water to cope with the consequences of climate change.²⁶

Even though it is taken for granted nowadays, to have potable water available at any time in European cities is not naturalness. It was and is the result of a societal project which is not finished yet. The consensus which helped the project to come off the ground and to grow in the way we know it today is also needed to maintain and adapt the project and its systems to future challenges. Only if the public debate can kept going and thus legitimacy can be created for the continuation of the common project, there will be a basis for necessary investments in the maintenance and reconstruction of the infrastructure.

3.2.5 New Developments

To handle future challenges it is necessary to come up with new ideas, think along new ways, and maybe abandon traditional ways of doing things.

On the side of water supply, desalination may become a new practice. Most water on planet earth is salt water and only a small part of fresh water is easily accessible. With climate change and growing urbanisation, water scarcity in arid as well as in urban areas will become an ever growing problem, especially in Southern Europe. Turning salt water into fresh water sounds a promising way to reduce the dilemma of growing demand and decreasing supply. So far however, the method of reverse osmosis has been too expensive to be taken up on large-scale (Sedlak, 2014, p. 237; on the process of desalination and projects e.g. in Israel and Australia see *ibid.*, chap. 11).

An innovative approach helps turning salt water into fresh water by means of renewable energies. The approach has been developed by a Dutch start-up, ‘Elemental Water Makers’, and has been tested large-scale on the British Virgin Islands since 2015.²⁷ The approach uses renewable energies and gravity for its purpose and thereby does not only reduce costs compared to other methods of desalination, but also avoids carbon dioxide emissions.

Another new path could be taken on the side of waste water treatment when it comes to the separate treatment of grey and black water, as mentioned earlier. The “separation of blackwater (urine and feces) from greywater (the waste stream that contains everything else) prior to treatment” offers the advantage “that materials with a very different composition can be treated with technologies optimized for either energy recovery or water reuse” (Sedlak, 2014, p. 259). In Lübeck (Northern Germany) already in 2002 a housing development for 400 people used a network of subsurface wetlands to treat the grey water, which is a cheap, low-tech approach (Sedlak, 2014, p. 261).

This leads us to the topic of reusing or recycling of water. Here, sewage is only treated such that it is

²⁵ Project Partners: TU Delft, SUEZ-Environnement/Ondeo Industrial Solutions, Deltares, Imperial College, London, Wageningen University & Research Centre, IBM Zurich, Commissariat à l’énergie atomique et aux énergies alternatives (CEA), and Climact. For more information: <http://www.climate-kic.org/projects/smart-urban-water/>, accessed 25 October 2016.

²⁶ <http://www.climate-kic.org/case-studies/a-step-change-in-urban-water-management/>, accessed 25 October 2016.

²⁷ See <http://www.climate-kic.org/news/dutch-start-up-elemental-water-makers-hits-the-news-as-they-turn-seawater-into-fresh-water-on-the-virgin-islands/> and <http://elementalwatermakers.com/>, both accessed 25 October 2016.

ready for feeding back into rivers or the sea, or further to be used for specific usage (without drinking). This water could be used to water public gardens, golf courses or private lawns and save fully treated potable water for better purposes. Also, the cleaning of sewer pipes could be done using reused water instead of potable water as currently usual in many cities. However, to prevent disease outbreaks of the kind we know from the 19th century, when germs spread from sewage to drinking water, for this approach two supply systems (one for potable water, one for irrigation water) are needed. This makes it economically unattractive at the moment, albeit this could be changed by introducing special tariffs or incentives. The fact that critics coined this approach “toilet-to-tap” has not been very favourable for its scaling, too (Sedlak, 2014, pp. 188–210) (*clash of different cognitive frames on what water should be like as well as economic and ecological interests*).

Another way to increase the attractiveness of reused or reclaimed water could be “to recycle water at the scale of an individual household or a cluster of buildings”. For one, many problems coming up with dual distribution systems would disappear. What is more, “it is likely that people’s reluctance to use reclaimed water would be diminished if they knew that they themselves were the source of the wastewater being applied to their lawns” (both quotes: Sedlak, 2014, p. 254). Thus, it might make sense also to confront people more directly with the preconditions and consequences of their consumer behaviour.

3.2.6 Emerging Water 4.0

The preceding examples already show that new possibilities exist if we utilise different, more decentralised approaches. Centralised systems are under pressure with a view to population developments, climate change and environmental reasons (Sedlak, 2014, p. 238). Most cities are afraid of turning away from centralised water systems which have proven reliable under many circumstances. Therefore, systems are still expanded, money is invested in renewing them and making them fit for coming challenges (Sedlak, 2014, p. 239). This might not be the only and even not the best way. “The path of least resistance that is being followed means higher water bills and lots of controversy over a resource that has been taken for granted for too long” (Sedlak, 2014, p. 239).

Courage is needed to take up long-term solutions, develop visions and follow them instead of looking at what faces least resistance in the short run. As Sedlak concludes, “any policies that substantially reduce water use are going to be less popular than investments in assets that satisfy customer demands and bring in more revenue” (2014, p. 242). When trying to reach a fundamental goal, like making the fresh water supply fit for an uncertain future, it seems necessary to create a vision and resist short term solution pressure. Creative solutions could be tested on a low scale and then adopted and applied to a larger scale where sensible.

The transition from centralised to decentralised water systems should take place gradually and where it makes sense with regard to technological possibilities, economic options and environmental conditions. Hybrids of centralised and decentralised systems will emerge and continue to exist side by side as long as needed (Sedlak, 2014, p. 245). If *social networks* from politics, experts and civil society work together and handle the change of systems in a transparent way it would be possible to overcome the path dependency and break free of the water grid “by using combinations of the approaches that are currently being pursued in a piecemeal manner in water-stressed cities” (Sedlak, 2014, p. 246). In communities with low population density, even today the individual water supply is met by wells, waste water is treated in household-scale waste treatment systems, and excessive runoff is taken care of without centralised storm sewers (ibd.).

The Bavarian interest community IKT (Interessengemeinschaft Kommunale Trinkwasserversorgung

in Bayern)²⁸ has been campaigning for decentralised solutions for 30 years. Instead of spending large amounts of money on net extension and building bigger waterworks and sewage plants, its representatives argue for niche solutions for fresh water supply and waste water treatment in rural areas and the self-responsibility of municipalities. This approach deserves more attention. Not only under financial aspects, but also in order to be better prepared for the future, should decentralised solutions be preferred. There is not only one way to success. “Paying attention to the variety of cognitive frames, institutions and networks while holding abstract ends in view is one way of remaining open in this point” (Ziegler *et al.*, 2016, p. 3).

Decentralised networks might provide a further advantage for the future as they could help to make fresh water supply more resilient against biological warfare and cyber war attacks. It is therefore essential that experts from different disciplines like water engineers, IT specialists, public health experts etc. jointly work together in these questions.²⁹

3.2.7 Citizen involvement and transparency

Turning to technology alone will not be the solution. Civil society is playing a more and more important role especially in an urban context, and to come up with sustainable solutions it will be necessary to bring all stakeholders around one table. This applies to those affected by marginalisation as well as to those affected by a SI (Jacobi *et al.*, 2017, p. 2).

The development of the Berlin Water Table (*Berliner Wassertisch*) and the fight against privatisation of the Berlin Wasserbetriebe as well as for transparency of the contracts from 2006 to 2013 shows the importance of these issues.³⁰ Awareness of diversity and context sensitivity is essential. Interests and needs differ and it is necessary to find a balance between them and make it transparent for everybody. Here, civil society (*social network*) actively enforced the *cognitive frame* of water being a human right. People got a chance to participate in the movement, get actively involved and co-shape their living conditions. After the referendum, the city of Berlin had to buy back the shares of the Berlin Wasserbetriebe from private companies (*economic social network*) and re-municipalise the firm (*institution*). The Water Table is still active and has last co-initiated the Berliner Wasserrat (Berlin Water Council) (*social network*) to work for transparency, social justice, and sustainability of the fresh water supply in Berlin (Scheuerle *et al.*, 2016a, pp. 151–152).

“To tackle the challenges of water in the city, it is necessary to take numerous aspects, interest and actors into account” (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016). This can be done by water governance which allows all stakeholders (government, private sector, civil society as well as pressure groups) to “contribute their ideals, express their priorities, exercise their rights, meet their obligations and negotiate their differences” (*ibid.*).³¹ Building up adequate water governance capacities is recommended by the OECD to make cities prepared for a sustainable future (OECD, 2016). Cultural shifts such as people’s perception of nature and especially water may play a larger role in the future for the discussion of sustainable and reasonable solutions (Scheuerle *et al.*, 2016a, p. 147).

Making water 4.0 a similar success story as our fresh water supply set-up since the 19th century, it seems advisable to follow an inclusive approach and to have a broad beneficiary focus in mind when

²⁸ Interest community for communal drinking water supply. See <http://ikt-bayern.de/>, accessed 7 September 2016. More on this point can be learned from the forthcoming analysis in WP 7.

²⁹ On the EU level as well as on the national level, opportunities to make critical infrastructures better protected against terrorism and attacks of different origins are being explored. See for example Commission of the European Communities (2006), Bundesamt für Sicherheit in der Informationstechnik (2014).

³⁰ This paragraph draws on material collected by Rafael Ziegler in WP2 Ziegler (2015).

³¹ For different definitions on water governance, its gaps and capacities see Koop, Steven H. A. and van Leeuwen, Cornelis Johannes (2016).

making arrangements from which the whole society will profit (Scheuerle *et al.*, 2016a, p. 172).

3.2.8 Private or Public Provision

A debate still running centres on the question whether it is public or private provision of potable water that better serves the needs of consumers. Connected to this is the question if water constitutes a common in the sense of Ostrom (1990), or a commodity.

In the historical analyses we found different models of fresh water supply in history (see Scheuerle *et al.*, 2016a, pp. chap. 4). In the beginning, many water companies were private. Around the turn of the century, in many countries municipalities took over the operation. In some countries, special systems like public-private arrangements or cooperatives developed.

Privatisation of water companies since the final decades of the 20th century in many European countries brought results similar to the experiences of the 19th century: rising prices, rising profit ratios for private water companies, and an underinvestment in infrastructure (Edmiston, 2015, p. 587). In the 19th century, people recognised that mostly profit-oriented private companies made less investment in infrastructure, extended the pipe network more slowly and only to regions where the extension was attractive.

In the UK, the privatisation of the water sector since the 1980s led to rising bills and an increasing tension between public health/social policy on the one side and economic interests and concerns of private water companies on the other side (Edmiston, 2015, pp. 584–587).

Since the turn of the millennium, as a reaction to the privatisation wave of the late 20th century, re-municipalisation has become a new trend. In Berlin as well as in Paris the water companies were again municipalised to make water affordable again for all (Scheuerle *et al.*, 2016b, p. 145).

3.2.9 Concluding remarks

Water infrastructure mainly is set-up on the local (city) level and sometimes on the regional level. Many of the above mentioned challenges will affect the local level (migration, urbanisation, climate change, maintenance issues, and consumption). However, many challenges, influences and trends are deriving from other levels: laws and regulations for example from the regional, national or supranational level, economic crises or migration from an international level, climate change on a global level. It therefore seems to be necessary to connect different approaches and facilitate their implementation to enable our societies to prepare for a water-wise future. Transition has to start now to prevent reactive action which is more costly and often more ineffective than planned adaptation (Koop, Steven H. A. and van Leeuwen, Cornelis Johannes, 2016).

Table 3: Social grid elements in the sustainable adaption of fresh water supply

	Cognitive frames	Social networks	Institutions
Preconditions/consequences of marginalisation (normal style); <i>preconditions/consequences of SI (italic style)</i>			
<i>Natural</i>	- Sustainability - Protect nature - Protect climate	- Environmental groups/NGOs	<i>Further directives and laws on protection of water, treatment of potable water and waste water</i>
<i>Artefactual</i>	- Prepare for climate change - Gain resilience with regard to climate change and population dynamics	- (Social) Innovators - Water professionals - Experts from other disciplines	- Adapt legislation regulating management and construction in public space, access to it, etc.
<i>Cultural</i>	- Water as a cultural heritage - Water is a common good.	- Civil society - Urban planners and architects	- Adapt legislation regulating management and construction in public space, access to it, etc.
<i>Economic</i>	- Keep water affordable	- Providers	- Polluter pays principles

	- Water as commodity vs. water as commons	- <i>Global water justice movement</i>	- <i>Make reused water economically attractive for lower purposes like cooling or watering public and private green.</i>
<i>Security-related</i>	- Decentralised networks pose a problem to public health. - <i>Decentralised networks make fresh water supply more resilient against biological warfare and cyber war attacks.</i>	- <i>Experts from different disciplines (water engineers, IT specialists, public health experts etc.)</i>	
<i>Political</i>	- <i>Smart cities</i> - <i>Participatory water governance</i> - <i>Access to affordable water for all</i>	- <i>Civil society organisations</i> - <i>Water tables</i> - <i>Politicians, parties</i> - <i>Municipalities</i> - <i>National and supranational political bodies</i>	- <i>Human right to water</i> - <i>Legislation allowing for social and ecological tariffs</i>
Resulting Capabilities (+ = <i>achieved</i> ; - = <i>deprived</i>)			
(+) <i>access to water is a human right</i> (+) <i>access to sufficient and affordable potable water</i> (+) <i>participation in community building</i> (+) <i>co-shaping of living environment</i> (+) <i>having a political say</i>			

With the infrastructure for fresh water supply and sewage “we have inherited a complex system that evolved to meet a variety of needs” (Sedlak, 2014, p. 276). We should consider carefully which parts need to be contained and which parts need to be altered to face the future and what Sedlak (2014) calls Water 4.0. “Any attempt to alter the designs of these complex systems will have to be made in a way that does not interfere with their ability to deliver these essential functions” (Sedlak, 2014, p. 276).

Matching models and lessons from fresh water supply in history with the coming challenges we recommend, based on our analyses, to work on local solutions and to apply knowledge created and tested elsewhere but adapt to local situation. Another important aspect is to give a chance to niches. There does not have to be a single choice, no one-size-fits-all solution. Demands and possibilities might vary. Instead, each city must come up with and decide upon the best solution with regard to its local situation (Sedlak, 2014, p. 244).

Maybe the most important point of all is to find an integrated approach. When thinking technological change and social change together as technical innovations co-evolve with society (cf. Geels, 2005), SI will profit from technological innovations as well.

Fresh water supply facing the above sketched challenges exemplifies that SI keep changing and adapting to new situations- even if they have already become mainstream and standard. The problems are only solved or the conflicts satisfied for a certain period. When the situation changes, especially in times of crisis, the old questions turn up again in a new livery and the underlying issues have to be dealt with. Then the social in the original SI becomes visible again and the normative basis reappears.

3.3 Models and lessons from fresh water supply in history for other questions of infrastructure development

Many infrastructure projects followed the introduction of fresh water supply and sewage hook-up. Canals and railways became a big issue in the 18th and 19th century as did motorways in the 20th. However, in many cities and countries water and sewage infrastructure were the first infrastructure measures that related to the single house(-hold). “The appearance of the electrical grid, around the turn of the century, tends to attract more attention, but it was the building of the invisible grid of sewer lines and freshwater pipes that made the modern city safe for the endless consumer delights that electricity would bring” (Johnson, 2006, p. 214). In the late 19th and later in the 20th century, electricity, phone, radio and television by cable, as well as nowadays broadband internet, often followed the example in setting-up, organising, and managing the supply structure while paying attention to different physical requirements. If the set-up of a general infrastructure was considered to be difficult or even dangerous, as in the case of gas, decentralised solutions were found in some countries.

Recurring questions dealt with the topics of grid and network as well as with feed-in:

- Who supports the grid/network?
- Who is responsible for the extension, the maintenance and the functioning?
- Who bears the costs?
- Who is allowed to feed in?
- How is the provision organised?
- Who has access to the network and who gets what?
- Who should be included in the network?
- How fast have people to be included?
- Who takes these decisions?
- By which means and on which pre-conditions?

In each context, the solutions found depended on the role that *institutions*, *social networks* and *cognitive frames* played and the way they were connected to each other.

It is an insight of the history and sociology of technology that a technology in itself does not command a specific usage or way of utilisation (Kline and Pinch, 1999, p. 113; Bijker, 2009, p. 90)

Already for the case of railways it becomes obvious that there was not a single best way to set-up an infrastructure and utilise it. In his comparison of English and Prussian resp. German railways and railway operators, Then (1997) demonstrated that different developments were caused by different legal systems (*institutions*), the composition of relevant committees (*social networks*), societal developments (including *cognitive frames*) and the general situation and development of the market. The actors and stakeholders in this set-up of infrastructure and its extension were different, as was the use they made of social networks. The interaction between legislation and politics, society and economy was crucial for the process. In the end, key for success was the ability to adapt to local, regional and national circumstances – and that includes not only geographical restraints and local resources but legal and social conditions, too (Hughes, 1983, p. 462).

When turning to the question of which lessons can be learned from fresh water supply as infrastructure development in history with regard to current developments, we focus on the set-up of broadband internet as today’s equivalent. Under a SI perspective, a relevant precondition for the many ICT based ideas is a well-functioning network infrastructure. Many ICT based SI, for example in the areas of education, job market, prevention or health, can only develop and unfold full effect if

the net is expanded extensively and allows good access for everybody. The net has to be able to transport and deliver the data needed and what it is even more important: it must be accessible to innovators as well as to all recipients, being it customers or prosumers, marginalised or not. If this condition is not met the digital divide will just be widened. In this sense, the fresh water case could serve as model when looking at the extension of the Internet, the connecting of rural areas, creating access for the marginalised as well as with regard to questions of regulation, provision and operation.

3.3.1 Regulation

When the history of the Internet started in the late 1960s, nobody envisioned the potential this new technological innovation would unfold when scaled to a global dimension. This changed in the 1990s with the introduction of the World Wide Web and the growing exchange of mails, information, and documents via e-mail (Poe, 2010, pp. 213–215). The scaling of the new innovation developed hand in hand with other technological developments; progress of hardware and new devices like smartphones and tablets; new software tools and standards to access and use this infrastructure like html, browsers, java, content management systems, e-learning software etc., which offered new possibilities and provided new applications and new ways of connecting. Technological innovation and social innovation influenced each other. “‘Design things’ are technologies and in all the cases when the technologies at stake can be characterized as potentially ‘controversial design things’, designers are involved in engineering technological and social innovation together. This is especially obvious in infrastructure technologies such as railroad tracks, cables, or the Internet.” (Budde *et al.*, 2016, p. 18)

To better and faster handle the increasing amount of data, broadband networks and Next Generation Access (NGA) networks were set up in European countries since 2000. However, similar to our findings in the freshwater supply case, not all areas were developed equally well. In the case of fresh water supply, economic interests led to a limited extension of the water network and the neglect of rural areas (Scheuerle *et al.*, 2016b). The same applies with regard to the extension of high speed internet (Kühling and Neumann, 2012, p. 188). It is mostly the densely populated areas, where costs are low and high profits can be made, that are connected by private companies.

“Areas with denser population are cheaper to serve, since the costs of civils per household are lower (because the fibre lengths are shorter). This means that the wider the coverage the higher the unit cost, since more sparsely populated geographies fall within the scope of the calculation. Analysys Mason (2008) estimates that providing FTTH to ‘the last 20 per cent’ of homes in the UK would cost roughly as much as providing it to all of the other 80 per cent in more densely populated areas” (Bakhshi and Windsor, 2015, p. 3 quoting Analysys Mason, 2008).³²

In the case of fresh water supply, municipalities and public bodies took the lead, took over the operation from private companies at the end of the 19th century and governed the extension of the fresh water supply network.

The broadband issue is part of the sector of telecommunication. This sector is being liberalised and under regulation state aid is limited to cases of market failures³³ or to reach common interests. In contrast to the fresh water development in the 19th century in principle fast access to the Internet is looked upon as a service to be delivered by private actors. Nevertheless a justice issue is acknowledged. Public funds should be provided under certain conditions to diminish the digital divide and to improve broadband coverage in areas which do not attract commercial providers. The EC aims to offer a broadband supply under the same conditions to all its citizens. Therefore, states are allowed to intervene to counterbalance social or regional inequalities and to enable all members

³² FTTH is the abbreviation for fibre to the home.

³³ See for the definition of market failure: European Commission (2013b, 37).

of society (*social networks*) to have access to an essential instrument of communication and participation in society. This is considered to be important for social and territorial cohesion (European Commission, 2013b) (*cognitive frame*) and might also be important under economic aspects (Kühling and Neumann, 2012, p. 169).

With its broadband strategy policy, the EC tried to govern the process of broadband introduction and the extension of broadband networks. According to reports on the Commission's website, basic coverage has been reached within the EU and the next objectives are set:

- “Basic broadband for all citizens by 2013: target met - satellite broadband is available to raise the coverage to 100% in every Member State.
- Coverage: Next Generation Networks (NGN), 30 Mbps or more for all by 2020.
- Uptake: 50% of households having 100 Mbps subscriptions or higher.”³⁴

With the Digital Agenda, the EC has reinforced these goals and enacted guidelines on state aid for the rapid deployment of broadband networks (European Commission, 2013b) (*institution*).

EU directives serve as regulation and standardisation. This is a continuation of other EU policy areas in European history. When the Low-Voltage-Directive of the then European Community was issued in 1973, this marked the beginning of regulation and standardisation within the member states. European technological zones were one step to create a “European Community as a political space” (Kaiser and Schot, 2014, p. 289). But while the EU Guidelines for the application of State aid is in power with regard to the fast set-up of broadband networks and specified common goals like the general extension of the network and the connection of rural, distant as well as thinly populated areas, and while it stresses the importance of social and territorial equality, it yet remains open to different ways of solutions (technology neutrality) (European Commission, 2013b, 78e). It is very important to offer financial resources or leeway for other ways or solutions than those already thought upon.

Still smaller, innovative providers have experienced problems with the implementation of these state aid rules as the nation states decide on the best technological solution. Small and medium-sized enterprises (SMEs) like WiSpire³⁵ feel excluded from funding by EU state Aid restrictions and are competing with the big telecommunication companies, such as in this case with the incumbent British Telecom (BT), which are publicly subsidised. WiSpire, an initiative of the diocese of Norwich, UK, “deliver(s) faster speed broadband to potentially 300 rural communities via a line-of-sight network linking one church spire to the next” (Waghorn, 2013).

WiSpire has criticised that “(t)he highly prescriptive model for broadband deployment handed down from Brussels has – in our direct experience – stifled competition for broadband services, by limiting the ability for SME providers to compete with BT, leading to sub-optimal results in terms of broadband availability and uptake among the population” (WiSpire, 2016). This is a situation experienced by other smaller competitors in the European telecommunication market, too.³⁶ They hope instead for a different approach of “embracing a range of technologies and allow(ing) the government to deliver on the target of reaching 100% of the population by 2020” (WiSpire, 2016).

According to our research results, too much regulation restrains creativity. It seems to be important that regulations on all political levels always leave space for alternatives and do not predetermine things in favour of one technological or organisational solution approach. With regard to broadband and fast internet, there are situations where fibre is not necessarily the best solution or technology

³⁴ <https://ec.europa.eu/digital-single-market/en/broadband-strategy-policy>, accessed 6 September 2016.

³⁵ <https://wispire.co.uk/about/>, accessed 18 November 2016.

³⁶ Another example is the German start-up ViaEuropa Germany (<https://www.viaeuropa.de/>) (2016).

available. Other ways like satellite or other wireless approaches might be better suited to reach the goals of the EC fast and effectively.

One of our findings in deliverable 5.1 was that niche solutions should get more esteem (Scheuerle *et al.*, 2016a). Therefore, one should leave options for other possible solutions as long as the result (net extension, connection for rural or thinly populated areas, consideration of social and regional equality) is the same. Experience from the past shows that there is not one best way. Other ways to solve a problem could be regarded as local application that fits better under certain premises. At the same time, it serves the development of different approaches and the collection of knowledge and experience.

3.3.2 Quality and Standard

In the case of fresh water supply, the factor of centralisation was not decisive alone for the SI becoming a mainstream. More than just that, decisions on the protection of drinking water sources, surface protection, agreements on standards for the delivery of water to households, and regulations on sewage and sewage treatment were important. On these terms, no difference was made regarding the content. It is the common understanding to date that all water running through pipes in a certain area is of the same quality. The net character guarantees egalitarian access to a vital resource. Thus in the case of fresh water supply we nowadays have a standardised quality of water, all customers of a certain provider pay the same price for the same amount of water, and we rely on the security of supply. The water might be of different origins within one network, but it has the same quality and the same standards are fulfilled. In the case of electricity, the story is roughly the same. We receive a standardised quality (e.g., clearly defined and precisely maintained voltage and frequency), all customers of a certain provider pay the same price for the same amount of electricity, and we enjoy the security of supply.

In the case of the Internet, discussions on the curbing of the speed depending on the price paid for transmission endangered the freedom of the net until summer 2016. Then, the Body of European Regulators for Electronic Communications (BEREC), the regulation office founded in 2009,³⁷ published the new EU guidelines on 31 August 2016 (BEREC, 2016) (*new institution*). Massive protests of civil society and organisations like AVAAZ and Save the internet.eu³⁸ (*social networks*) ensued that there will not be an ‘internet of two classes’ within the EU. The new regulatory obtains that companies will have to obey the basic rights, consumer rights and the laws on data protection. While critics are happy with the success, they however keep observing that spatial services, data management, and zero-rating-tariffs continue to be allowed, which offers the possibility to transport data faster when paid for it.³⁹ (*Actor constellations from different backgrounds (economy, civil society, politics) and different cognitive frames*)

The universal scope of fresh water supply had the positive effect that even members of the middle classes or elites pushed for the infrastructure (for themselves or for instrumental reasons, e.g. labour force, fear of epidemics), so that the marginalised groups tended to benefit. However, access to the Internet, the broadband and the digital world are as such not in the same way as essential and important for human survival as is water. As no one can live without water, substitution possibilities and especially healthy substitution possibilities are limited, and the marginalised are especially

³⁷ http://berec.europa.eu/eng/about_berec/what_is_berec/

³⁸ <https://www.avaaz.org/page/en/highlights/>; <https://savetheinternet.eu/>

³⁹ See for the discussion: <http://www.politico.eu/pro/telecoms-got-beat-on-net-neutrality/>, accessed 12 September 2016; <http://www.euractiv.com/section/digital/news/internet-activists-hail-historic-eu-net-neutrality-rules/>, accessed 12 September 2016;

http://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/guidelines/6160-berec-guidelines-on-the-implementation-by-national-regulators-of-european-net-neutrality-rules/, accessed 12 September 2016.

vulnerable with a view to affordable drinking water. Access to the Internet has a more indirect influence on the well-being of people. It enhances the opportunities of marginalised people for learning and education, for work and for participation in society in general, to mention just a few.

Another important point in this context is the question of whom do we mean when talking about the marginalised. In the case of fresh water supply, the marginalised were living in the cities, often under horrible hygienic conditions, having no or only limited access to affordable potable water. In the villages, the situation often was better than in the cities as the water quality was better there. Therefore, the rural areas in most cases were developed later than the cities. In the case of internet access and broadband internet, the situation is different. While in most cases the cities are developed and provide fast internet access and opportunities even for free WiFi, it is the smaller cities and rural communities which are neglected and which have slow internet access or none at all. Especially marginalised people living there have problems to get an affordable broadband internet connection. So, to make sure that all profit from the opportunities of the Internet, it is indispensable to make sure that all have access to the offer.

Interesting furthermore is the question whether one can claim a right to internet access (*new institution*). In this case the extension of the net would become an obligation to states and confederations. If we claim a right to information and education we could claim that everybody should have access to broadband internet too. This would be another analogy to the freshwater supply network. The number of people and states answering this question with yes is growing. The Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression of the Human Rights Council of the General Assembly of the UN, Frank La Rue, already in 2011 explained that internet access is important to express the right to freedom of opinion and expression as well as other human rights (General Assembly United Nations, 2011, III.22):

“The right to freedom of opinion and expression is as much a fundamental right on its own accord as it is an ‘enabler’ of other rights, including economic, social and cultural rights, such as the right to education and the right to take part in cultural life and to enjoy the benefits of scientific progress and its applications, as well as civil and political rights, such as the rights to freedom of association and assembly. Thus, by acting as a catalyst for individuals to exercise their right to freedom of opinion and expression, the Internet also facilitates the realization of a range of other human rights.”

Depending on different (economic, social, political) interests and different *cognitive frames*, some countries already followed this view. Several European countries set up *institutions* accordingly. In **Finland**, for example, since 1 July 2010 everybody has the right to access to a 1Mbps broadband connection⁴⁰. The Constitutional Court of **France** already in 2009 declared that the freedom of speech and expression as understood in the Declaration of the Rights of Man and the Citizen of 1789 implies the freedom to access all public online communication services (Constitutional Council, 2009, 12). And still another year earlier, in 2008, **Greece** made the participation in the Information Society for its citizens a constitutional right (Hellenic Parliament, 2008, art. 5A, 2).

But what does a right to internet access really include? Does it mean access to basic internet or to broadband internet? Is the protection of the right only ensured with a certain downstream or upload speed? What is considered to be a standard and what represents a luxury good (*cognitive frame*) continues to be an important debate. The experience shows that what is considered a standard and what a luxury depends on societal development. The possibilities of the Internet and its usage are changing in rapid speed. Like with streets it seems that the opportunity creates traffic. In the 1980s people loved the speed of ISDN modems. A bandwidth of 64 kbit/s was supposed to be marvellous

⁴⁰ <http://www.bbc.com/news/10461048>

(compared to the older analogue standards of 14.4 or 28.8 kBit/s). Nowadays bandwidth reaches values more than 100 times higher. But with more and more people streaming music and videos and using the internet for VoIP connections the demand grows tremendously. What is a satisfactory speed and bandwidth is on the move and cannot be defined without taking the ever changing usage in account.

However, things change fast in the digital age. What was considered luxury five years ago can easily be considered a standard today. “(F)ast-changing nature of digital technology environment means that governments must at each point in time ask themselves whether their policy towards digital infrastructure is right” (Bakhshi and Windsor, 2015, p. 3). Therefore, it is - and this is in accordance with our findings on historical SI (Scheuerle *et al.*, 2016b) - important to check decisions continuously and to make sure that they stay flexible and can be adapted to new challenges, changing conditions and further developments. After all “it is impossible to fully anticipate what social and technological innovations will benefit from 1 GBps speeds” (Bakhshi and Windsor, 2015, p. 2).

Therefore it is essential to lead this discussion openly and transparently within society and to come up with a democratic decision on this question.

3.3.3 Extension of the network and connection of rural areas

According to the Digital Agenda of the EC, member states set up their own national policies (*institutions*).

Austria, for example, wants to have comprehensive ultra-fast broadband access with rates of at least 100 MBps. The Breitbandstrategie 2020 (broadband strategy 2020), passed in 2012, aims to close the digital divide within Austria and to connect all parts of the country with high-speed infrastructure⁴¹. Therefore, the preparation of NGA is partly supported financially to reach a comprehensive supply. Investments in infrastructure of rural areas target to extend and improve broadband networks and to connect isolated applications to more powerful communication networks⁴².

The government of France in February 2013 issued the ‘plan France Très Haut Débit’ (PFTHD) (Plan for fast broadband in France) which followed an earlier national programme started in 2010. Access to fast broadband internet for all shall be reached by an investment of 20 billion euros within ten years.⁴³

The **UK** aimed to have the “best superfast broadband network in Europe by 2015” (Department for Business, Innovation & Skills (BIS), 2010). With the set-up of Broadband Delivery UK (BDUK), several programmes with an amount of £1.7 billion were started in 2013 to deliver superfast service to 95% of the population by 2017⁴⁴. While the UK is on track to reach this ambitious goal, the House of Commons still criticises shortcomings of the approach followed so far.⁴⁵

As a result of different national programmes and strategies, the proportion of broadband internet access in Europe is growing. Since 2004, the percentage more than quintupled, from 15% to 80% in 2015 (Statista GmbH, 2015, p. 23).

Further extending broadband internet to rural areas is of great importance to create access for everybody and to make services available to all. However, in many cases, as examples from the UK and Germany show, network providers do not invest in these areas if they cannot make profit there.

⁴¹ <https://www.bmvit.gv.at/telekommunikation/breitband/strategie/index.html>

⁴² <https://www.bmvit.gv.at/telekommunikation/publikationen/bbs2020.html>

⁴³ <http://www.arcep.fr/index.php?id=11325>; progress of the plan can be traced on the website <http://www.francethd.fr/>.

⁴⁴ <https://www.gov.uk/guidance/broadband-delivery-uk>

⁴⁵ <http://www.publications.parliament.uk/pa/cm201617/cmselect/cmcomeds/147/14702.htm>, accessed 27 July 2016.

Independent and decentralised networks seem to offer a possible solution. Alternative nets (Alt Nets) play an important role to reach distant or hard to access areas. George Windsor of NESTA suggests that “government, large Internet Service Providers (ISPs) and Alt Nets can collaborate to address some of the most stubborn infrastructure problems” (Windsor, 2016). In the case of Broadband for the Rural North (B4RN) for example, “people in the community came together to build a broadband network, offering labour and time for free or with payment in kind” (ibd.). This approach can be tracked back at least until the settler’s movement in post-WWI Vienna in the area of social housing (Scheuerle *et al.*, 2016a, p. 255).⁴⁶ While traditional models of ownership, financing and deployment of incumbent telecommunications companies often neglect rural areas, the B4RN project took a new approach. It can be understood as an example of a broader sharing movement (Bakhshi and Windsor, 2015, p. 9) and relied on the development of ultra-fast broadband by community volunteers.

The Alt NETs, “whose small scale and innovative offerings could provide solutions to deeply entrenched infrastructure issues, like reaching the final 5 per cent to promote digital inclusion” (Windsor, 2016), can offer tailored technical solutions “fit for purpose and place specific” (ibd.). Where the “option of fixed line broadband is not available”, as in the case of geographically isolated communities or businesses, satellite technology has been used to provide connectivity (e.g. Shetland Islands by BeyonDSL) (ibd.).

Solution with a niche character, sometimes anarchistic or individual like the initiative for free wireless networks⁴⁷, might well be called upon to close the digital divide. In analogy to the fresh water supply case study, it is important to offer the same possibilities to all (then: potable water, now: access to the Internet). However, not everywhere the same technology and the same way of access are necessary or reasonable. For instance, “(i)n hard to reach rural areas fibre is extremely uneconomical” (WiSpire, 2016). The idea of WiSpire, mentioned above, is to use a more simple technology to develop larger areas faster and get them connected to the last junction by directional radio⁴⁸. In their opinion, “wireless technologies are inherently better suited to the needs of those currently unconnected by fibre or satellite” (WiSpire, 2016). What counts is the result, we learned from our different case studies. For the time being, the better might be to go for decentralised and local solutions, connected via a fibre backhaul to the main network. The reason for this, just to raise another important point, is that it is essential to balance access, costs, and time: “the rural population are more concerned about getting decent broadband speeds today, rather than superfast broadband at some unspecified future point” (WiSpire, 2016).

Another possible solution to set up a communication network fast, which resembles the ideas of the non-commercial initiative for free wireless networks, is the commercial solution of ‘WLAN to go’. ‘WLAN to go’ was started by the **Spanish** company fon, founded by Martin Varsavsky, and is based on a community approach. „9,000 members join(ed) the community network during the first month“.⁴⁹ The intention is to build the largest global hotspot network with millions of cost-free hotspots. When the founder realised that the necessary investments were too large to be handled by a non-profit organisation, he looked for partners, and his company set up rules for the interaction among users. If private users open their WLAN to guests without being liable for their usage, they are allowed to use all other hotspots in the network for free.⁵⁰ „Immediately telecommunications companies were interested in the idea of a community network. International operators joined fon,

⁴⁶ Settlers had to render a certain amount of working hours in building houses, digging ditches or working in squarries to become eligible for the newly built homes.

⁴⁷ <https://freifunk.net/en/>

⁴⁸ <https://wispire.co.uk/about/>

⁴⁹ <https://fon.com/wifi-community-network/>

⁵⁰ <http://www.berliner-zeitung.de/15937258>, interview of 4 November 2006. The legal discussions on this point are still ongoing.

giving all their subscribers the opportunity to become fon members by installing the fon functionality in their home routers.”⁵¹ In the meantime, fon is cooperating with several telecommunication companies in Europe to extend the circle of participants.⁵² British Telecom (UK) and Deutsche Telekom are important partners, as e.g. the latter’s agreement with fon “spans all Deutsche Telekom countries“ (besides Germany this includes: Hungary, Greece, Romania, and Croatia.)⁵³

Next to the questions on the speed with which the broadband internet network can be built up and the way that hard-to-reach-areas can get connected, another debate, not only in **Germany**, revolves around the question of the appropriate technology being vectoring or fibre. The Deutsche Telekom as large telecommunication company and German incumbent intends to invest 1 billion Euros in vectoring. The technology is not without critics but steps up the extension of broadband internet in Germany. Vectoring is faster as more data can be transported through the copper cable grid. So in the short-run capacities will be improved while in the long-run they will be limited as compared to fibre networks.

On the one hand, this technology would provide faster internet for up to 6 million households in German city centres. On the other hand, it means to disconnect more than 135.000 VDSL connections of competitors since both technologies cannot be run in the same street cabinet. Hence, the competitors warn of the emergence of a new monopoly. They advocate the extension of the fibre network which would even more than vectoring accelerate the speed of the Internet. With the decision of the Federal Network Agency (*Bundesnetzagentur*) to allow the Deutsche Telekom to invest in vectoring, the competitors in Germany are afraid of facing difficulties in the extension of the fibre network as it will become more expensive, more tedious and less economical.⁵⁴

The purpose of the German government is to have the broadband extension realised by 2018. Without vectoring, this aim will be a lot more difficult to reach as Germany still is underdeveloped with regard to fibre compared with countries like Lithuania, Denmark or France (Fibre to the Home Council Europe (FTTH), 2016, p. 3). While in Sweden 49% of all internet access relies on fibre technology, the proportion in Germany is only 1.2% (2016). The Federal Network Agency therefore considers its 2015 fundamental decision to still be a fair compromise between the former monopolist and its competitors. No company should be limited in providing fibre to the building (FTTB). The Deutsche Telekom still is obliged to offer a wholesale product but it could be more expensive and slowly than before⁵⁵. This is in so far in accordance with the EC as it has declared technology neutrality and lets the national concessionary boards decide on the best technological solution or a mixture of technologies (European Commission, 2013b, 78 f.). Certainly an advantage of the use of existing technologies and the reduced need to dig new trenches to rollout fibre or to get access to customer’s homes is a decrease in costs and a speed-up of the process (Windsor, 2016).

Yet, where is the real problem in the sense of our research question? Actually, there are two discussion threads: one concerns the appropriate technology, the other is about competition for state funding and market shares. However, both are to be discussed under the aspect of justice. Therefore the basic question is: What is the standard necessary and financed publicly, and what is a luxury

⁵¹ <https://fon.com/wifi-community-network/>

⁵² <https://fon.com/wifi-solutions/>

⁵³ <https://fon.com/success-stories/>; other European partners are Proximus (Belgium), KPN (The Netherlands), Vodafone (Spain and Italy), SFR (France), NOS (Portugal), Netia (Poland), and Cosmote (Greece). See also in general <https://fon.com/>, <http://www.telekom.de/privatkunden/zuhause/zubuchoptionen/internet-optionen/hotspot/wlan-to-go>; and <http://www.surfstick.cc/741/wlan-to-go-rechtliche-fallstricke-und-was-man-beim-neuen-telekom-angebot-beachten-sollte/>.

⁵⁴ See on the debate e.g. <http://www.pcwelt.de/ratgeber/Ratgeber-Internet-Vectoring-DSL-mit-bis-zu-100-MBit-s-7889633.html>; <http://www.computerwoche.de/a/breitband-hoffnung-vectoring,2530425>.

⁵⁵ The final decision was published on 1 September 2016 Bundesnetzagentur (2016).

which has to be financed privately? If we want the marginalised to enjoy the possibilities of the Internet and give social innovators a chance to reach their target groups with ICT based applications, it is to question if connecting and speeding-up city centres, which are already equipped quite well, is more important than connecting and speeding-up rural areas which often have trouble to get fast internet. Technology does not give answers to these questions.

3.3.4 Provision/Operation

What we have learned by comparing the extension of the freshwater supply network with the case of the Internet is that monopolies are problematic. When we deal with networks and infrastructure, access to the net should be open to a variety of actors. Like research on biodiversity shows, a variety of providers offers solutions for future problems.

In the very beginning of fresh water supply in the UK, private companies built their own networks and water supply lines, first in competition to each other, then in certain parts of the city. “Starting in the mid-1700s, a growing patchwork of privately owned water pipes began snaking their way through the city, supplying the wealthiest Londoners with running water in their homes ... By the mid-1800s, the loose assortment of small firms running the water pipes had consolidated into roughly ten major firms, each with its own protected turf in the city” (Johnson, 2006, p. 105). Learning from these experiences one started to differentiate between the supply network, the infrastructure, and the access to the net for service providers. “Infrastructure development (transportation, telecommunication, energy, water) are prerequisites for social and economic development” (Prasad, 2008, p. 1).

In the case of broadband internet supply today, we find different models of organisation: public, private, and mixed forms (*different actor constellations and social networks*). As a rule, private providers act under regulation by the state or the EU, as EU regulation applies (*institution*), and only to some extent association of municipalities or special purpose associations or private companies which belong to municipalities. Municipalities as public institution are only under certain circumstances and with special requirements allowed to act as operators (European Commission, 2013b).

One lesson to be learned from the fresh water case study is to be open for new cooperation as new stakeholder coalitions (*social networks*) might come up with new ideas. In the Italian city of Arezzo, the first water supply network was built by a charity in 1870 (Lobina, 2005, p. 109). The following examples from different EU countries show the success of such cooperation in the extension of broadband internet, some even building on experiences gained or structures created in the set-up of the fresh water supply in the 19th and 20th century.

In the **Dutch** cities of Roden and Peize, citizens organised their own FTTH network in 2015/16. Both cities were located within a white area⁵⁶. The cooperative model, called ‘De Kop Breed’, served as a model for other initiatives in the same area. The cooperation decided to reinvest the revenues in social and societal projects in the same region which creates still more added value⁵⁷.

In **Austria**, the mayors of three villages joined in a work association called ‘Waldviertel AG’ Glasfaser in 2005. Even though their villages only had poor access to internet, no incumbent operator planned to improve the supply. Fibre was laid to every property of the three villages and local farmers helped with the work. While the three communities joined forces, they shared knowledge and

⁵⁶ The term *white areas* describes neighbourhoods or areas without broadband access or NGA. For the definition of white, grey and black areas see European Commission (2013b, 66-67, 72, and 75-77), on the consequences for permission see Kühling and Neumann (2012, pp. 214 f.).

⁵⁷ <https://ec.europa.eu/digital-single-market/en/content/de-kop-breed-roden-and-peize>, accessed 6 September 2016; <http://www.dekopbreed.nl/>

experience and gained economies of scale. However, each community still owns their own ducts and dark fibre. In the meantime, an operator was found to run the network⁵⁸.

In **Germany**, Zweckverbände (special purpose associations) are an established and proven organisational form. In areas of fresh water supply, sewage and garbage treatment, expertise could be gathered which is now transferred to new areas when dealing with the set-up of broadband infrastructure and fibre networks.⁵⁹ One example is the Schwarzwald-Baar-Kreis in Southern Germany. 20 communities founded the 'Zweckverband Breitbandversorgung Schwarzwald-Baar' in March 2014.⁶⁰ The county covering 1,000 km² and including more than 200,000 people is not attractive for private investors because of the topographic conditions, and the incumbent saw no need to get active. The FTTH network was successfully inaugurated in July 2016. In the meantime, the Deutsche Telekom as incumbent joined the competition after the special purpose association had successfully started its endeavour. However, not all will profit from the extension of the Deutsche Telekom network, only those living in the bigger cities and close to the street cabinets. The Zweckverband instead will continue to connect the villages and try to avoid double supply to save taxpayer's money.⁶¹

Bóly, a city situated in the Baranya county in southern **Hungary**, conducted a regional fibre boost in 2006-09 and started a NGA project in 2010. The original network was built up with the help of the citizens in the 1990s. Now the city introduced FTTH adapted to the existing network. The local government acts as Internet Service Provider and is responsible for billing and customer service, while a local company takes care of the maintenance of networks and infrastructure. The hopes of the local government to keep young people in the town and the area, to attract new businesses, and to give the elderly the chance and the training to connect to modern society seem to have been fulfilled.⁶²

The **Finish** network cooperative 'Kajo' works together with the water cooperatives traditionally in charge of fresh water supply in rural areas of Finland (Scheuerle *et al.*, 2016b). While the water cooperatives act as principal client and supervisor, Kajo was allowed to install fibre in the same trenches as the water supply lines which helped to lower organisation, costs and work. While profiting from these synergy effects, Kajo pays for the costs arising from construction of protective piping, wells, and connectors plus a share for land use and a proportion of supervision.⁶³

Several wireless long distance WiFi networks were set up in the **UK**. The 'Tegola Network' for instance is a joint venture of three Scottish universities and rural communities which are difficult to reach and unattractive for commercial providers. The Tegola network consists of seven interconnected community networks. It is using unlicensed radio spectrum and has access to a fibre backhaul.⁶⁴

In the Emilia Romagna in **Italy**, a public-private partnership called 'Lepida Network' manages the efforts to create a fibre network. The Lepida Network is a private company owned by different public administrations. Goal of the project, running from 2013 to 2018, is to bring fibre to industrial areas, connecting public administration and private enterprises. This was reached so far successfully and the

⁵⁸ <https://ec.europa.eu/digital-single-market/en/arge-glasfaser-waldviertel-austria>, accessed 6 September 2016; <http://www.arge-glasfaser.at/>

⁵⁹ <http://www.landkreistag.de/themen/breitbandversorgung-in-der-flaeche.html?start=1>

⁶⁰ <https://www.baden-wuerttemberg.de/de/service/presse/pressemittteilung/pid/weitere-rund-15-millionen-euro-fuer-den-aufbau-des-glasfasernetzes-im-schwarzwald-baar-kreis/>, accessed 10 October 2016; <http://www.schwarzwaelder-bote.de/inhalt.villingen-schwenningen-ein-historischer-tag-fuer-den-ganzen-kreis.3f6ae1d4-c898-46c5-aa0e-c779b76ed456.html>, accessed 10 October 2016; <http://www.breitband-sbk.de/zweckverband/>, accessed 10 October 2016.

⁶¹ <http://www.badische-zeitung.de/schwarzwald-baar-kreis/das-breitband-duell-hat-begonnen--112795704.html>, accessed 10 October 2016.

⁶² <https://ec.europa.eu/digital-single-market/en/content/regional-fiber-boost-boly>, accessed 6 September 2016; Fibre to the Home Council Europe (FTTH) (2011).

⁶³ <https://ec.europa.eu/digital-single-market/en/content/network-cooperative-kajo-finland>, accessed 6 September 2016; Niemelä and Oy (2010, pp. 17–20).

⁶⁴ <https://ec.europa.eu/digital-single-market/en/content/tegola-project-scottish-regions>, accessed 6 September 2016; <http://www.tegola.org.uk/>

geographical range further extended. Cost reduction was reached by reusing existing passive public infrastructure⁶⁵.

From our research, it seems to be important that the best way to ensure future problem solutions is to have a variety of providers. Therefore, access to infrastructure and funding should be open to all kind of (social) innovators/providers. This has to be kept in mind when formulating regulations, tenders, and monetary grants.

3.3.5 Concluding Remarks

By analysing the introduction and extension of broadband internet in EU countries through the lens of the ESGM, we found different *social networks*, different *cognitive frames*, and *different institutions*.

While Finland, France and Greece see a need for a right to broadband internet access or participation in Information society, in other countries the issue is more handled as a commercial good. Different *cognitive frames* within the societies colour the discourses. At least four cognitive frames can be detected: a) everybody should have access to the Internet, b) where possible everybody should have access to fast internet, c) better slow internet for all than no affordable internet for some, and, finally, d) extension to remote and sparsely populated areas only when economically reasonable.

These *cognitive frames* are verbalised by different actors. The active *social networks* consist of market actors and providers of different size, municipalities, local economy, internet activists, the wireless community network, and last but not least EU and national governments. All these actors follow different interests: economic interests (market shares but also international competitiveness), social interests (social inclusion and cohesion), political interests (democracy and participation), and technological possibilities (which technology for which purpose?).

Even though the telecommunication market underlies EU regulation and *institutions* like the Digital Agenda, and though guidelines on state aid structure the process, national laws and decisions are decisive for the factual rollout in the member states.⁶⁶

If we could reach general access to broadband internet within the EU countries for all citizens this would enhance the capabilities of not only but also the marginalised people especially with regard to learning and education opportunities, jobs, and participation in society.

The SI community tends to concentrate on the exciting possibilities of digital social innovation. What a perfect medium for grassroots oriented, easy to access and cheap services and means of communication and cooperation. However, on the base of this sits another social innovation: Affordable and high quality access to broadband communication for everybody. It is an old fashioned topic around hardware, digging ditches and laying pipes, erecting masts for transmitters and shooting satellites into space. As though by chance, if we look at that basic infrastructure we meet again actors we already know from other SI streams: municipalities, non-profit organisations, churches and cooperatives. They play a vital role on the way to internet access for all.

⁶⁵ <https://ec.europa.eu/digital-single-market/en/content/net4all-public-private-partnership-industrial-areas-emilia-romagna>, accessed 6 September 2016; <http://lepida.it/en>

⁶⁶ On the integration of the European telecommunication sector in more detail see Ahr (2012).

Table 4: Social grid elements in the discussion on broadband internet

	Cognitive frames	Social networks	Institutions
Preconditions/consequences of marginalisation (normal style); <i>preconditions/consequences of SI (italic style)</i>			
<i>Natural</i>			
<i>Artefactual</i>	<i>New technologies provide for new usages and applications.</i>	Engineers, IT specialists	- Different technological possibilities and systems
<i>Cultural</i>	- <i>Everybody should have internet access.</i> - <i>Better slow internet for all than no internet for some.</i>	<i>Wireless community networks, internet activists</i>	- laws and regulations - <i>right to internet access</i>
<i>Economic</i>	- Fast internet access wherever possible. - Extension to remote and sparsely populated areas only when economically reasonable.	Market actors, providers of different size, local and national economy, municipalities	
<i>Security-related</i>			
<i>Political</i>	- <i>Internet access is important to express the right to freedom of opinion and expression as well as other human rights.</i>	<i>UN, EU, national governments, municipalities, special purpose associations</i>	Laws, regulations Political goals and agreements
Resulting Capabilities (+ = <i>achieved</i> ; - = <i>deprived</i>)			
(+) <i>learning opportunities</i> (+) <i>education</i> (+) <i>job opportunities</i> (+) <i>social recognition</i> (+) <i>participation in society</i> (+) <i>participation in community building</i>			

The case of fresh water supply made it clear: if all tend to profit, the support of the process is stronger than if only a part of society is targeted. Also, marginalised people will in the long run profit more if actors from different backgrounds and of a broader movement shape the process.

4. Discussion and general lessons

In this paper we applied findings from CrESSI's long-term case studies to current SI and developed possible scenarios for the future of recent (social) innovations. We demonstrated how certain elements of the core SI develop or reoccur, and where present SI could profit from lessons of the past. The bottom line is that the SI from our comprehensive cases are far from being complete, but constantly develop further. This is due to dependency on the specific ecosystem in which they grow and results in a permanent process of adaptation. New questions demand new solutions, new situations may lead to new *cognitive frames* (e.g. refugees, standards). When the questions break up again and the issues are dealt with anew, the social component of the original SI again becomes visible, and the normative basis re-emerges.

Especially the chapter on social housing showed where historic models are or should be taken up again. Like in the 19th century company owners could build for or assist their employees in finding appropriate accommodation. This would not only produce relief in built-up areas with housing shortage but could also turn into an important advantage in the fight for talents. Movements like the

Garden City movement or cooperatives could offer other solutions. Including more general principles of living to housing concepts instead of just concentrating on accommodation alone would provide a sustainable approach here - as does e.g. the Mietshäuser Syndikate. A third model could be to follow the example of the Amsterdam School of architecture and bring together social and technological innovations in innovative ways of building. Although this interaction is not studied very often, it is of particular interest. “Both dimensions have never been separated as important new technologies always intervene into social setting and social settings determine the innovation pathways of technologies” (Budde *et al.*, 2016, p. 16). This holds true for the broad-scale electrification after WW II as for sustainable building and the fulfilment of energy efficiency standards.⁶⁷ A thought to be pursued could be to dissolve the separation of working and living areas.

Looking for answers to the question of which lessons from the past should be taken up, we derived seven lessons which we present shortly hereafter. As mentioned already in the introduction, lessons from the past do have a rather general character and should be used as a pool of ideas.

Lesson 1: It is recommendable to get together actors and innovators from different backgrounds. In the case of historic fresh water supply, amongst them there were engineers, physicians, social reformers, as well as representatives of civil service or municipalities. To achieve sustainability and acceptance, a transparent solution should be found which considers all stakeholders in the process.

Lesson 2: Local solutions should be looked for and worked on. This does not mean to neglect proven models, but to apply knowledge created and tested elsewhere and adapt it to the local situation.

Lesson 3: An important learning is to give a chance to niches. There is no one-size-fits-all solution. Demands and possibilities might vary. In general, decentralised solutions should be preferred. It is true that costs get lower if standardisation is introduced, but caution should be taken to prevent creating new path dependencies. There is not only one way to success. Niche solutions could be understood as test beds for future solution approaches ready to be applied when need occurs.⁶⁸ Thus – and this is another research result – even stable solutions are not eternal. Discourses will again erupt if the framework conditions change. Therefore, it is favourable if alternative solutions are already existent to be taken up.

Lesson 4: A change in cognitive frames affects the assertiveness and scaling of a SI. This proved helpful with regard to the topic of hygiene in the case of fresh water supply, or the environmental movement (Scheuerle *et al.*, 2016a, p. 179). However, it might also work against a SI if the change is not supportive to its idea.

Lesson 5: Looking at social housing or fresh water supply, it is advised to keep a mix of provision models. This has several advantages: it provides different forms of solutions (e.g., mixed forms, cooperatives), offers ready to apply solutions when needed, and guarantees for less dependence than with just one way of provision.

Lesson 6: It seems to be important to make sure and demonstrate that many will benefit from the SI. It is therefore recommended to advocate spreading the SI to all so all would benefit (see Edwin Chadwick in mid-19th century Britain Scheuerle *et al.*, 2016b, p. 97). If the position of marginalised people improves by the SI, others profit as well. This particularly poses a challenge in the current asylum crisis comprising housing and education.

Lesson 7: Both case studies made clear that it is crucial to resist short term pressure. In times of crisis and resource scarcity there is a tendency to clutch quick solutions. These however often create new

⁶⁷ See also the ROSA case study within this deliverable.

⁶⁸ This idea can already be found with regard to the involvement of philanthropic organisations in the field of education in Thümler (2014, pp. 242–244). Even though the notion is very similar, the terminology of “islands of success” is slightly different.

problems. It is therefore better to first create a vision and then go for creative but temporary solutions to test what is going to make more sense in the long run. In the meantime, SI might profit from technological innovations and change.

The process of developing and adjusting never ends for a SI. Empirical evidence shows

“that systems matter and that the success or failure of innovation rarely depends (solely) on individual actors (e.g. a genius with a brilliant idea or a patentable blueprint of a new artefact or model) but on a wide range of actors (including those on the demand side), possessing different types of knowledge, providing different kinds of services and (knowledge, material , monetary) resources, their interaction and the institutional settings framing the environment in which innovation processes take place. In sum, successful innovations require different types of knowledge and skills, and those are rarely – if ever – available inside a single organisation (possessed by a single actor) (Budde *et al.*, 2016, p. 39)”.

The central question of this paper was to find out whether and which innovative approaches of today could learn from historic solutions, and / or where they had been inspired by predecessors. We showed that context factors in the social grid do change, but similar patterns reoccur in the problematic situation, and solutions do resemble each other. In other cases, several lessons were successfully collected to provide ideas to and guide SI of the 21st century.

Part 2

The relation between social and technological innovation in housing projects – the example of “Rosa Zukunft”, Austria

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1. Abstract

The housing project “Rosa Zukunft” in the city of Salzburg, Austria, is one of the lighthouse projects of the so-called “Modellregion Smart Grids Salzburg”, a region enforcing innovative projects on energy efficiency. The case study deals with a middle-sized housing project started in 2013, which focuses on decentralized power generation, smart homes (embedded living system) and consumer to grid options. The project itself not only aims at technological innovation, but also at integrating both innovation in buildings and the perspective of residents. Some of the 129 housing units have been equipped with smart technology (monitored smart homes) and a web application (“smart center”), enabling the interaction between humans and buildings.

Following the social grids approach, the case study on “Rosa Zukunft” will examine the role of the envisaged social innovation (cross-generational housing enforcing social integration, participatory approaches, collaborative actions etc.) within the Smart Grids housing project as well as the institutional set-up and cognitive frames of the involved stakeholders and their interaction (energy provider, researchers, real estate developers and site managers/social coordinators). By means of interviews with relevant stakeholders, the relationship and balance between social and technological innovation will be discussed as well as the impact and sustainability of the measures developed within the project, with special focus on the social structure within the housing areas as well as the behaviour and attitudes of its residents.

2. Background

Much has been written on innovation in various research fields, especially since the mid-1990s, examining new forms of products, services, regulations, processes or even systems (see Toivonen, 2015, pp. 83–85). Common to all innovations and considerations especially about social and system innovation is that they target complex societal and economic issues, no matter what realm of society they deal with (labour market, health, housing, education, energy matters etc.). With respect to housing issues, different aspects of innovations are concerned, such as technological innovations, e.g. for housing construction, energy efficiency and so on, up to organizational innovations that comprise more than traditional service provision. Even more, certain forms of housing turned out to be social innovations themselves (e.g. social community housing in Vienna, the so-called “Gemeindebauten des Roten Wiens” (superblocks during the Red Vienna period)). Therefore, the aspects most important in terms of this case study can be summarized by the following definitions on social innovation as well as technological innovation with respect to an economic perspective:

Social innovation: “The development and delivery of new ideas and solutions (products, services, models, markets, processes) at different socio-structural levels that intentionally seek to change power relations and improve human capabilities, as well as the processes via which these solutions are carried out.” (Nicholls and Ziegler, 2015, p. 2)

“Technological innovations are new and more efficient ways to transform the material reality, and economic innovations put the technological innovations to the service of the production of surplus value. Taken together these two classes form the sphere of techno-economic innovations.” (Hamalainen/Heiskala 2007 cit. in The Young Foundation, 2012, p. 8)

3. Approach

The following research questions will be addressed by integrating different sources of information (such as project description, literature review) and empirical research (qualitative interviews, secondary analysis of evaluation report etc.):

What is the role of technological and social innovation in the case study project?

- Which kind of framework for innovation in the housing project can be identified with respect to institutions, cognitive frames and networks?
- Is there an interrelation between technological and social innovation, and, if so, what kind of measures have been taken to foster the concurrence?
- Which impact do technological and social innovations have and what fosters sustainability of both?

Thereby, the case study follows the social grids approach as described by Beckert (2010) (see figure 1 below).

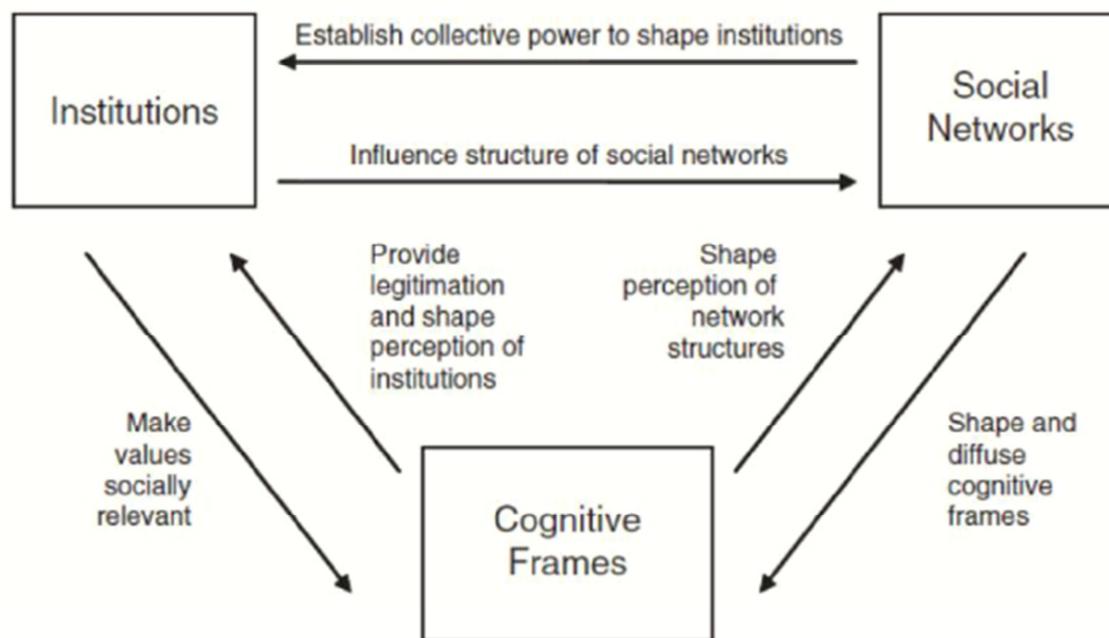


Figure 1: Social grids approach (Beckert, 2010, p. 612)

Beckert discusses three forces that are integrated in a dynamic relationship and together shape the formation of market fields. The institutions mentioned in figure 1 (above) are the constraining rules and norms of a society that influence the structure of social networks and influence cognitive frames of individuals and groups by making values socially relevant. The institutions gain their legitimation through collective power and their perception is shaped by cognitive frames, which themselves are referred to as commonly shared meanings and interpretive material making sense of society and its actions. Third, the social networks are the structures of social relations and relational patterns in society (cf. Beckert, 2010).

The case study discussed in this paper is embedded within the Smart grids Modellregion Salzburg (a model region established in 2009), which tried to amalgamate different projects and approached dealing with energy provision and services, mobility services and housing project targeting at the reduction of CO₂-emissions. Figure 2 shows the various benefits of a Smart Grids approach as understood by the “Modellregion Salzburg” and points out the interrelations of the different realms. The integration of both a horizontal and a vertical approach is central to the “Modellregion” and set up the connection to the above discussed Social Grids approach – namely the dynamic relationship of institutional bodies and regulations, the networks between the involved actors and their needs, as well as collective sense-making.

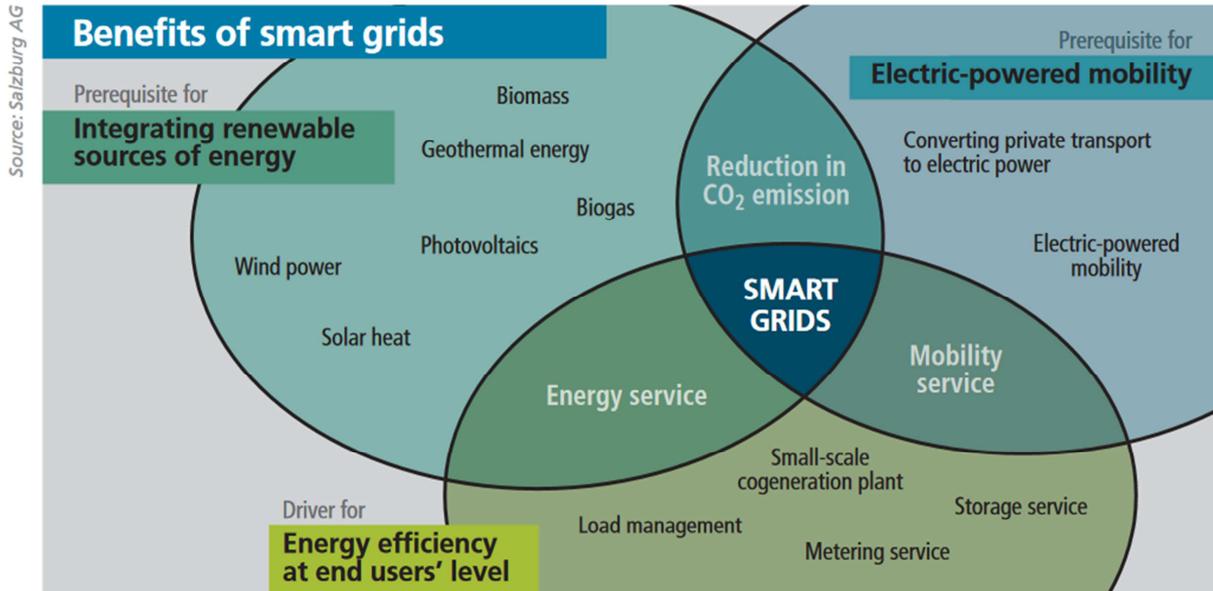


Figure 2: Benefits of smart grids (bmvit, 2010)

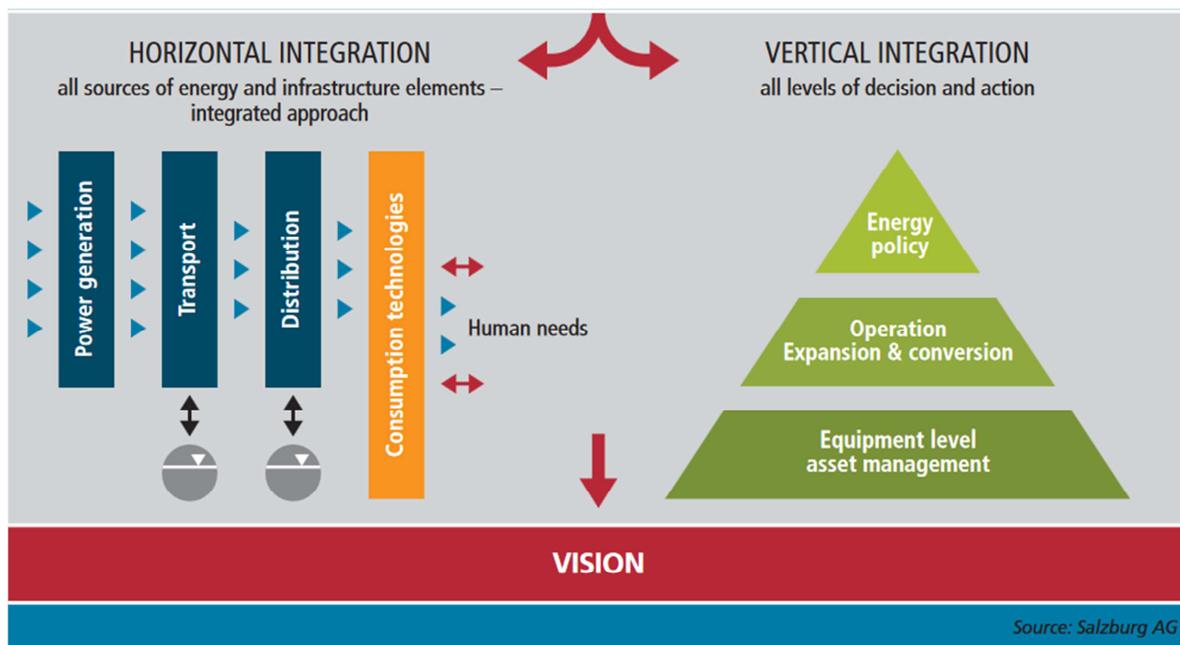


Figure 3: Horizontal and vertical integration in the Smart Grids region (Stutz et al., 2015)

4. Case study on project “ROSA ZUKUNFT”⁶⁹ in Salzburg, Austria

4.1 Overview

The housing project is located within the city of Salzburg in Austria. In this residential complex (129 residential units) smart meter and home automation devices and sensors have been implemented to encourage customers to adjust the consumption behaviour to the network availability. A number of

⁶⁹ The name comes from the Rosa-Hofmann-Straße (Rosa Hofmann Street) where the building project is located.

34 living units have been equipped with a tablet providing an app which shows the current price of electricity, and furthermore combines energy feedback, home automation, and car sharing. Part of the application was designed as an ‘energy clock’, indicating whether the electricity price is currently cheap or expensive. The tablet also provided the possibility to control heating and ventilation. In addition, an ECO button was installed in these so-called monitoring apartments. When the ECO button is activated, a designated socket is switched off without voltage for each room and the room temperature is lowered by an adjustable value. Furthermore, room temperature controllers as well as room air sensors were installed to measure room temperature, relative room air humidity, and CO₂ concentration (see Stutz *et al.*, 2015).

In addition, the inhabitants were given a device called Wattson. Wattson is a commercial product that measures the current power consumption and displays real-time feedback in watts and euros. This real-time feedback was intended to be valuable to customers, as they can identify the energy consumption of individual electrical appliances (see Stutz *et al.*, 2015). Standard invoices were sent to customers by the energy provider (Salzburg AG) and, as a result, many customers reduced their energy costs compared to the standard rate. However, during the project the range of price for electricity had been extensive, and the advised commitment of customers/participants in the embedded living system lowered over time. In the end (after a 1 year period), it was only one single household that still showed up with reduced energy consumptions and costs, while the commitment of the others had decreased significantly.

To complement the measures of the smart homes project, the residents of 85 apartments out of a total 129 apartments received access to the energy feedback web portal “Energy Cockpit” and were signed up to a monthly newsletter by mail (offering consumption information with hints on energy efficiency).

4.2 Institutions

Relevant stakeholders besides the users/residents themselves are the respective real estate developers, the energy provider (Salzburg AG) and the Diakoniewerk Salzburg⁷⁰, a social service arm of the Protestant Church. One of the main institutional barriers for the housing project mentioned was posed by the city administration of Salzburg, as cooperation with this actor mainly due to scarce resources seems to be difficult. There has been no support from the city, not even in the initial phase of the project. However, interviewees did not in detail determine the reasons for this lack of cooperation and support by the city.

What has become clear is that a regulatory framework for flexible networks and Smart Grids is not yet established, but would be crucial. The current standards are promoting and enabling network flexibility in the energy sector only to a small extent. CO₂ neutrality and comparability call for sustainable standards. Especially during planning and operation, the success or failure of a housing project regarding CO₂-emission reduction is extremely dependent on the underlying conversion factors. In Austria, they pretty much differ in a spatial perspective (with respect to federal states) as well as between different systems of energy supply (for example, district heating (see Stutz *et al.*, 2015)). Consequently, replicability of the innovation taking place in the “Rosa Zukunft” might be challenging, even though it is one of the elements of social and systems innovation to foster (rapid) imitation and diffusion.

Another institutional aspect of the Smart Grids Project has been an accompanying research study, which had been designed as a one-year field study from both the perspective of the residents and the

⁷⁰ The Diakoniewerk Salzburg is responsible for ensuring the social innovation aspects of the project and is also involved in another project in the region aiming at combining private housing with health and social services.

buildings (April 2014 - March 2015). The results should enable an integrative understanding of the implementation of smart grids-friendly concepts. The objectives included

- (1) the detection of potentials of a smart grid-friendly building,
- (2) an optimization and expansion of interaction and building technologies for the residential complex,
- (3) a description of the interaction between users and building,
- (4) an evaluation of the integration of the building and into the energy network,
- (5) preparing a guideline for the implementation of a smart grid friendly housing.

To achieve these goals and to integrate the building and its inhabitants as “interactive participants” into the smart grid, the building provided as much flexibility as possible in form of controllable consumers, generators and storage systems. The empirical part of the research study included a series of surveys conducted in the form of questionnaires, focus groups, interviews, and diary studies with the residents of the monitoring apartments, and partly with the residents of the other housing units. The different surveys targeted at analysing the acceptance of the technologies used as well as potential changes in the energy consumption behaviour.

The results of the study show that the use of intervention technologies did in fact yield the desired results in terms of power consumption reduction and the occurrence of learning effects. In comparison to the residents of the comparison apartments without the embedded living system devices, the inhabitants of the monitoring apartments used app. 15% less electricity (see Stutz *et al.*, 2015). Furthermore, neighbourhood effects showed up to be influential as the project increased interest in energy-related topics. Photovoltaic devices, energy storage and electric mobility vehicles have been perceived as being of much interest to the people interviewed as well as their social contacts. The exchange of knowledge amongst residents of “Rosa Zukunft” has been fostered, and the reporting and interest by the media initiated a positive response from the stakeholders in the city politics on an institutional level.

4.3 Social networks

As described in the beginning, the housing project itself is part of the Smart grids Modellregion Salzburg. Taking this into account, one can say that the embeddedness into networks is given in terms of the scientific community, as well as with respect to the energy aspect (the stakeholders dealing with energy issues in the various projects in the whole region are to a remarkable amount the same ones, which indicates good networking and exchange). However, this is not the case at the level of the residents in the housing complex itself, as they are probably interlinked within the housing area, but there are no links, joint activities or processes of knowledge exchange with other projects.

The social innovation addressed within “Rosa Zukunft” is a cross-generational housing enforcing social integration. The housing project includes home ownership for people of all ages who appreciate the advantage of networking with a senior citizen-friendly environment. The cross-generational housing concept is supported by the so-called “Wohnkoordination”, a service provided by the Diakoniewerk Salzburg. A contact person provides low-threshold service, coordinating activities and is present at a reserved housing unit within the “Rosa Zukunft”-housing complex at certain opening hours. The overall aim of the “Wohnkoordination” is to enable the community to help themselves and establish links to the network of residents in the housing project in a sustainable way. The focus is on the strengthening of self-employment and the self-organizing capacity of tenants. Consideration, attention, networking of interests and support of needs are intended to bring benefits to younger and older residents. The costs for this service staff are shared proportionally by all residents of the housing complex and is envisaged for five years (yearly evaluation of impact and activities).

To provide the opportunities for residents to get together and start joint activities, a shared lounge is provided in the housing complex. The “Wohnkoordination” organises various activities there; but the residents themselves too use the room for private festivities etc.

When it comes to the allocation of apartments, the “Wohnkoordination” will meet the potential new residents first and explain the main idea and aims of the project to them. However, the allocation itself is conducted by the real estate developers themselves, without obligation to consider the assessment of the “Wohnkoordination”. Remarkably there has been very little change of residents within the first three years as hardly anyone is moving away.

4.4 Cognitive frames

The overall housing satisfaction is very good; however, the offers of the “Wohnkoordination” are less frequently used by working persons and to a higher extent by senior citizens. Amongst the group of elderly preferences differ, as some want no contact at all and others like to have someone who listens to them and gets them involved into activities. Also, the security aspect seems to play a role: it is important to the residents to have someone who sees them and notices if something happens to them.

The empirical research surveying the residents showed that the topic of energy saving in the household is highly relevant. This is reflected, on the one hand, in the attitudes towards environmental protection and energy-saving behaviour, which were already very pronounced before the intervention study. On the other hand, the already existing energy-saving behaviour makes it clear that the inhabitants are very conscious about energy. Energy-saving practices such as the use of switchable sockets, the twisting of light after leaving a room, or impulses instead of tilting are widespread. In addition, high interest in the interaction technologies that were used in this study testifies that the residents are open to further improvements in the use of energy.

With respect to the web portal (Energie-Cockpit) and information website, there is a significant difference between the monitored smart households and the control group of the study. While the two study groups did not differ in terms of the number of clicks on the information website, the time spent on the website differs pretty much: The monitored smart households spent a significantly longer time at the portal than the comparison group. This leads to the conclusion that the users involved in the embedded living system are dealing more intensively with energy issues than other, even if the interest in energy topics themselves might be the same at the beginning. With regard to environmental consciousness, values and attitudes, the group comparison showed that, at least in part, an increase in awareness for energy-related topics had taken place. The technical equipment helped many residents to increase their awareness about their energy behaviour. Thereby, an important element was the visualization of energy, which means that the technical equipment of the monitoring apartments had a learning effect. The relationship between energy costs and the consumption of individual devices, which is not directly perceptible, was thus first realized by many residents (see Stutz *et al.*, 2015).

Finally, the use of interaction technologies is strongly context-dependent. For example, the placement of the equipment in the living space plays a role. The context-dependent factors allow or prevent visibility and thus interaction with the technology, raising awareness about energy. A further influential factor are other members in the household or in the wider social environment. Thus, they can be reinforcing or hindering when it comes to adopting energy-saving behaviour, often to a higher extent than the technological devices themselves (see Stutz *et al.*, 2015).

5. Participation and social innovation in housing

As highlighted in literature on social innovations, the participatory dynamics of that kind of

innovations targeting at individual and collective empowerment are central and require input from various stakeholders and users (Toivonen, 2015, pp. 85–86). Also with respect to housing and spatial development one thing is certain: planning processes and instruments are challenged by the network paradigm and the crisis of traditional representative democracy. Consequently, it is forced to respond to the call for inclusiveness of democratic procedures, such as transparency in government actions, involving citizens, participation, reducing unequal power structures and empowerment (Albrechts and Mandelbaum, 2005, pp. 2–3). Especially urban development policies by means of governance tools nowadays address image building, local identities and participation. The themes of ‘home’ and ‘neighbourhood’ focus on improving the living conditions for city dwellers and the emerging and sustaining of a location-based community, and identity is promoted since neighbourhoods are perceived as social capital. One of the key notes usually influencing contemporary urban development perspectives and housing policies is participation, which has become a central component of inclusive urban development concepts (Strom and Mollenkopf, 2004, pp. 286–288). It is not just about informing the involved actors, but about encouraging active involvement of actors. One can observe very different strategies taken towards the enforcement of participation, the mobilization of actors and their empowerment, but their shared aim is to foster an urban culture of participation and to enable collective sense making and learning (Frey, pp. 80–81; Gualini, 2005, pp. 289–290).

“Public participation was always perceived to be a possibility for comments on decisions to be taken by elected representatives. Yet with the demise of the order of expertise, policy and politics, participation has gained another role. (...) Participation is now interpreted as a matter of generating knowledge as well as a matter of providing legitimacy.” (Hajer and Zonneveld, 2000, p. 351)

The participation of the residents and involvement of users within “Rosa Zukunft” took place only during the design of the technical devices for the embedded living system in smart homes, but not in the further course of the project. In order to get to know different user groups’ requirements to these interaction technologies, an empirical review of the developed interaction concepts as well as the developed user interface designs with eight end users was carried out. The focus was put on basic understanding, usability and user experience of the interaction systems. The identified weaknesses of the design with regard to usability were included in the requirements for the development of the final concept (see Stutz *et al.*, 2015). Remarkably, the technologies of the embedded living system had been used differently over time. The average use of the smart center on the tablet was relatively constant after the initial phase of the field study (several times a week), with some peaks that can be attributed to interventions within the field study (see figure below). With respect to the energy forecasting clocks and eco-buttons, however, there was a tendency towards a lower utilization at the end of the field study than at the beginning.

This clearly shows that interventions in the area of embedded living systems or smart homes are necessary in order to make a smart technology sustainable. Furthermore, the usage is also differing with regard to frequency (some rarely look at it, some do extremely often) and with respect to the situations when the residents interact with the forecast clock. It turned out that most of the situations in which the residents reported to use the clock are household tasks such as washing clothes, dishwashing, cooking, ironing and vacuuming (a total of 78% of the reported usages). In only 6% of the usages dealt with the use of the computer or entertainment electronics like TV or radio (see Stutz *et al.*, 2015), which indicates that the respective cognitive frames play a major role for energy consumption behaviour and smart homes acceptance by user groups (however, this needs to be further examined).

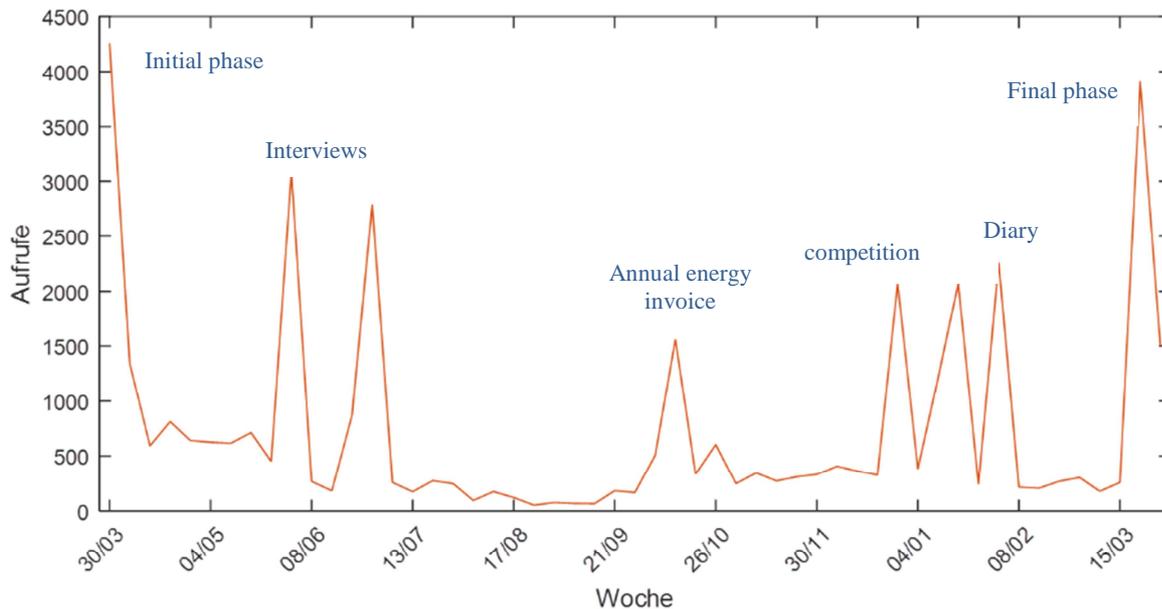


Figure 4: Usage of the tablet and smart home application – distribution of usage intensity over time (source: Stutz et al., 2015, p. 33 own adaptation)

6. Summary and discussion

Social innovations are new solutions that meet a social need and enhance society’s capacity to target complex societal and economic issues. The change of energy consumption behaviour, the design of a middle-sized housing complex as an embedded living system that connects to the flexibility of a smart grid are for sure complex tasks. As the analytical approach of the Social Grids and the self-understanding of the Smart Grids Modellregion in Salzburg have shown, the interrelation on a system level between technology, social and

organizational aspects as well as services are evident. Looking at the process of social innovation, the case study discussed in this paper is located still at an early stage; showing the characteristic of a prototype and also sustaining.

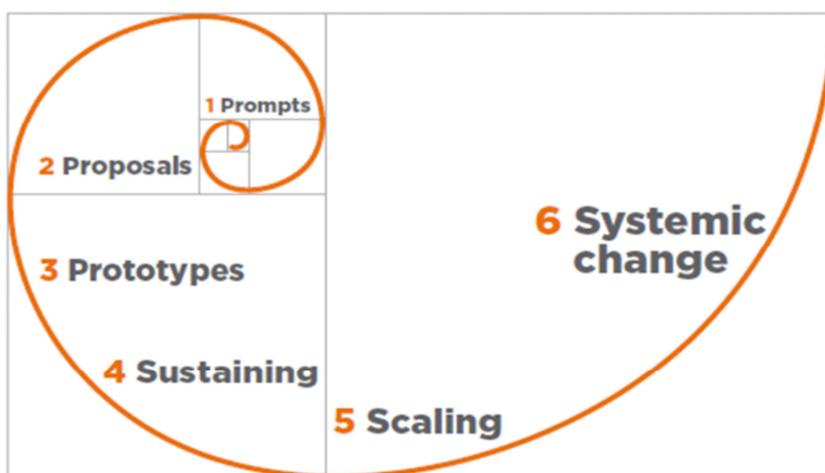


Figure 5: The process of social innovation (The Young Foundation, 2012, p. 34)

The most innovative aspect in terms of social innovation is the community approach, which has proven to also be crucial for sustainability of the intervention or measures. Therefore, the “Rosa

Zukunft” project is to be seen in the tradition of social housing in the 19th and 20th century as it takes up the idea of different social groups living together in a larger housing complex. Solidarity among the residents and the neighbourhood have been key values for social housing and within this current project, they are put in focus again by establishing the “Wohnkoordination”. Furthermore, the “Wohnkoordination”, which is shared in costs by the residents, also ensures the long-term nature in this housing project. This leads to another success factor of the social innovation part of “Rosa Zukunft” project; it needs to be a low-threshold offer at low or no costs. However, in terms of smart home technology, a different picture showed up: the energy savings only influenced the energy bill to a very small extent, which means that the change in awareness and energy behaviour is not a solely monetary incentive. Constant provision of incentives (persuasive technologies, gamification etc.) seems to be crucial for sustainability in terms of embedded living systems. Also with respect to the social innovation, the most difficult thing is to get past the initial phase. Only if the networks, the community-building, collective sense-making and the interest of stakeholders can be maintained beyond the first phase, sustainability can be ensured. This indicates another similarity of the “Rosa Zukunft” project with the idea of Social Housing in the 19th/20th century, namely a disciplinary aim. While in the 19th century hygienic aspects have been shaping the housing standards and framing the idea of social innovation in housing, now the institutions try to foster sustainability and resource-efficiency by changing/steering the behaviour of people in such housing projects.

Another core factor is the user-orientated design and conceptualization, which also needs to take into account the cognitive frames of different user groups. However, in the frame of “Rosa Zukunft”, the participatory approach was in place only during the design phase of the project. It was targeted solely towards usability of smart technology, not at social innovation in the project. This refers to the above-mentioned understanding of participation as generating knowledge in the perspective of a user-orientated approach. However, the housing project “Rosa Zukunft” cannot be called a user-driven innovation as the social actors had not fully been involved as cofactors in the innovation process.

Within the “Rosa Zukunft” project, social networks understood as ways of connecting residents amongst each other are of major importance, as is the technical network of the Smart Grid. The social networks have only been addressed by the above-mentioned community approach and the “Wohnkoordination” as major network hub. However, there have been no institutionalized efforts to establish or make use of (other) social networks, like connections to other housing projects or already existing social networks. The use of ICTs to support social networking has been accepted by the residents only to very small extent. This goes hand in hand with the fact that no connection or interrelation amongst the social and the technical networks within the project has been established. Consequently, also the accompanying scientific research on the housing project has not dealt with the networking aspect as major issue. What has become clear is that a regulatory framework for flexible networks and Smart Grids is not yet established but would be crucial. The current standards are only to a small extent promoting and enabling network flexibility in the energy sector.

A final aspect is that the interrelation between technological and social innovation had not been fostered within the “Rosa Zukunft” project. The Smart Grids Project monitoring the energy consumption has been ended without ensuring sustainability. As indicated by the “Wohnkoordination”, e-bikes are rarely used; the planned car sharing system had not been established at all (due to lack of interest by the residents themselves), which shows that the usage and acceptance of technology is highly dependent on the context and the needs/cognitive frames of the different user groups. As social innovation targets a change of perspectives, behaviours and values, the linkage between social and technological innovation seems to be crucial for sustainable success in terms of energy consumption change, integration into networks, and usage of smart living devices. Although in the “Rosa Zukunft” project both types of innovations can be observed, no additional values have been created as the linkage has not even been conceptualized.

7. Appendix

Interview Wohnbaukoordination Salzburg with Birgit Radwanovsky, 18.11.2016; phone interview

Interview guideline:

- What are the main aims and tasks of “Wohnbaukoordination”?
- Coordination and networking between residents – does it work sufficiently or not?
- How is the allocation of the apartments organized? Are the residents involved and/or does they give recommendations on new residents?
- What is the role of technology in the process of social networks?
- What is the innovative aspect of the project?
- What is the greatest factor of success? What can you suggest to other (similar) projects?

Interview with Markus Radauer, Salzburg Netze, October 2016

Interview guideline:

- Short description of the project
- What was the starting point of the project?
- What are the enablers and barriers? With respect to...
 - Market place
 - Regulation
 - Cooperation between stakeholders
 - replicability
- Was there a user involvement and if so, in which way?
- Who are the relevant stakeholders?
- Governance and bottom up – how did that take place in the project?
- What are the main factors of success?

Part 3

Social Innovation at the Cross Roads of Public Health and Action Research: Participatory Health Research

Susanne Giesecke AIT

1. Abstract

Considering social innovation for the benefit of marginalised people in our society, the health sector offers a vast field of study objects. Participatory Health Research, for example, has become recognised a field of activity both for researchers and activists in the public health sector to engage in the quality assurance of health promotion and disease prevention in relation to socially disadvantaged groups. In our paper we will show how social innovation in this field was able to lead back economically marginalised parts of the population to economic participation and reintegrate them into society. Theoretically, our paper relates to Beckert's (2010) social grid model. Beckert noted that common analyses of markets as social structures fail to integrate established approaches that tend to focus exclusively on one explanatory theory alone. This siloed thinking does not give a full account of the social enactment of economic structures and social exchange relationships and, as a consequence, typically does not acknowledge socio-economic exclusion as a product of market arrangements. Beckert contended that the formation and continuation of such grids is not a neutral process but (re)enacts existing power relations and social structures, thus resisting changes in social relations that disrupt extant benefit regimes. Finally, Beckert saw the three analytic elements – social networks, institutions, and cognitive frames - of his model as being closely related to another through multiple interactions and feedback loops. To change the structure, elements of the social grid need to undergo transformation first, either due to internal pressure from the social grid or due to external pressure. A social grid that is in a “regime” position can only be altered if niche innovations find a way to compete and challenge the incumbent structure, preferable during a time frame, where major external events open up a window of opportunity. In our paper we focus on the German case, showing that change at regime level needs to be induced from the interplay and change of networks, institutions and cognitive frames.

2. Introduction

This document is a deliverable of the work package 5 of the EU-funded FP7 project CRESSI. CRESSI explores the economic underpinnings of social innovation with a particular focus on how policy and practice can enhance the lives of the most marginalised and disempowered people in society. To date, case studies targeted among others social housing, micro finance, and drinking water supply. The present case study focuses on the field of health and attempts to give an overview on a social innovation called Participatory Health Research. It looks at developments in Germany at two consecutive time segments. The piece is to be understood as an introduction to this practice field rather than a detailed analysis of a single project or case.

The Social Grid as defined by Beckert consists of three main elements: institutions, networks, and cognitive frames. These three elements pose conditions and restraints on each other for their and the social grid's reproduction and change. Understanding the reproduction of market fields and their dynamics is only possible if **all three** types of social structures are recognized simultaneously. Looking at all three structures makes it possible to understand the mechanisms of which social structures **reinforce** each other; and through which actors employ resources gained from one of the three structures to **reconfigure** other parts of the social structure in a way favourable to their goals. **Friction** between the three structures is a powerful source of change.

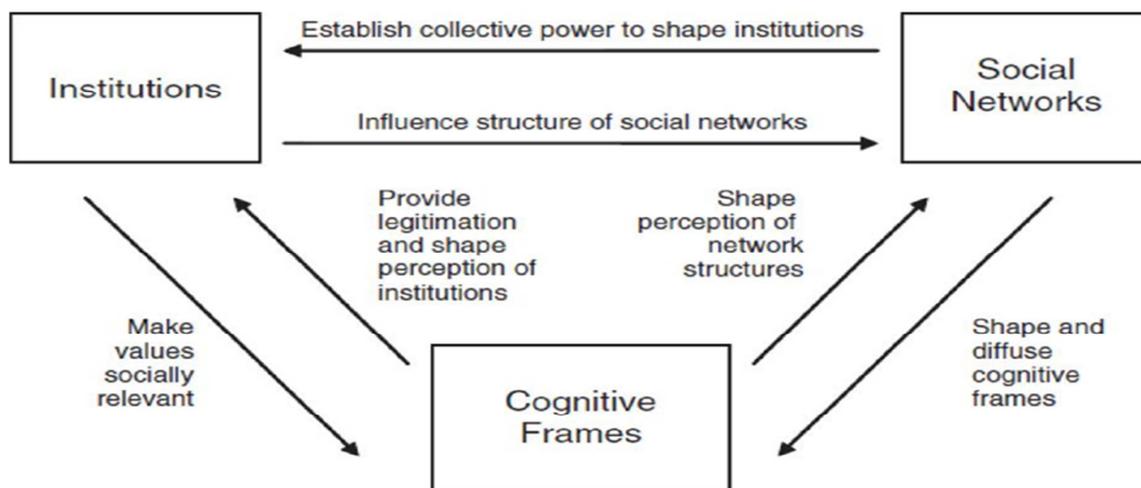


Figure 6: Social Grid according to Beckert (2010)

What can we learn from the Social Grid Approach? First of all, change of social innovations from one regime to another is influenced by niche innovations and depends on pressure from the landscape level (opportunity, contingency, structure). This case study shows how social innovations lead from one “regime” to another, however without replacing the incumbent regime. The incumbent regime here was a paternalistic and authoritarian expert-based health care system in Germany. Through the introduction of Public Health and Participatory Health Research this system changed toward a more egalitarian and communicative regime. To enable change through a new social grid, institutions, networks and cognitive frames have to work simultaneously and reinforce each other. Other studies of the CRESSI project have shown that a social grid can also turn against marginalised people if not all three elements are considered equally (see Scheuerle *et al.*, 2016). However, the contradictory character of the different social structures highlights spaces for innovation, e.g. market failure to solve public health problems. Additionally, bottom-up movements and advances in science affect change in the medical system.

3. Problem area and targeted beneficiary groups

Participatory Health Research (PHR; sometimes also called community-based participatory (health) research (CBPR), collaborative research, action research, interactive research) denotes the cooperation between research, health care, and engaged citizens to jointly achieve new insights in the improvement of public health. Particularly socially marginalised parts of our society benefit from this approach because it facilitates innovative practice that can contain the negative determinants of health. Research is not conducted on people as passive subjects just to provide data; it is rather conducted “with” them in order to provide relevant information for improving their lives (Israel *et al.*, 1998; Minkler and Wallerstein, 2008; Macaulay *et al.*, 1998; Macaulay *et al.*, 1999; Green and Kreuter, 2005).

PHR is regarded an effective method for transferring evidence-based research from clinical settings to communities that can benefit most; thereby, it can improve people’s health. PHR’s community-partnered research processes offer the potential to generate better informed hypotheses, develop more effective interventions, and enhance the translation of the research results into practice. Thus, PHR is an essential tool for action-oriented and community-driven public health research.

4. Problem background and solution approaches

Considering social innovation for the benefit of marginalised people in our society, the health sector offers a vast field of study objects. Participatory Health Research, for example, has become

recognised a field of activity both for researchers and activists in the public health sector to engage in the quality assurance of health promotion and disease prevention in relation with socially disadvantaged groups. In most OECD countries life expectancy and at the same time compression of morbidity increase if a person belongs to the privileged group that can benefit from the progress in health research, health care, better education, and improved standard of living. However, one fifth of the population fall through the cracks. Those who have a low income and poor education or grew up in an underprivileged parental home are more inclined to suffer from poor health than others. This is partly due to the fact that chronic-degenerative diseases are the major cause of health problems and death in OECD countries; these diseases develop earlier in underprivileged people and lead to death more often and earlier (WHO World Health Organization *et al.*, 2011). Chronic-degenerative diseases are however to a large degree avoidable if primary prevention measures are taken early enough. This is one major focus of community-based participatory health research. Other focuses are, for example, women's health, migrants, and elderly people.

In this case study, we want to show how PHR developed from two historical contexts: in the health sector it was the emergence of Public Health, and in the social science sector the emergence of action research. The theoretical approach chosen for this undertaking is Beckert's social grid, in combination with applied theories of innovation and innovation systems. While PHR had taken somewhat different paths in its beginnings in various countries, it has evolved toward a more convergent phenomenon over the last two decades. Considering the varieties of national histories, in our case study we will focus mainly on the German path, with some comparisons to Austria, the US and Canada at points where varieties are significant and point to alternative approaches in terms of institution building, social networks and cognitive frames.

As of all social innovations the history of PHR is one of social change. In our case study, for the development of PHR in Germany we will look at what the prior "regime" was in which public health was conducted even though the term did not exist at that time. We will move on to describe the various changes that occurred on institutional level, on network level and with regard to cognitive frames. As this study will show, significant social change induced by social innovation relies on manifest changes in the social grid structure that need to grow over time in order to be solid and long-term.

4.1 Inception phase in Germany – the incumbent “regime” and Social Grid at the early beginnings in the context of Public Health

4.1.1 Cognitive Frames

In Germany of the 1920s a stream of research developed which focused on the maintenance and improvement of health, so-called "Sozialhygiene" (Social Hygiene). The term already describes a cognitive frame combining descriptive and normative aspects at the cross-roads of society and health. Besides care for the ill some medical experts were concerned with the status of public health policy at that time. Proponents of a new approach were for example Rudolf Virchow and Salomon Neumann who recognized the relation between societal, cultural and economic circumstances and the public health. The impact of work and living conditions on health got pointed out by Alfred Grotjahn (first published in 1904 and 1926). Taking up on these insights there was also practical efforts to maintain the Public Health or to improve it. Focal points have been the increase of hygiene and living conditions in cities, nursing of infants, care for the dying and prevention of infectious diseases (Schaeffer *et al.*, 2010). During the Nazi regime the German Public Health Sector got politically and ideologically exploited. The NS-regime took over the maintenance of Public Health with a focus on Racial Hygiene. The Nazis used the frame of Public Health to shift from caring for the weak to mystifying and privileging the strong and to justify mass murder (Rosenbrock, 1998). Proponents of the society-centred approach from the Weimar Republic who had also used the term

“Gesundheitswissenschaft” (health sciences) had to emigrate or were killed.

After WWII, there was a strong reluctance to Public Health and the German health sector in society in both parts of Germany (Wright *et al.*, 2008). In Eastern Germany, Public Health got co-opted again by the ideology of the regime, and in Western Germany the task of the public sector to promote human health got left behind (Schaeffer *et al.*, 2010). Since then the focus of health policy has been to *take care of sickness*. This implied a medical-professional institutionalised curing of symptoms. This approach did not consider the determinants of health such as living environment, social, psychological or mental conditions (Rosenbrock, 1988). Medicine focused on medical-therapeutical intervention on the individual patient and not on a general health policy for parts of society or society as a whole. However, the hegemony of neo-liberal thinking arising during the 1980s had precarious consequences for public health and for PHR. Neo-liberal policy making does not favour any increase in health sector-related governmental efforts and transfers the responsibility for health to the individual level.

4.1.2 Institutions

We have to differentiate between the building of institutions in East and in West Germany after WWII. In Eastern Germany, the health system was controlled by the state and highly inter- and transdisciplinary. Practitioners worked together with specialists in other health related fields in so called “Polyclinics”. The municipalities provided preventive services, health education and specialised care for chronic diseases. This meant less awareness for the issue of health prevention in the general public. The implementation of preventive health care laws failed.

The fact that health policy focused on symptom control instead of health prevention put the individual practitioner in a central position. More than in any other industrialized country, the conservative middle class policy of Western Germany supported medical doctors in their class consciousness and prestigious economic and political position and endowed local general practitioners with the necessary power to virtually become idols, a development that later on continued in a political climate of neo-liberalism throughout the 1980s and 1990s (Rosenbrock, 1998). This was reinforcing the individual and sickness centred approach on health. Improvements in health were sought through a higher usage of technology and a massive program on individual early diagnosis (Rosenbrock, 1998). This was enforced through a German science tradition which could be described as conservative, in the sense that it is organized along the disciplines. This holds not only in the academic institutions but especially for funding, which is mainly granted for mono-disciplinary projects. Calls for funding are traditionally not problem-based or practice-based (which would require interdisciplinary research), but focus on basic research and theory creation. Hence health in the academics was mainly an issue for medicines and not for social sciences or even a multi-disciplinary topic.

4.1.3 Networks

In Germany there is a strict division of labour between two types of universities: one is rooted in the theory creating and disciplinary segmentation at traditional universities and the other are universities for applied sciences which follow a practice-oriented approach. Also, NGOs and public institutions in Germany have no tradition in conducting their own research. This holds true also for health insurances which conduct research only for reasons of quality management. Over all there was very little cooperation between practice or politics and academics⁷¹. Thus we can say that there were several networks operating in their own areas but there was no significant interaction between them

⁷¹ Personal Interview AIT with Wright, M. T. Professorship for Research Methods at the Catholic University for Applied Sciences Berlin, 10.2.2016

to take a new approach toward health. This does not imply that there would not be a personal relationship between the physician and the patient, but broad social circumstances are usually not considered holistically.

4.2 Co-existence of Regimes: Public Health next to Conventional Health Approach

4.2.1 Cognitive Frames

Since WWII, the living conditions and life expectancy increased in Germany as in other “Western” countries due to improvement of hygiene and economic wealth, not so much through medical improvements or even medical prevention. This led to a decrease in acute and transmissible diseases. Instead, chronic-degenerative diseases became the major cause of health problems and death in OECD countries, for example cancer and cardiovascular-diseases, socio-somatic, eco-somatic and psychosomatic dysfunctions which had a strong correlation to lifestyles (Schaeffer *et al.*, 2010, p. 21). The social system was burdened through a shift in demographics as life-expectancy rose and proportionally less children were born.

Medicine focused on medical-therapeutic intervention on the individual patient and not on a general health policy for parts of society or society as a whole. But with the predominance of non-communicable diseases (NCDs), the need to change the medical approach became obvious. The development of treatment-, rehabilitation- and care possibilities, which was the approach up to then, became more and more expensive and had no impact on diminishing the spread of NCDs. Attempts to educate society with traditional means on risk factors remained as insufficient in decreasing the amount of NCDs as law-restrictions (Schaeffer *et al.*, 2010). Chronic diseases require a more nuanced approach to treatment; however, the most significant impacts on outcomes are likely to arise equally from behavioural changes and the administration of drugs and clinical interventions. There was and still is a rise of awareness of the fact that this demands not only expertise from different medical and social sciences, but a hitherto unusual degree of cooperation between health professionals and patients or health service users in the fields of health-care provision and health research, especially because of the increasing importance of patient experience in determining the way in which interventions for chronic conditions are designed. This shift in perception of public health in society and science paved the way for a “rebirth” of the German tradition of Public Health, as Schaeffer (2010) sees it.

The handling of AIDS in society, politics and the health sector in rich, industrialized countries can be seen as a social innovation which led to a changed perception of public health. There was a wide consensus through these countries that HIV/AIDS needed a new approach to health politics which was soon called “exceptionalism” (Smith *et al.*, 2010). But what led to this special way of perceiving the disease? Rosenbrock (2002) names several interconnected reasons. With the beginning of the 1980s HIV/AIDS epidemic, the conviction of the end of the age of infectious diseases in industrialized countries got unsettled. The realization that clinical medicine was not able to cure or prevent the spread of the disease led to another shock of society and professionals in medicine and care. There was no information about how bad it really was. Potentially the whole sexually active society was in danger of getting infected. The spread of AIDS was also heavily symbolically loaded. The debate about AIDS had to reflect on topics like sex, homosexuality, prostitution and drugs after the modernizing processes in the 1970s. Right wing actors used this situation to stigmatize behaviour that deviated from the norm. Old public health measures like forced examination and civil rights interventions got questioned concerning their effectiveness and feasibility. The existence of several societal movements was an important factor to support the establishment of a new public health approach. A lot of “gay communities” organized to push behavioural change among their members and inspired a mobilization of AIDS-activists from political parties, the general society, public rights

activists and people working in the care sector. The discussion about strategies on how to handle the AIDS disease was happening in an open political system that involved a range of different actors like NGOs, governments and professionals of the health sector. This mode of discussion led very quickly to a high information level of the public. Following Rosenbrock (2002) the emergence of AIDS opened a “window of opportunities” (Kingdon, 1984) for a new health policy. The implementation of primary prevention of AIDS was based on mobilizing the ‘communities’ and the participation of the target groups in the whole process, which should result in ‘enabling’ and ‘empowerment’. This basic concept got manifested in the Ottawa Charter in 1986.⁷²

4.2.2 Institutions

The Ottawa Charta for Health Promotion of 1986,⁷³ often recognized as a foundational document of health promotion, gives an overview of the critiques of the predominant individual-curating approach in health sectors and offers some guidance for action. And it is still a relevant document for public health. Inspired by the WHO Constitution, the Alma Ata Declaration, and the Lalonde Report, the Ottawa Charter endorses a positive definition of health, situates health as a product of daily life, proposes core values and principles for public health action, and outlines three strategies and five action areas reaching beyond the boundaries of the health care sector. The Charter established a radical agenda for public health, specifically to emphatically convey the values “new” public health pursues, thereby increasing the potential for the reflexivity of the field and opportunities to consider complementary values in actions that promote population health. The strategic innovation of the Ottawa Charta is that strengthening health sovereignty of the target group is set as a goal. People should be empowered to recognize and minimize the risks for their health (Rosenbrock, 1998).

‘Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well-being.’⁷⁴

4.2.3 Networks

In the 1970s there have been several social movements involving workers unions and student movements which led to congresses and political and academic publications on the issue of social politics and societal medicine. Since 1980, the “Gesundheitstage” (Health days) took place in Berlin with up to 20,000 participants. This was the beginning of the alternative health movement in Germany. In 1982, the first bigger prevention project in Germany, the “Deutsche Herzkreislauf-Präventionsstudie”, got implemented (Rosenbrock, 1998, p. 10). Following Rosenbrock, these groups failed to establish a common platform which led to a spread in several different directions and no bundled effort.

As mentioned above, the concept of the Ottawa Charta was implemented in the AIDS ‘exceptionalism’. Here the target groups, NGOs, governments, and people working in the care sector were all together participating in the process of formulating and implementing policy on the topic. The “Deutsche AIDS Hilfe” was one of the first NGOs oriented towards Public Health. It was founded in 1981, and quickly became an important partner in politics (Rosenbrock *et al.*, 1999, p.

⁷² WHO: <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>

⁷³ <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>

⁷⁴ <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>

22). Long established hierarchies were changed, for example the role of the actors of ‘Old Public Health’ and medicine in general was decreased in favour of more social science based expertise. Due to the high pressure to implement new concepts into praxis, a very effective transfer of knowledge between research and praxis in both directions emerged (Rosenbrock *et al.*, 1999). This sector overlapping approach to prevention created the need to involve mass media, education and jurisdiction as well as private economy. Due to the change in health problems and the general changed perception of public health, academics from other disciplines entered the academic field and people working in the care sector started to academically professionalize their approaches. As a consequence, networks of medicines, social scientists and care workers evolved where transdisciplinary projects could get developed (Noweski, 2009).

In 1988, the Working Group “Gesundheitsrisiken und Präventionspolitik” (Health risks and prevention politics) was established at the Wissenschaftszentrum für Sozialforschung (WZB) in Berlin, which was in 1995 renamed to “Working Group Public Health”. The fact that the WZB is a non-university research institute where researchers from different social sciences conduct problem-centred basic research on social and political topics has probably improved the possibility for a non-disciplinary working group on public health. It existed until 2012.

Starting in the 1990s, the state was funding Public Health related research projects for 12 years. Several research associations on Public Health emerged from this funding.⁷⁵ One of the biggest successes of implementing the Ottawa Charta is the transfer of public health into the academics. About eight post gradual student programs were founded in German universities. In 1994 the first German faculty for Public Health got established. It follows the model of “Schools of Public Health” which work explicitly interdisciplinary and problem oriented. The aim is to provide opportunity to study each of the disciplines that are relevant for public health within one faculty.

Concerned about the socially induced inequality of health, the then newly founded working group “Gesundheit Berlin-Brandenburg” (formerly “Arbeitsgemeinschaft für Gesundheitsförderung”, Gesundheit Berlin e.V.) and a section of the medical association, “MUT”, in 1995 organised the congress “Armut und Gesundheit” (Poverty and Health) in Berlin. In the following years, the workers unions and politics got involved, the yearly congress grew and today is an important event for networking and communication about Public Health.

To support the case of Public Health, in 1997 the “Deutsche Gesellschaft für Public Health” got founded. It consists of institutions, organizations and communities which are concerned with education, research and praxis of Public Health and aims at improving the national and international cooperation between Public Health research and practice. Its communication-channels are the journals “Public Health Forum” and “Journal of Public Health”.

Participatory Health Research Emerges from established Social Grids

Participatory Health Research is not only a remarkable social innovation in the context of Public Health. In a scientific context, Participatory Health Research is part of participatory social research and emerged only recently in a significant way.

⁷⁵ [http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/\\$002fj\\$002fpubhef.1995.3.issue-4\\$002fpubhef-1995-1239\\$002fpubhef-1995-1239.pdf?format=INT&t:ac=j\\$002fpubhef.1995.3.issue-4\\$002fpubhef-1995-1239\\$002fpubhef-1995-1239.xml](http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/$002fj$002fpubhef.1995.3.issue-4$002fpubhef-1995-1239$002fpubhef-1995-1239.pdf?format=INT&t:ac=j$002fpubhef.1995.3.issue-4$002fpubhef-1995-1239$002fpubhef-1995-1239.xml)

Participatory Health Research
is based on two previous Social Grids

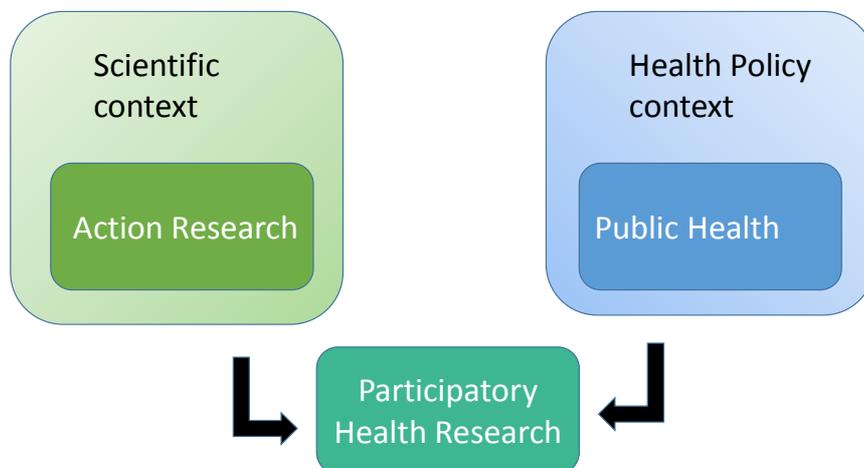


Figure 7: Participatory Health Research emerges out of Action Research and Public Health

Similar to Public Health, PHR has its methodological origins in the Germany of the 1920s. It has some roots in the so-called action research and was originally developed by a Jewish doctor in Berlin, Kurt Lewin, who wanted to match action and research. Under the Nazi regime, he fled to the US where he continued his work. It took until the late 1960s and the following years during the student revolts and the emergence of Critical Theory (Frankfurt School) for this approach of participatory social research to be taken up again in Germany. However, it was soon stigmatised as Marxian and unscientific (because of the supposed lack of neutrality when a researcher is personally involved in the field of study) and almost disappeared in Germany (and in most of Europe), but it survived and was further developed in North America, Latin America, and to some degree in the Scandinavian countries (Wright, 2012b, p. 418).

Consequently, very different kinds of this research approach developed; apart from differences, there are usually two common characteristics:

1. New insights are directly connected with new forms of action to improve the living conditions of the marginalised.
2. Researchers, practitioners, and citizen scientists work at the same level in order to conduct a research project and they work together during all of its phases; this is what is meant by the term 'participatory'.

Action research today takes very different paths and a common basis for consolidation still needs to be found. It is present in various fields and areas and there is no common definition or even title. Action research, not only related to the health sector, is characterised by a huge theoretical heterogeneity which makes it impossible to speak of a common school of thoughts or academic consistency. Some critics noted that action research is held together more by political objectives of social transformation than shared scientific criteria (Lukesch and Zecha, 1978, p. 41).

As to action research, the health sector belongs to the most established ones; this has historically been accompanied by the emergence of Public Health and the Ottawa Charter for Health

Promotion⁷⁶. The Ottawa Charter notes that the following conditions are necessary to promote health:

- peace,
- shelter,
- education,
- food,
- income,
- a stable eco-system,
- sustainable resources,
- social justice,
- and equity.

These prerequisites can only be provided in collaboration with the local communities. Local communities are thus often involved in Participatory Health Research and are essential for the funding of related projects. Some of the principles of this joint activity in the health sector are:

- mutual learning and transfer of expertise,
- divided decision making,
- common ownership of all products and process achieved in the common work or project (Wright, 2012b, p. 419).

A crucial feature of action research and thus also of Participatory Health Research is, in its own rhetoric, the intended interaction between research, on the one hand, and action, on the other, i.e. a harmony between both. Action research intends to cross the boundaries between science and ‘real life’ and not just collect empirical data or engage in analyses and theory building. Instead, researchers want to be involved and change things; on the other hand, citizens, i.e. the research objects, want to contribute and also to be actively involved in the research setup (Masters, 1995). Another characteristic of action research is that it acknowledges that communities create their own identities; in the field of health, action research also focuses on the relevance of communities or neighbourhoods with reference to particular health problems and it is strongly committed to sharing knowledge and solution-solving approaches within the respective community and beyond. Projects in Participatory Health Research usually take a long-term approach and intend to enhance and stabilise the social relationships among project partners. They often take ecological perspectives into account, since these are considered to be important health determinants, at least at the declarative level.

However, these principles are not always implemented in practice. Especially the participatory aspect is often neglected. Instead of concentrating on the community, the studies often focus on the individual. Another practice is that studies are often not much concerned with communities as identity-creating entities but with collecting data in many communities, which leads to general interpretations at society level that are, in the end, aiming at policy interventions at that level. Many projects focus on prevention alone, without considering holistic approaches that would require political precaution. An ideal solution would be a systemic perspective including a cyclical and iterative approach of empirical data collection, interpretation, and intervention (Wright, 2012b, p. 421).

In the following chapters we will point out how the social grid of Participatory Health Research emerged against the background of Public Health and Action Research.

Networks Growing out of New Institutions

An obstacle for the scientific acknowledgement of Participatory Health Research is the fact that

⁷⁶ <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>

similar to other areas of action research it has not yet achieved a definite academic profile that would serve as a solid basis for explaining and justifying its methodological and theoretical heterogeneity. Due to these deficits, Participatory Health Research stands in stark contrast to randomised clinical studies for instance, at least from an academic point of view.

In order to overcome this deficit, some proponents of Participatory Health Research established the International Collaboration for Participatory Health Research (ICPHR) in 2009 (Wright *et al.*, 2009; Wright *et al.*, 2010). It intends to strengthen the role of PHR in intervention design and decision-making on health issues. The work of the ICPHR focuses on systematically bringing together the knowledge and experience of PHR gained in different countries in order to strengthen its role with reference to issues of quality, credibility, and impact on policy and practice. The ICPHR is an international organisation aiming at consolidating common principles on the international level and at encouraging this kind of research in countries which have only recently started to engage in PHR. The ICPHR central office is located at the Catholic University for Applied Sciences in Berlin, Germany.

Activities of the ICPHR include:

- developing guidelines for conducting and evaluating PHR;
- describing the unique impact of PHR as compared to other research approaches;
- describing which forms of theory and evidence are produced by this approach as compared to other forms of health research;
- finding ways for conducting systematic reviews of the PHR literature in order to contribute to the body of international knowledge on improving community health;
- creating a database of resources on the theory, practice, and outcomes of PHR⁷⁷.

The creed of the ICPHR is very similar to the context and content of social innovation definitions because it acknowledges that “not all people have an equal chance to live a long and healthy life or to have their voice heard in society. People who have to struggle to live, for example, because they are poor or because they are discriminated against or because they have a disability, often have more health problems.” ICPHR wants to “promote PHR as a way to generate knowledge that is relevant to these people and can thus increase the likelihood of improving their living and working conditions so they, too, can have a chance to live healthier, happier lives. In the understanding of its members (mostly medical sociologists), PHR is a new way of doing health research.” (both quotes: ICPHR, 2014)

The formation of a first international PHR-related association can be interpreted as a first move towards institutionalisation. To distinguish PHR from other health-related research approaches, Springett *et al.* (2011) suggest some topics which coincide to a large degree with the features already mentioned above, whereby a strong normative focus, especially in the context of social innovation, is worth mentioning. In the end, PHR is supposed to support a kind of social transformation towards a better and most of all healthier life for marginalised people in accordance with democratic principles of empowerment and participation. Participation is to be understood in the sense of the German term ‘Teilhabe’, which practically means that the people in focus, i.e. the marginalised, actively take part in the research process, not only as study objects but also as lay researchers or citizen scientists. These citizen scientists take part in the development and testing of instruments, in the collection and interpretation of data, etc.

The organisation of the ICPHR was highly participatory, in order to ensure networking of German prevention research ‘from the inside out’. The structural elements of the cooperation project reflected

⁷⁷ <http://www.icphr.org/>

They also regulate prevention and self-help, occupational help promotion, rehabilitation, participation of physically and mentally challenged persons, inclusion, the organisation of a safe work place, and the management of health authorities at the workplace.

5. International Framing of PHR

Since the 1960s, several developments have contributed to a change of cognitive frames, i.e. changes in narratives and discourses. Amongst those developments there were several medical scandals which in the end resulted in demands for more patient involvement, better information on risks of the broader public, and a greater demand of the public for more accountability in public (health) services. From the 1960s on it can be observed that on the part of the patients there is an increased willingness to challenge so-called experts in medical and scientific research and a decreased trust in technocrats and scientists (Ismail, 2009; Collins and Evans, 2002).

One of the crucial incidents dates back further in history than AIDS. We have to turn to the beginning of the 1960s to the medical scandal related to Thalidomide, a medication for pregnant women that caused physical impairments in several thousands of new-borns; approximately half of them died. It was never fully documented how many children were affected and the practice of admitting the drug to the market was very different across countries. It seems that the majority of Thalidomide victims could be found in West Germany, since here the drug was admitted first. Due to poor documentation standards, little knowledge on evidence-based medicine, and no patient involvement whatsoever, it took several years until the disastrous effects of Thalidomide were scientifically proven and revealed. Interestingly, the political and judicial reactions also varied across the different countries. While in Europe a lawsuit against the responsible company Grünenthal was settled via extra-judicial procedures, including compensation for the parents of the impaired and deceased children, in Canada parents of victims took a grass-root approach: They formed a group called The Thalidomide Victims Association of Canada, a group of 120 Canadian parents of children who survived (Warren, 2001). Their goal was to prevent future usage of drugs that could be of potential harm to mothers and babies. The members of this Thalidomide Victims Association were involved in the STEPS programme which aimed at preventing teratogenicity (Franks *et al.*, 2004). The harmful effects of Thalidomide increased the fear of insufficient safety of pharmaceutical drugs. After the effects of Thalidomide were made public, the Society of Toxicology of Canada was established to focus on toxicology as a discipline separate from pharmacology. After the Thalidomide scandal, the need for testing and approval of toxins in certain pharmaceutical drugs became more important. The Society of Toxicology of Canada is responsible for the Conservation Environment Protection Act and focuses on researching the impact of chemical substances on human health (Racz *et al.*, 2003). The Thalidomide scandal resulted in changes as to the way drugs are tested as well as to what type of drugs can be used during pregnancy, and it increased the awareness of potential side effects of drugs. The case became relevant for establishing Public Health as an institution of its own because it reconsidered procedures of medical documentation and patients' rights.

In the United States, Thalidomide was distributed only during a test phase and has never been on the market since the FDA denied the approval. During the test phase some children with impairments were born, which raised suspicion. Consequently, FDA officials demanded further research. The Thalidomide scandal prompted many countries to introduce stricter rules for the testing and licensing of drugs, e.g. the Kefauver Harris Amendment.⁸¹

⁸¹ In the United States, the new regulations strengthened the FDA, amongst other ways, by requiring applicants to prove efficacy and to disclose all side-effects encountered in testing. The FDA subsequently initiated the [Drug Efficacy Study](#).

Critical reflexivity is seen as a core element of participatory research. This approach is linked to the theory of transformative learning. The theory, proposed by Ledwith and Springett (2010), inspired by the anthropological theories of the Brazilian educator Paulo Freire, provides a framework for understanding collaborative communication and engagement that can lead to social change. It is based on the assumption that communication is critical to individual and community well-being and that participatory practice is a way for a community to operate with mutual respect between its members and with a common purpose, and not to neglect the global connection. Ledwith and Springett apply a cyclical reflection approach for the building of theory on the basis of empirical data collection and every-day action. Action is critically reflected in order to lead to new or improved action, etc. All involved participants (researchers, practitioners, lay persons) are united in the attempt to improve living conditions.

The role of (professional) researchers is unconventional in the sense that they are not the only experts to determine the steps of the research project, to design the approach, and to interpret the data. They are not the only ones who explore possible solutions to a social problem. The participative approach calls the so far uncontested expertise into question. This creed requires a high level of professionalism, including a high degree of reflexivity on the quality of the researchers' work and also on the power relations in our society which are reflected in professional relations. These power relations, especially with regard to the health sector, show some degree of variation across different countries. For instance, a health-related profession which has an academic status in one country may be still in a stage of development in another. Another example is the status of health care, social work, and therapeutic occupations in the Anglo-Saxon countries: there are faculties and research infrastructure dedicated to these fields, whereas in countries such as Germany and Austria professional associations like the chambers of physicians try to keep other health occupations at a distance. Established power relations also exist between the physician and the patient. It is traditionally a top-down relation. Professionals engaging in participatory health research have to abandon this paternalistic habitus, at least to some degree; they have to communicate with the patients – who are rather their clients – on the same footing, and consider the implications. This is meant by reflexivity. Also some abstraction is required in order to assess the degree of participation that is actually available to the client or patient or to another lay person and to evaluate to which extent the researcher is responsible for this degree. Even though this degree cannot be quantified or standardised, it can be assessed according to a multi-stage model that has been developed by proponents of participatory health research based on Arnstein's ladder of participation (1969) (see figure 3).

[Implementation](http://www.fda.gov/Drugs/NewsEvents/ucm320924.htm) to reclassify drugs already on the market. (<http://www.fda.gov/Drugs/NewsEvents/ucm320924.htm> (U.S.) and [Directive 65/65/EEC](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31965L0065:EN:HTML) in the E.U. (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31965L0065:EN:HTML>))



Multi-stage model of participation accord. to Wright/Block/v. Unger in Weight 2012a, p. 96

Figure 8: Multi-stage model of participation

In the literature on PHR the normative goal is that the participants do not just participate but have some ownership in the decision making process (partial decision-making authority) related to crucial decisions on their lives by identifying, for example, what their health problems are and what measures have to be taken to improve their health. The model can be understood as evolutionary. During a project the participants can proceed from one phase to the next one; the last phase, which goes beyond participation, comprises all forms of self-organised measures. These can be measures induced bottom up from the group of lay persons who also take the responsibility for the process and results. One example would be diabetes patients setting up a self-help group to support their fellow citizens and occasionally inviting experts from a clinic or health organisation. The multi-stage model is not to be understood as a scale for the evaluation of the projects. Rather, it is supposed to provide some guidance for reflexivity and regarding the direction a certain project has taken or intends to take. Thereby, this model contributes to the quality of participatory health research.

Another shocking medical scandal mostly struck the UK but had widespread effects in other developed countries as well. It was the scandal related to the UK government's handling of the bovine spongiform encephalopathy or Creutzfeldt-Jakob disease crisis in the mid to late 1990s, which contributed to the scepticism of the public as to the public authorities' ability to successfully deal with critical health issues. More recently, in the United Kingdom the public concern about a purported connection between the MMR (measles, mumps, and rubella) vaccination and autism seems to have manifested itself in an opposition to the scientific research establishment, although there is overwhelming evidence that no such connection exists (Milewa *et al.*, 2008). A series of organ retention scandals at major hospitals in the UK, including the Bristol Royal Infirmary and the Alder Hey Children's Hospital, had arguably more damaging effects in terms of public trust in medical research; in the early to mid-2000s this issue led to public enquiries and important changes in the regulatory regime in this field (House of Commons, 2001; Ismail, 2009). These experiences were also discussed on the European continent regarding further political action, and challenged the so-called medical and scientific research experts. Since the 1980s they furthermore led to a demand for public-sector reforms in the developed world, at least in terms of political correctness and wording in public accountability.

A factor that enhances participatory health research is the changing perception of disease and illness, both within and outside the medical field. Today, key health challenges in developed countries do not

arise from acute or transmissible diseases (i.e. tuberculosis or cholera) but from non-communicable diseases (NCDs), also known as chronic diseases (i.e. cancer, diabetes, or heart disease). Chronic diseases require a more nuanced approach to treatment; however, the most significant impacts on outcomes are likely to arise equally from behavioural changes and the administration of drugs and clinical interventions (Rose, 2008). There is a growing awareness of the fact that this demands a hitherto unusual degree of cooperation between health professionals and patients or health service users in the fields of health-care provision and health research, especially because of the increasing importance of patient experience in determining the way in which interventions for chronic conditions are designed.

Internationally, the growth of a well-funded and active AIDS movement has also had significant impact on the amount of research that has been conducted in this area (Epstein, 1996); combat veterans in the UK and US have also been engaged in a similarly high-profile, although less successful, campaign to bring about changes in the research approach on the Gulf War syndrome (Zavestoski *et al.*, 2002).

A key outcome of these changes was the emergence of the notion of a so-called lay expertise, mainly from the field of medical sociology. This concept is increasingly spreading in participatory and community-based research (Prior, 2003). In the past years the concept of lay expertise seems to have received official approval through growing institutional support of participatory research. Internationally, the United Nations Covenant on Civil and Political Rights has provided an important underpinning for steps in this direction (Kuruvilla, 2005). In the UK, the NHS INVOLVE programme was established in 1996 in order to help enhance the increased lay participation in research supported by the health service.

Another societal development contributing to a favourable climate for PHR was the increasing democratisation of science, promoting the involvement of the public at a strategic level. Of course, this is important not only for PHR and it reflects the premise that democratic systems of decision making at (almost) all levels give room for participation in an open debate, which is a crucial momentum for proponents of patient and user involvement in the decision making process (Viswanathan *et al.*, 2004; Wilsdon and Willis, 2004). From a philosophical perspective one can argue, as Habermas does, that any expert culture is essentially anti-democratic (Habermas, 1987, p. 481). Arguments contributing to this notion also include the broad concept of citizenship, understanding patients and users as stakeholders who have the right to shape their own lives and future, especially with regard to public funding supporting scientific research. In the long run this development may even considerably change the health research system by changing the power balance between patients or users, scientists, policy makers, and funding administrators. In the context of technology assessment, foresight, and patient empowerment the discussion also focuses on the ethical acceptability of health research and on social inclusion of patients. Especially against the background of physical, psychological, and psychiatric treatments for disabled persons there are attempts to minimise disruption to the community they live in and to avoid exploitation of the patients and other lay participants. At the same time, the inclusion of lay participants in the research process, as promoted by PHR, is supposed to provide adequate information for this group, while providing useful data on patient perception of treatments (see, for example Resnik, 2001).

Proponents of patient rights argue that health-related issues and health research usually concern human beings which demanded that people should be involved in decision making at as many levels as possible. Accordingly, patients should come first in the design of health research programmes as these are conducted to their benefit. As Goodare (1995) pointed out, patients should be directly involved in helping set the research agenda, in defining the topics to be studied, designing the research programmes, defining the level of consent required for individuals to participate, etc.

From health research there is increasing evidence that health is not exclusively a matter for health

professionals. Over the last decades (at least in developed countries and increasingly in developing countries as well), this subject has also been influenced by patients, since NCDs, which often result from life style, are on the rise. Amongst health professionals at all levels and in all medical areas, the concept of cooperation (in the sense of co-production) between patients and the health system is prevailing if a better life and well-being are to be achieved. Particularly regarding diseases such as diabetes, obesity, chronic kidney disease, or cardio-vascular diseases, patient involvement can make a real difference. As Andersson et al. (2006) have shown, patients' health may improve by far if patients are actively involved in the decision making regarding their treatment and if they assume the responsibility for it to a large degree.

6. Further Institutionalization: Effects on a New Way of Doing Science

All these societal developments that occurred in the last 50 to 55 years are drivers which contributed to a changing understanding of public health and patient participation. The social innovation of PHR has benefited from these developments and from policy arrangements (institutions such as certain laws as well as funding provisions), and the study of the action field of this social innovation has to consider the co-evolutions of these developments. The emergence of PHR coincides – or depends on – a growing scientific and political interest in programme evaluation and best practice cases.

The quality of the research process and its evaluation is an important issue for PHR activists who aim at lending more credibility to their work and at enhancing its comparability with other approaches in health research. In practice this means that researchers monitor and document a participatory research project in order to ensure intersubjective validity and the constant possibility to monitor developments. Quality assurance especially concerns the process, the context, and the results. Thereby process may refer to the role of the lay researchers or the communication between the involved actors; context may refer to the local knowledge, collective learning, etc.; and results may refer to the competence building of the participants (Wright, 2012b, p. 423).

Another indication of a step towards an institutionalisation of PHR is the fact that an increasing number of scientific journals are willing to publish participatory research results. Quality criteria are, for example, defined in the journal *Progress in Community Campus Partnerships for Health*. This journal exclusively publishes results from participatory research.

Several initiatives were created by proponents of Participatory Health Research to establish a basis for quality development. This can also be interpreted as a contribution to the institutionalisation of the field. An approach called 'participatory quality development' is supposed to develop and test instruments of quality control with the goal to improve the quality in health improvement.⁸²

The normative approach of PHR and its attempt to be acknowledged by other scientific disciplines has already been mentioned. An additional step in this direction is a critical debate on PHR-related values and the reflexivity of the entire approach and the project in focus. Participatory health research assumptions have to be questioned in order to avoid the impression of a missionary attitude.

7. Zooming into Institutionalization in Germany

Rosenbrock (1998) assumes that the reluctant implementation of the Ottawa Charter in (West) Germany is rooted in the disastrous role of German health policy and the euthanasia programme during the Nazi regime. After WWII, medicine focused on the individual patient and not on a general health policy for parts of society or society as a whole. As mentioned above in the sub-chapter on the inception phase in Germany, proponents of a society-centred approach (social hygiene) from the

⁸² <http://www.partizipative-qualitaetsentwicklung.de/>

Weimar Republic either had been killed or had emigrated. Instead, more than in any other industrialised country, the conservative middle class policy supported medical doctors in their class consciousness and prestigious position and endowed local general practitioners with the necessary power to virtually become idols, a development that later on continued in a political climate of neo-liberalism throughout the 1980s and 1990s. So far, the establishment and implementation of preventive healthcare-related laws have failed in Germany, and public health care is limited to preventive measures such as vaccination, health and safety regulations at the work place, the WHO European Health Cities Network and several other developments at the cross-roads of society and health. Apart from an impressive increase in public health-related studies at several German universities, it is also worth mentioning that there is an increased cooperation between the health sector, patients, and society in HIV prevention, and that there is an alternative health movement which started in the 1980s. However, the hegemony of neo-liberal thinking arising during the 1980s had precarious consequences for public health, the implementation of the Ottawa Charter, and for PHR. Neo-liberal policy making does not favour any increase in health sector-related governmental efforts and transfers the responsibility for health to the individual level. Accordingly, attempts to change German health care-related laws and to create a financially viable basis for a nation-wide prevention programme have failed. Some critics even fear a drawback of the PHR and prevention programmes that could already find funding (Kuhn, 2011). The discovery and decoding of the human genome may play into the hands of those advocating individual medicine alone. Environmental factors are disregarded, while the focus is on the genome.

Finally, at the turn of the millennium, major parts of public funding for PHR in Germany were provided under the prevention research programme of the Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung; BMBF). The programme was installed in 2003 as an interdisciplinary programme aiming at identifying how and to what extent health-preventive measures can help improving people's health and quality of life. One of the goals of prevention and health promotion is to increase individual responsibility, to avoid the need for early retirement, and to maintain and strengthen the quality of life and performance levels well into old age.⁸³ Based on a close collaboration between prevention providers and scientists, effective and practice-oriented prevention offers are to be created in this way.

The programme, for which application-oriented research projects were selected by external experts, ran in four funding phases until 2012. Each funding phase focused on a specific target group for which health promotion is of particular socio-political relevance. Target groups included children, adolescents, elderly people, and socially disadvantaged people. About 60 projects were funded by overall 20.05 million euros.

The health-related focuses of the individual projects varied from nutrition, exercise, and stress management to company-based health promotion or addiction prevention. In this context the projects attempted to develop and test new concepts, programmes, and access channels in order to evaluate the effectiveness and cost-efficiency of measures, and to promote quality assurance, networking, and the development of structures in the field.⁸⁴

Since June 2013 the BMBF is following on the previous program funding research associations for primary prevention and health promotion. It aims at strengthening the interdisciplinary collaboration and the structures of prevention research. With this program seven application-oriented research projects are getting funded. One of them is PartKommPlus, the current project of PartNet (see next paragraph).

⁸³ <http://www.bmbf.de/en/1236.php>.

⁸⁴ <http://www.knp-forschung.de/?uid=580c784d0bb6f24f28fcce660951db9a&id=Seite3190&lang=en>

8. International Developments Strengthen Networks in Germany

In the beginning of the new millennium, inspired by similar projects in the USA, the working group Public Health (see above sub-chapter on inception phase) started the until then biggest participatory health research project in Germany. They organized a convention on participatory research, finding out that the methods of participatory research were not established at all in Germany and that there were not yet allies for long term cooperation on participatory health research. This led to the idea of implementing the network PartNet on participatory health research in 2007 to especially promote the cooperation between actors from practice and academics and sharpen the profile of participatory health research in the German speaking countries.

The AIDS organizations as an international movement always put cooperation between academics and praxis at its core, but in Germany there just were no academic allies which worked with participatory methods contrary to other areas of the world, especially in the USA. When the working group Public Health started to focus on participatory research, the so-called AIDS-Hilfen (AIDS aids) quickly became an important partner and together they developed the first big projects of PHR. Up to now academic institutions are more likely to start cooperative research projects. The German AIDS Hilfen is one of the first NGOs in Germany to initiate participatory research projects as a partner from praxis. In Germany there is no tradition of NGOs to have their own research departments. This is changing now, since in the workshops organized by PartNet half of the participants are from academics and half from practice.

PartNet is now a regional partner of the International Collaboration for Participatory Health Research (ICPHR) which was established in 2009 (Wright *et al.*, 2010; Wright *et al.*, 2009), and is thus reaching out to international networks and thus perpetuating the standing of PHR. The ICPHR's as well as the PartNet's central offices are located at the Catholic University for Applied Sciences in Berlin, Germany (see above).

There is also a working group on participatory health research at the Deutsche Gesellschaft für Sozialmedizin und Präventionsforschung (DGSMP) which is interconnected with PartNet, ICPHR and KNP and organizing events on the yearly conference of the DGSMP.

9. Obstacles

In practice there are many obstacles to action research and particularly to participatory health research. It is often difficult for professionals to leave their expert role behind and acknowledge that fellow participants may have the same level of expertise. Conversely, this also applies to lay persons and patients – they often feel inferior to experts and shy away from giving their cases and beliefs more prominence within a project; they possibly lack the necessary skills or self-confidence to formulate what they want, or think that it is less important. In other cases great expectations are raised on both sides in terms of participation and the progress a project can make. If these expectations are not met, the whole project and the approach may be negatively affected as well.

There are also some institutional barriers. Funding for those projects is very limited and funding organisations do not always understand the principles of participation in this context but rely on objective indicators because these are easier to assess. From the point of view of institutions, participation is often not desired because this concept does not fit into their operational structures. Project outcomes are usually only considered if they do not imply significant changes of the existing set up (see also Wright, 2012a, p. 99).

10. Development and Impact

Summarising the abovementioned features, it can be said that participatory health research is

developing towards a health science approach especially designed to analyse and promote participatory processes. The beneficiaries are mainly marginalised people who have been deprived of social, economic, political, or other participation in issues in which society is usually involved. Activities of PHR are set up to promote such participation in a networked and communicative way. PHR is an international phenomenon and at the moment in a phase of consolidation, in which the scientific criteria as well as the advantages and disadvantages regarding other health science approaches are assessed. The formation of an international organisation and the establishment of several national and international networks (e.g. in Germany the Netzwerk für Partizipative Gesundheitsforschung) are working towards a scientific acknowledgment of PHR as a discipline of its own. The commitment of several national health and research ministries to install research programmes and funding tools enhances this development. Proponents of PHR are optimistic that in the near future this approach will be established on a solid scientific basis and advance towards helping marginalised people more efficiently and more effectively.

11. Conclusions

PHR holds considerable relevance, since it aims at studying the complex health problems of the 21st century and at taking action to address them in an adequate way. A number of foundations and government agencies have played a leading role in promoting and funding PHR; however, reluctance to fund PHR remains common. PHR presents a number of challenges for practitioners as well as for health funders. The longer time frame required for partnering with communities and the related need for sustained financial commitment may be problematic for those seeking clear funding goals and short-term outcomes. Evaluating the effects of PHR also may prove challenging, although new approaches, including tools for examining shorter term system-level effects, appear to hold promise.

Participatory Health Research proves to be a rich and worthwhile practice field for the study of social innovations. This overview reveals that networks, institutions, and cognitive frames have to be the outcomes of co-evolutionary developments in order to make PHR work. Several of these elements vary across the two time periods we looked at. We have to understand PHR as a global phenomenon, since actors are connecting across borders and learn from each other. The developments in Germany were much depending on crisis situations but also on progress made in other countries (e.g. USA, Canada, UK). The question as to how important technologies are for this action field still requires a more in-depth research. To date, there is evidence that technologies such as the internet, which make social networks possible, play a role, though not a dominant one. Human genome research, on the other hand, has to be evaluated more carefully. Although this technology supports the argument of individual medicine, the conclusion cannot be that personal health is a matter of individual responsibility alone. On the contrary, as the arguments in this case study have shown so far, concerted efforts on the part of policy makers (not only from the health sector), health care professionals, research, and from society are needed to support marginalised people in their efforts to participate in our health system. This also means that joint efforts have to be undertaken in order to transform certain parts of the present health system and to make it more compliant to the needs of marginalised people. It remains to be seen whether the necessary actions will be taken within our health systems or whether – as the case studies on social housing and Participatory Health Research have shown – external shocks such as wars, medical scandals, and epidemics must serve as an impetus for sustainable transformation.

This case study showed how social innovations lead from one “regime” to another, however without replacing the incumbent regime – the paternalistic and authoritarian expert-based health care system. Speaking in the language of Multi-Level Perspective (Berkhout *et al.*, 2004; Geels and Schot, 2007; Giesecke, 2016), the regime change was induced by complex changes at landscape level (medical scandals, new diseases, new movements) and mutual interaction with international developments.

But also inappropriate structures and processes of the incumbent regime to respond to the development at landscape level led to internal crisis. In this situation, a niche development – a more egalitarian and communicative regime – offered more appropriate solutions, and thus PHR, benefiting from the introduction of Public Health, could become a parallel, though somewhat smaller regime. For sure Public Health and PHR did alter the former incumbent regime to some degree, but the incumbent regime was not totally turned around. It still exists, with slow changes developing over time. The two regimes co-exist and at some points they share similar aspects within the social grid or even interact. Even if there is no chance to replace the incumbent regime, in the future it could be more severely altered if more legal institutions are built to support PHR.

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