



Tools and approaches creating shared understanding of systemic change

Reflections on three case studies

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Contents

1. Introduction.....	4
2. Methodological starting points	6
3. Case 1: Customer centred services for chronic illnesses.....	10
3.1 Vision workshop	13
3.2 The stakeholder workshop	15
3.3 Directions of change workshop.....	18
4. Case 2: Sustainable district	21
5. Case 3: Socially acceptable mining	26
5.1 The role of the facilitator in the workshops	30
6. Main findings and discussion	32
6.1 Participation	32
6.2 Atmosphere and role of the facilitator	32
6.3 Creation and dimensions of knowledge	34
6.4 Understanding the systemic change in time	35
Acknowledgements	37
References.....	38

Abstract

Tiivistelmä

1. Introduction

This paper is closely connected to the literature on change and transition management (TM). We use the multi-level perspective of change as a theoretical framework and consider the landscape pressures, niche experiments and regime developments that influence a system's transition. However, rather than describing change on a general level, we focus on *micro-level dynamics of ongoing change processes, and assessment of usefulness of the approach and the tools that we have developed for enhancing sustainable change.*

The TM literature has been structured into different approaches, such as the innovation systems, multi-level perspective, complex systems, evolutionary systems, multi-regime interaction and transition context approaches (see van den Bergh et al. 2011, Papachristos et al. 2013). In our article we will draw on two different streams of research, which focus on the historical as well as future transitions. Firstly, there is the research that analyses major, long-term historical transitions and aims to draw lessons from the past (e.g. Schot et al. 1994; Verbong & Geels 2007). Secondly, there is abundant research on future transitions that aims to analyse, monitor and promote sustainable change in different spheres of society (e.g., Rotmans 2001, Grin et al. 2004). These future-oriented streams are mostly characterised by policy-level analysis and development of management tools for policy makers.

In TM approaches, the micro-level analysis of ongoing change processes has been scarce. Part of the literature called Strategic Niche Management (SNM) focuses on niche-level dynamics. It is, however, mostly assessment oriented (Weber et al. 1999; Schot & Geels 2008). There are only a few studies which strive to develop practical tools for the enhancement of niche development (e.g., Caniels, M. & Romijn, H. 2008; Raven et al. 2010). All in all, there is a lack of studies which would shed light on the micro-level dynamics and tools for promoting ongoing change processes.

The multi-level perspective (MLP) offers a framework for understanding the dynamics of systemic change (Geels 2002). It proposes that realising complex socio-technical change calls for holistic understanding and linking of multi-level processes. However, there is little knowledge of the *micro-level dynamics concerning promotion of change in practice.* For this reason we have applied the MLP framework in different time scales into concrete changes, actors, barriers and carriers and organised workshops to activate relevant stakeholders. We have developed further

means, tools and processes used in foresight, societal embedding, and stakeholder analysis. The main research question is how the developed processes and tools influence the building of a shared understanding of change, its barriers and carriers, and key actors.

The paper is based on three methodological pilot cases where we have acted as facilitators for building a shared understanding regarding the concrete changes that reaching the vision implies. The first case relates to regional intervention aimed at transforming the current service system for chronic illnesses from producer-centred to customer-centred. The second case is about the change process of a building industry and housing sector to achieve energy efficiency and renewable energy targets in districts. The third case deals with the change process of a Finnish mining industry pursuing the social licence to operate in an altered sustainability-seeking environment. Although the contexts for the cases differ, they all share the need for change. The case studies have been carried out successively and, therefore, we analyse them as a learning process.

The paper is structured as follows. The next section introduces the methodological starting points on which our approaches in the case studies are based. Sections 3-5 describe the context and process of the case studies and how the tools and approaches were developed. Section 6 discusses the lessons learned and concludes with recommendations for further research.

2. Methodological starting points

Our work for developing tools for creating a shared understanding of the change was founded on the integration of methodologies used in foresight and societal embedding. Both approaches are perceived to complement each other. *Foresight* supports the building of a shared vision and identification of future paths and development needs (e.g., Martin, 1995; Miles et al., 2008; Slaughter, 1997; Rohrbeck, 2011). *Societal embedding*, in turn, aims to improve the societal quality of innovation by activating and sustaining dialogue among key actors who have agency in its development and diffusion (e.g., Kivisaari et al. 2004; Heiskanen et. al. 2009). Both approaches are *participative* in their nature and, as such, they tend to support learning of the problem to be solved and the creation of a shared vision for the future, and to increase the commitment of stakeholders to joint target setting and implementation of plans. Our idea was to combine them in such a way that their strengths would be best used and further developed in a specific case.

We applied the *multi-level perspective* (MLP), see, e.g., Geels 2002; Elzen et al. 2004) as the overarching theoretical framework explaining the dynamics of societal embedding. It was used to illustrate the holistic picture of system transition and the overall context to the stakeholders in the case studies. The multi-level perspective facilitates the analysis of the emergence of a new system as an outcome of interaction of different actors and structures and thus provides understanding of the dynamics of system innovation. One of the key features of the MLP is its focus on long-term thinking. Another is its explicit focus on the interconnectedness of technological and social systems, including governance models and institutions. The multi-level perspective stresses that technological systems change through the interplay between landscape, regime and niche-level processes. Socio-technical landscape refers to relatively stable, slow-changing factors such as cultural and normative values, long-term economic developments and societal trends. Socio-technical regime refers to the semi-coherent set of rules (e.g., agreements, directives, moral codes) carried by different actors (such as users, policymakers, scientists, and public authorities) and practices and action models based on these rules, and interaction between actors. Niches refer to initiatives and activities in special application areas or bounded geographical areas.

Regimes tend to generate incremental innovations, while radically new innovations are generated in niches which are protected from 'normal' market selection. Radically new innovations need protection because their cost efficiency technical performance and usability often need improving. Niches provide locations for experiments and learning processes, and space to build the social networks, which support innovation. Geels (2004, 37) explains that radical innovations break from the niche-level when the external circumstances are right, that is, when on-going processes at the levels of regime and landscape and timing create a window of opportunity. Particular attention is paid to the involvement of 'forerunners', i.e., representatives of innovative solutions that challenge the current socio-technical systems.

On the basis of multi-level perspective, Geels & Kemp (2006; see also Geels & Schot 2007) have categorised phases of societal change processes. They distinguish between three different phases of societal changes – reproduction, transformation and transition (Figure 1). In reproduction, there is almost no external pressure on the landscape level, and the system rebuilds itself inside the regime. In the transformation process phase, there are interacting dynamics at the regime and landscape levels, but incumbent regime actors try to find solutions how to answer the landscape-level pressure. In the transition process phase, the outside actors from the niche and landscape levels are shaping and creating the new regime.

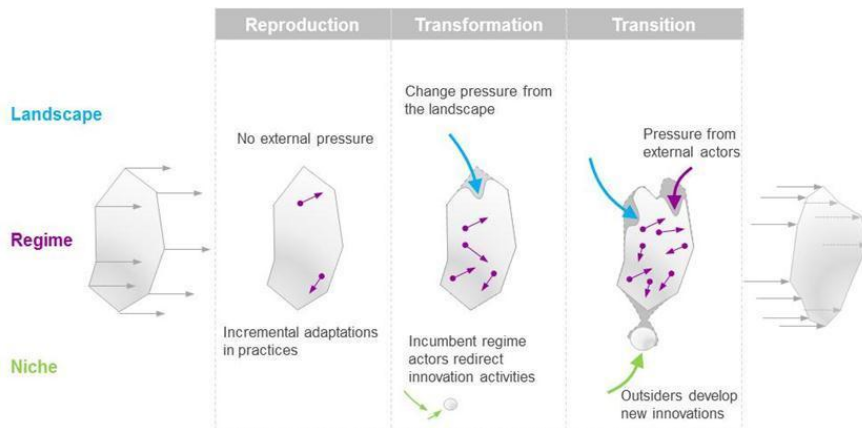


Figure 1. Different mechanisms of change processes.

Our case studies have benefited from ideas presented in *Transition Management* (TM) literature. TM is a multilevel model of governance which shapes processes of co-evolution using visions, transition experiments and cycles of learning and adaptation (Kemp et al. 2007, see also Loorbach and Huffenreuter 2013). This literature suggests that socio-technical change can be enhanced by the establishment of a *transition arena*. This refers to the selection of participants of the governance process so that they reflect the complexity of the transition at hand, have basic competences (be visionaries, forerunners, able to look beyond their own domains, open minded) and are willing to invest substantial amounts of time and energy on playing an active role in the transition arena process (Loorbach & Rotmans 2006; Loorbach and Rotmans 2010). Transition arena offers a forum for discussion between different actors, through which new insights and a shared understanding may emerge. The discussions on the arena are structured according to the TM approach. Facilitators synthesise these discussions with the aim of creating a shared understanding of the persistence of a problem at the level of a societal system, the necessity of a transition, and the definition of the challenge this poses. Key outcomes are a new, shared perspective - language to discuss the transition and the definition of a set of guiding principles for the envisaged transition. In this paper, we describe a similar type of facilitation process, but *focus on the micro dynamics of this process* which

is not described by Rotmans and Loorbach (2009). Another major difference is that our approach is *linked to niche building* (bottom-up emphasis) while Rotmans' and Loorbach's approach is for policy makers (top-down emphasis). However, this process may also be applicable in the more top-down process.

All our case studies deal with introducing new innovative concepts in a "probe and learn" kind of manner, benefiting from special circumstances offered by the local context. That is why our work connects to *Strategic Niche Management* (SNM) literature, (Kemp et al. 1998; Hoogma et al. 2005). SNM provides more bottom-up insight to transition compared to TM. SNM has been developed primarily to study successful niche development. The idea has been to improve steering from within the niche and to modulate ongoing dynamics. The latter is considered important because niches are perceived to diffuse more widely if they link up with ongoing processes at the regime and landscape levels. Niches are assumed to emerge through collective action of various stakeholders and are steered by a range of actors. This literature suggests that crucial dilemmas in niche dynamics relate to *managing expectations, learning, and building actor networks*. By developing new tools, we tried to tackle these crucial dilemmas.

Both TM and SNM emphasise the social nature of the change management process. They build on the interaction of multiple stakeholders and mutual learning in large actor networks. Integrating diverse knowledge and different kinds of resources contributes to a deeper understanding of the change and its barriers shed light on the carriers as well as the commitment of participating stakeholders. Therefore, we base our approach on identifying and mobilising stakeholders, identifying similarities and differences in their needs, interests and visions, and building actor networks where the composition of actors evolve over time. In these actor networks, building trust and the creation of common "language" is essential.

Although TM and SNM processes emphasise integrating diverse knowledge, they do not deal with the problem of how new shared knowledge is created on this basis, and they omit the significance of tacit knowledge. In order to understand the dynamics behind the creation of common language and shared vision, we applied the *SECI model* (Nonaka 1994; Nonaka and Takeuchi 1995), which describes the *shared knowledge creation* process. The model facilitates the understanding of the dynamic nature of knowledge creation. The idea is described by a spiral where the explicit and tacit knowledge continuously interact with each other and where different modes of knowledge conversion (i.e., socialisation, externalisation, combination and internalisation) play a crucial role. The creation of shared knowledge refers to the generation of new knowledge that people and communities can share without necessarily agreeing about the exact meaning when applying it to specific problems and goals collectively or individually (Eerola & Joergensen 2008). Creation of shared knowledge is, therefore, different from "learning" or "consensus building". The crucial idea of the model is that knowledge held by individuals is shared with other individuals so it interconnects with new knowledge. This approach has been further developed by Eerola and her colleagues (Eerola & Joergensen 2008; Eerola & Miles 2010) in foresight processes. The SECI model suggests that knowledge of future developments shapes up in dynamic interaction processes where not only

facts, but also well-grounded views and opinions are treated as ingredients. Eerola and Joergensen (2008) have used the SECI-model to explain how particular foresight processes have contributed to shared knowledge creation. However, it is worth noting that the focus in the SECI-model is on learning and knowledge creation at the organisational level, and it does not describe transitions or changes at the level of sociotechnical systems.

3. Case 1: Customer centred services for chronic illnesses

The first case example is part of Strada (Decision-making and support of change in complex systems; Nieminen & Hyytinen, 2015), a larger research project commissioned by VTT Technical Research Centre of Finland. Strada's aim was to develop tools for supporting strategic decision-making in systemic transitions by innovatively combining different approaches. Tools were developed in three different contexts: welfare, bioeconomy and urban traffic. This case focuses on the welfare context and relates to our collaboration with the three-year Wedge of Cranes (WoC) project in the Pirkanmaa region of Finland. The WoC project aims to develop a regional customer-centred service model for people with heart conditions. The case was preceded by an interview study that we conducted with 26 professionals on both regional and national levels for mapping of their needs, interests, expectations and future visions. There was a wide consensus on the need for transition towards customer-centred chronic care but there was no shared vision or understanding of how it could or should be carried out. The interview study revealed a need for building a shared vision and future path within a broader array of stakeholders and focusing on communication with the wider public, broader expectations of potential partners and shared learning (cf. Weber & Dorda 1999; Kemp et al. 1998).

The case was launched with the target of a) promoting a shared understanding of the change towards customer-centred chronic care in the wide and varied actor network and b) experimenting with innovative combinations of foresight, assessment, societal embedding and system dynamic modelling methodologies.

Several small seminars were needed between the researchers and WoC project for building a common understanding of the aim, procedures, and process management. Based on the insight gained in our prior long-term research activities in welfare sector innovation, we were able to sketch a fairly accurate description of current transformation dynamics by using the MLP framework (see Figure 2). Presently in the Western countries as well as in Finland, the welfare and health systems are facing a sustainability challenge due to several drivers. On the service demand side, societies are greying and chronic illnesses have become the norm in ageing populations. People are also better informed of what medicine can do, which has led to medicalisation and health consumerism. Change in the nature of diseases from acute to chronic has made the current health and welfare system outdated, inefficient and too expensive, while at the same time, progress in science and technology enables development and utilisation of new self-care service models. Because citizens themselves play a crucial role in managing chronic illnesses, the target is to transform the welfare system to be more customer-centred, meaning that the citizens are co-producers of their own wellbeing and care. Hence, there is considerable landscape pressure to change the current service model for chronic illnesses from an acute service model to a customer-centred model. The current service system is not able to meet the growing demands and is not economically sustainable.

On the Finnish regime level, multiple development programs of the Ministry of Welfare and Health and the Ministry of Employment and the Economy have aimed at enhancing customer centred services. This has been complemented by action on government platform and programs on other administrative branches. Multiple local experiments of new innovative customer centres services have been set up (niche level) – but all this without a wider breakthrough. The incumbent regime actors are advocating paradigmatic change towards a customer-centred system, but they have not been able to rise to the challenge. Some professionals have identified the potential of learning from other sectors. However, no pioneers are currently entering from outside the welfare and health sector. The only exception has been the large ICT providers - but at the same time they have turned out to be a counterforce to change. Weakening of their influence was a general wish from the ground of the workshops. Such incumbent actors as professional interest groups and regulators are also seen as strong counterforces for change.

Figure 2 roughly illustrates the change dynamics at different levels. Our case study is related to the WoC project that has been marked in red on the niche level.

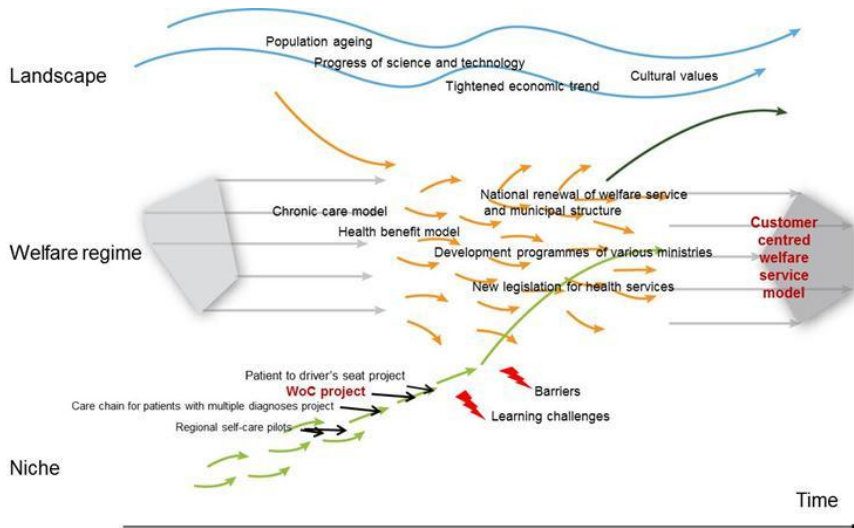


Figure 2. Change pressures and development processes at different levels in the welfare and health system.

All in all, the current situation resembles transformation (see Figure 1). Although there is strong change pressure from landscape, major problems identified in the current regime and multiple local experiments, the incumbent actors keep trying to reorient their innovative activities without competition from outside actors. They make incremental changes, but are unable to start a radical reform. Welfare and health care regimes in different countries are nationally regulated and guided by national values. This characteristic may tend to maintain its stability and “protect” it from international trends and ideas. Another peculiar feature of this sector is that

citizens/the customers have a passive role and that they are also perceived as outsiders. An interesting question is whether the customers will take the role of change agent with the support of the recent legislative change that increases their choice of service provider.

The head of the WoC steering group soon perceived the multi-level perspective to be useful for the *redescription of the fundamental challenge*. It would help communicate to decision makers that the change to the customer-centred service model was not only about renewal of health services, but a *wider societal challenge cross-cutting various levels and various societal regimes*. She perceived our approach as a *tool for mobilising a wider range of actors* to promote change. We interpreted her remarks on the redescription as one step towards shared knowledge creation. Another step soon followed: the WoC project management adapted our rough figure (Figure 2) when describing WoC's role as part of a larger national "movement" to their regional stakeholders. It was adapted as a conceptual tool that helped communicate the WoC project's agenda to regional stakeholders.

We agreed on organising three workshops. To set up the work, we analysed the interview data in more depth to identify similarities and differences in stakeholders' perceptions concerning needed changes, time scale of the change process, the role's and influence of various stakeholders, and the carriers and barriers of change. The MLP helped describe the variety of perceived change mechanisms. Some actors tended to perceive new *technology* while some emphasised *networks* and others *institutions*.

"We need to use new technology...//... I am beginning to become a technology believer" (municipal welfare manager)

"Wellbeing is not created in the echelons of the ministry of welfare and health...// ... centrally planned change will not work ...//...we need to look for consensus between multiple actors..." (NGO representative)

"We already have the legislative amendments...//...we only need to take them into practice, it means education and changes in attitudes and informing customers." (Public servant)

This analysis increased our sensitivity to needed actor composition in workshops because, in almost all interviews, *customers/citizens* were described as outsiders in this change process, we invited citizens with chronic illnesses to participate, but unfortunately without success. NGOs are often perceived as representing the customers' voice. Several NGO representatives participated, but we question to what extent they really represent the customer. As the need for "innovative outsiders" was pointed out in some of our interviewees, we invited, e.g., the manager of the National Consumer Research Center to give an opening speech and to participate.

We organised three workshops which progressively aimed at (1) deepening the understanding of what the change towards customer-centred chronic care means and at (2) extending the network of participating actors (see Weber & Dorda 1999;

Kemp et al. 1998). Each workshop was built on the findings of the preceding workshop, and all workshops were followed by a policy brief summarising the findings for all participants.

3.1 Vision workshop

The first workshop was organised for eleven key actors of the WoC project. In this workshop, as well as in ones to come, we made an effort to create a trustful, multi-voiced and humorous atmosphere so that the stakeholders would be “present” as human beings having equal footing, not as institutions. Such implicit knowledge as feelings and trust were taken seriously as a part of the vision-scoping procedure.

We started building a shared vision for 2030 by a modified “future wheel” (Glenn 2003) process where the most important aspects were distilled into four sentences describing the essence of the vision. The vision comprised four aspects: 1) the customer-centred model is realised on the systemic level, 2) the system is flexible, measurable, and educational, 3) knowledge is shared and the responsibility of the customer is defined, and 4) the customer is familiar with the system, makes choices, and money moves with the customer (Figure 3).

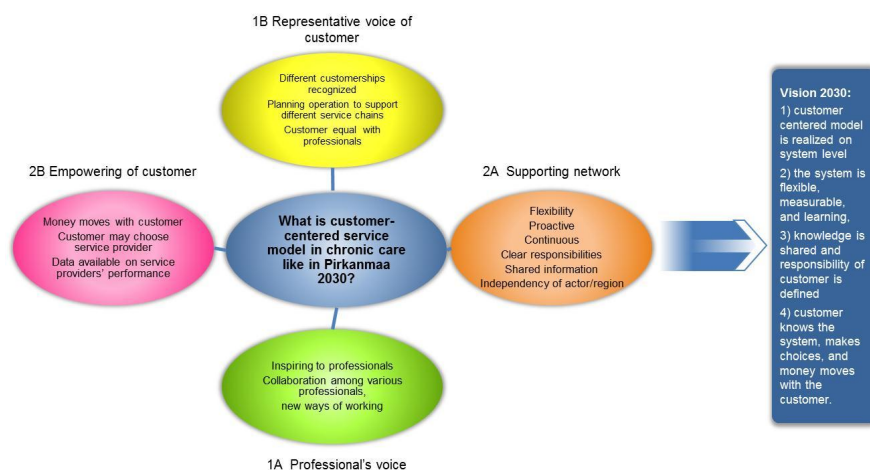


Figure 3. Dimensions of the customer-oriented service model and vision for 2030.

The TAO (Transition-Actor-Obstacle, see Figure 4) tool was developed for opening up the jointly built vision. Initially, our idea was to use the ACTVOD concept (actors-customers-transformation-values-obstacles-drivers; Hietanen 2006) originally developed for scenario processes. However, as drivers, values and customers seemed to be fairly clear on the basis of the background interviews, and other studies made earlier (e.g., Leväsluoto & Kivisaari 2012), we focused on the key issues of our case, i.e., transitions-actors-obstacles. Transitions are here understood as changes which may lead to a system transition in the long run. Actors are those who

are in the position to promote/hinder changes, and the obstacles are the barriers to change.

The vision was opened into a shared understanding of what concrete *changes* are needed to reach the vision, which *actors* can realise the changes, and what kinds of *obstacles* need to be overcome. This was done jointly by filling out a chart developed for this purpose. The three aspects were assessed in two different time spans: short, i.e., by the year 2016 and long, i.e., by the year 2030. In this phase, we interlinked and experimented with foresight, societal embedding, modelling and MLP approaches.

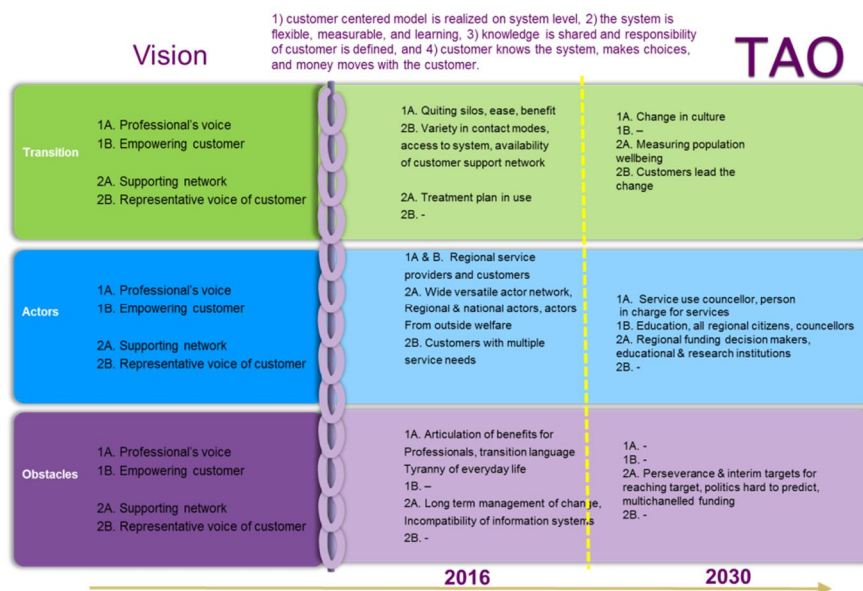


Figure 4. TAO opened up the vision into changes, actors and obstacles in two time spans. A simplified summary of workshop discussion. The markings (1A, 1B, etc.) refer to the markings in Figure 3.

Initially, we expected that we could link the changes to specified actors and obstacles, but that proved to be too difficult. On the other hand, we also expected that changes, actors and obstacles could be further linked to different dimensions of the vision. And, indeed, on the basis of the documentation of the workshop we were able to group the participants' views on those dimensions (see Figure 3). This called for translating participants' everyday experiences to elements of transition dynamics, and moving between niche and regime levels. Additionally, we came to the conclusion that the TAO tool was missing one important aspect, namely impact. This led to the development of the TAOI tool used later in the third workshop.

3.2 The stakeholder workshop

The second workshop was organised for various regional and national stakeholders. The facilitator’s command of all relevant “languages” (e.g., terminology related to chronic care and welfare and health policy) was of importance, here, as well as her capability to hear all “voices” and to be agile to make changes when necessary.

The aim of the workshop was to clarify the vision paths and identify key change agents. In addition to the key actors of WoC project, we invited a variety of national level stakeholders whose commitment would be needed in diffusion of the new service model. As a tool for identifying whose contribution is needed for realising the change, we divided stakeholders into (1) producers of the new innovative model in Pirkanmaa, (2) its potential users or beneficiaries, (3) those who take part in improving the model for scaling-up, and (4) those who indirectly set conditions to the scaling up of the new service system (see Kivisaari & Lovio 2000; Kivisaari et al. 2013). In cooperation with the participants, we ended up with a preliminary map which the participants were then asked to complete (Figure 5). They were also asked to tell what their primary roles in the workshop were. Naturally, most actors have several roles, but it is often good to be aware what the primary role is in a specific context.

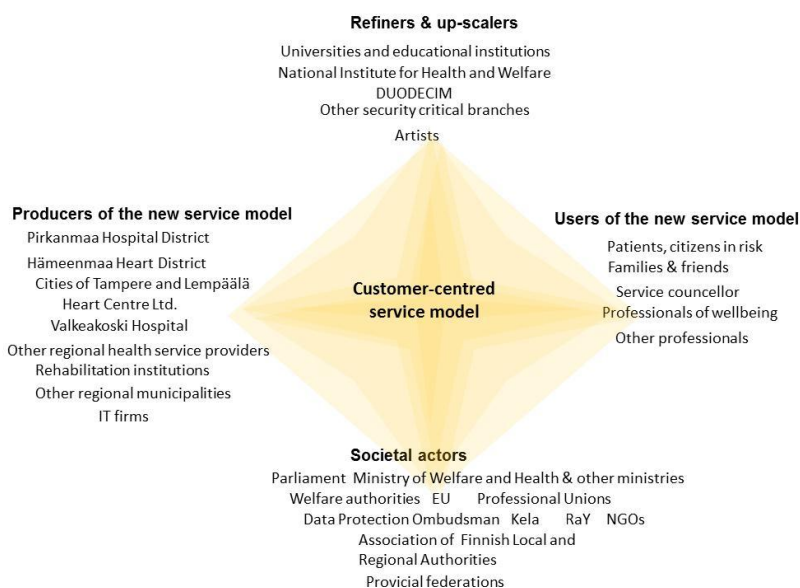


Figure 5. Map of stakeholders of customer-oriented service model for chronic care.

The stakeholder analysis led us to pay attention to actors who were considered outsiders in the change. Paradoxically, it was the customers who were considered as outsiders. They were not perceived as having power, legitimacy or shared vision in relation to the change. The analysis also brought to light the actors who were

considered as powerful, legitimate and having shared vision, but who did not take an active role as change agents.

In the beginning of the workshop, the MLP-figure was opened up to the participants as the overarching framework. The first exercise was related to examining the present state by *mapping the most powerful actors* who could contribute to the change towards a customer-centred service model. By this, we aimed to bring the change to a more concrete level and to deepen the understanding of what is needed. The participants were asked to form small working groups and then to choose 3-5 crucial actors and assess their power to influence the change towards a customer-oriented service model. The groups were also asked to assess to which direction the actors would direct the change and the material and immaterial resources the actor possesses (see Figure 6).



Figure 6. Mapping the most powerful actors in change towards a customer-centred service model.

The next exercise was based on a similar “power triangle,” but this time the exercise was focused on the future. The participants were asked to assess which actors would actually be needed in order to realise the change and what changes were desirable in actors’ positions from that point of view. Participants were also asked to discuss in groups what would facilitate/hinder making the desired changes in the positions (see Figure 7). According to the feedback from participants and our observations, this exercise was considered very demanding. This was mainly because they were not used to viewing the change from positions other than their own.

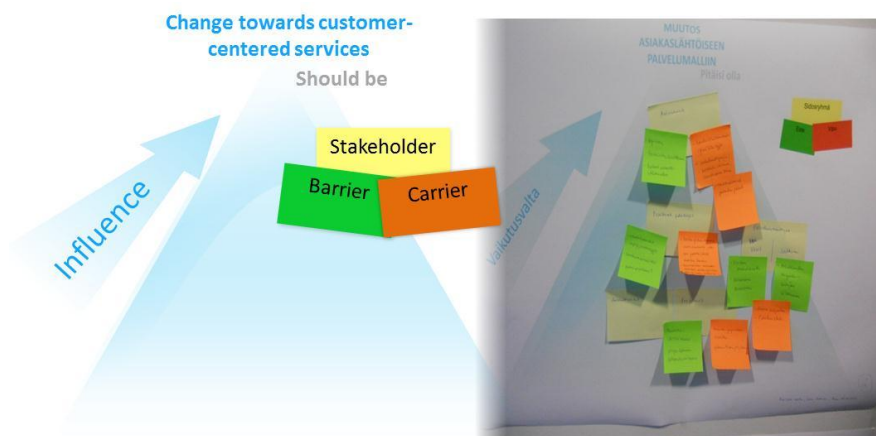


Figure 7. Desired change agents and factors facilitating/hindering changes in power positions.

The workshop was concluded by getting back to the MLP framework. At this stage, the facilitator-researcher sketched the first embryos for vision paths by suggesting a few key themes on the basis of the days' group work. By sharing the multi-level perspective with this broader array of stakeholders, we aimed to provide a bigger picture of the change. One indication of increasing knowledge of the variety and number of actors needed to contribute to change was manifested by the following exclamation of a participant:

"I never knew how many stakeholders need to be mobilised to work for the change before it can happen." (Stakeholder, NGO representative)

On the basis of the data collected thus far, we were able to outline *three series of developments or vision paths* which were named 1) Empowering the patient 2) Supporting network, and 3) National definition of policy. This was done by comparing the participants' views regarding the present situation and the desired future, on the basis of the power triangle exercises (see Figure 6 and Figure 7), and then sketching the vision paths. Initially, this called for comparing the findings of different group work that already incorporated multiple views (separately those concerning the present day and those concerning the future) and formulating the research team's interpretation of how the participants viewed the present and the future. This was challenging as the data incorporated multiple voices and we considered it important to "hear" or consider all of them.

We continued by analysing this interpretation of ours through TAO and MLP "lenses", which dealt with translating the practical findings into theoretical terms. The data was very rich, but three paths started to slowly emerge. The key actors, barriers and carriers of each of these vision paths are presented in Table 1. The table follows the TAO concept, although without a timeline which would show the phases of change. These theoretically described findings, again, were translated

into practical language in the next policy brief that we wrote to the participants. Interestingly, the two first mentioned paths closely relate to dimensions of the customer oriented service model although, then, in the first workshop it was not our aim to sketch vision paths. Every path covers processes the realisation of which calls for collaboration of multiple actors (see Table 1). This refers to the idea that occasionally the paths need to be aligned and converged on vision.

Table 1. Outline of three vision paths with differing carriers and barriers as well as different change agents.

	Carriers	Barriers	Examples of change actors
Patient from outsider to exercising power	Increasing freedom of choice of service provider; transparency of service quality assessment data, availability of self-care services.	Structural silos; customers' and professionals' expectations accordant with established system; customers do not know the system.	Producers of expert knowledge; innovative actors outside welfare domain; new service providers.
Improving supporting network	Improving information and communication systems; definition of responsibility of services, updating professional education; expanding cross sectorial collaboration of professionals.	Established management systems; lacking incentives to change; lack of cross-sectorial insights; professionals defend their own interests.	Health and welfare professional; producers of educational and research services; ICT firms
Creating national definitions of policy	Building shared national vision; intensified use of expert knowledge in decision making; cross sectorial collaboration.	Politicians' short time horizon and lack of courage; lack of systematic foresight processes.	Parliament, national and regional decision makers; producers of expert knowledge of different fields.

We perceive the outlined vision paths as complementary. They are all needed for realising the vision. It is important that these three streams of developments are occasionally geared towards the shared vision.

3.3 Directions of change workshop

The *third workshop*, organised for regional professionals, aimed at identification and mobilisation of local change agents and linking their everyday work to wider change dynamics. The importance of these participants in the process was communicated to them by printing a leaflet guiding them through all steps of the workshop.

Linking niche-level processes with regime-level processes (cf. Elzen et al. 2012) was one of the explicit aims of this workshop and, of course, it called for continuous attention of the facilitator. Local-level measures and everyday problems formed the

starting points of the discussion. Participants gave presentations of key mundane challenges that related to customer flows, service products, measures, and management. These themes were discussed and the effects and dependencies of different decisions were analysed in a larger framework. The thematic discussions were documented by researchers by using a TAOI (transition-activator-obstacle-impact) analysis. The facilitators linked the key issues into the wider context and transition dynamics and the issues were then placed in the MLP framework.

On the basis of this data on participants' discussions, we further analysed the different change needs as well as the barriers and carriers of the changes in the MLP framework. Figure 8 illustrates that some of the changes need to take place at the regime level like national direction and infrastructure while changes relating to experiments and customer's voice are more strongly linked to local-level activities. As a result, management, communication and learning-related changes open up more clearly as multilevel issues.

The figure has been constructed on the basis of data of all of the three workshops.

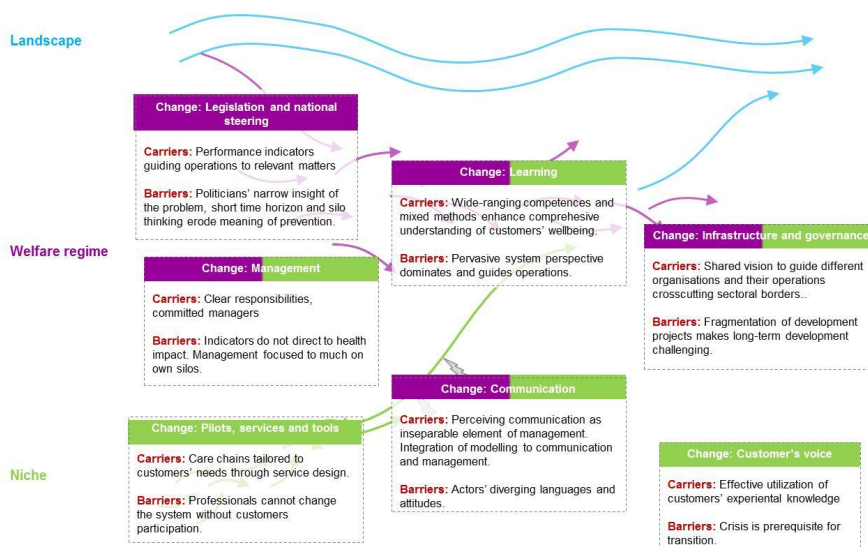


Figure 8. Distillation of discussion with multi-level perspective.

The figure shows a crystallisation of a shared understanding of the changes needed. In addition to shared understanding, there was also increased commitment to the changes. There was an emerging understanding that the participants formed a regional "dream team". This was illustrated by the following statements of participants:

"I gather here we have the dream team of the Pirkanmaa region's change agents!" (WoC key actor 1)

"The participants' understanding was deepened and some of them will be bellwethers for change." (WoC key actor 2)

4. Case 2: Sustainable district

In our second case that related to using renewable energy in new housing districts, we aimed at further developing the tools for creating a shared understanding. The case relates to a mainly TEKES (The Finnish Funding Agency for Innovation) -funded project called SUSER (Accelerating Transition Towards Sustainable Energy System within System-level Innovation Framework) in a Green Growth R&D programme. The aim of the programme is to enhance the potential of the Finnish innovation system and business development in a clean tech area. The SUSER project covered three case studies of Finland's energy-efficient districts that use renewable energy (Viikki, Vuores and Härmälänranta) in two cities (Helsinki and Tampere), and a study comparing the energy-efficient housing sectors in Finland, in the Netherlands and in Austria (Kohl et. al 2014, Kieft et al. 2014, Wessberg et al. 2013).

Figure 9 illustrates the ongoing developments in sustainable districts. Strong landscape-level pressure is accelerating the change in energy production and consumption behaviour as well as in natural resource use. The global climate change targets and EU directives require better energy efficiency and increasing use of renewable energy sources in the Finnish housing sector. According to targets set by the EU, all new houses in 2020 should be passive houses. At the moment, the amount of passive houses in Finland is very marginal. Traditionally, due to the cold climate in Finland, houses have been well insulated, and wood as a renewable bio-fuel has been largely used in heating the houses. In the cities, houses are heated primarily by a district heating system, which nowadays uses a large share of renewable energy. A recent big change in the Finnish detached house sector has been the increased implementation of heat pump systems. Solar energy and small-scale wind energy is still marginal.

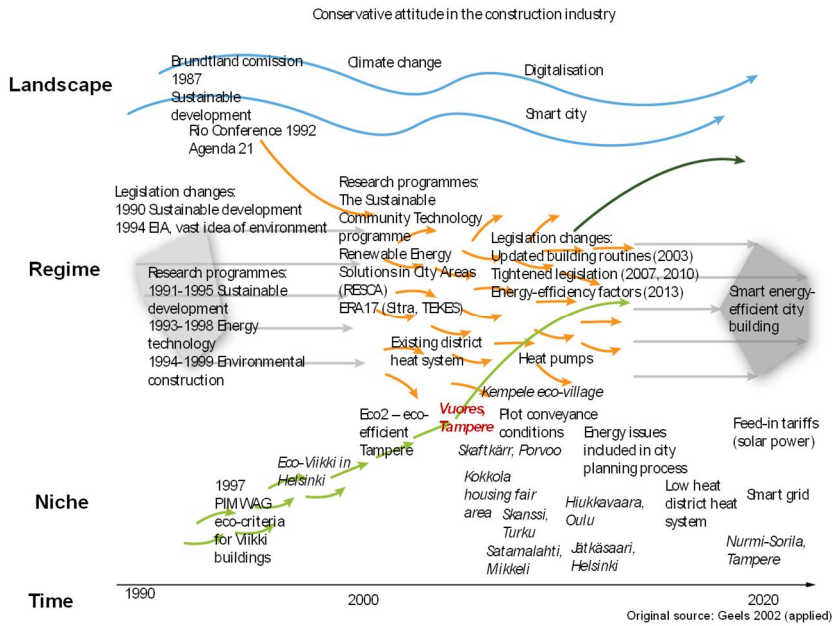


Figure 9. The context of the ongoing change process in sustainable districts.

Renewable energy use and energy efficiency targets in districts in Finland can be described to be in transformation, but also include signs of transition (see Figure 1). There is strong pressure from the landscape level caused by climate change mitigation and raw material scarcity boundary conditions as well as economic depression prerequisites. Economic aspects move the development needs towards domestic energy solutions both in order to avoid import and on the other hand increase emerging domestic business and new export potential. Currently incumbent regime actors try to redirect the innovation activities especially in the Environmental Ministry where the legislation is created; the legislation seems to be the most efficient change carrier in the building industry context. The most important change agents seem to be cities and building companies; at least they have the power to influence the system. Occupants and homeowners could also have the power, but do not seem to be interested in renewable energy and energy-efficient options in their houses.

While there were several noteworthy activities in the project, in this article we use case-study of the Vuores district and give a methodological snapshot of the process by concentrating on one workshop. We arranged a full-day workshop in April 2013 in Tampere. The workshop had two goals: to list preferable energy options for the Isokuusi area in general and the Harjanne area in particular and to identify drivers and barriers to implementing the identified energy options. The starting point was a vision statement of “Renewable Isokuusi/Harjanne in 2020”, defined by researchers based on the strategy of the city of Tampere. Even though the focus was on the

energy solutions of a local district, the question was framed against the backdrop of energy system transition towards renewable energy (see Figure 9).

The participants of the workshop were selected to represent different key stakeholders (Figure 10): companies and organisations representing different renewable energy options, urban planners and other officials of the city of Tampere, environmental organisations, representatives of the inhabitants and an eco-city consultant representing the planning process of the area. There were altogether 26 persons invited to the workshop, of which 17 could participate. Although all of the stakeholders worked in the field of renewable energy in housing, this was the first time they were brought to the same table.

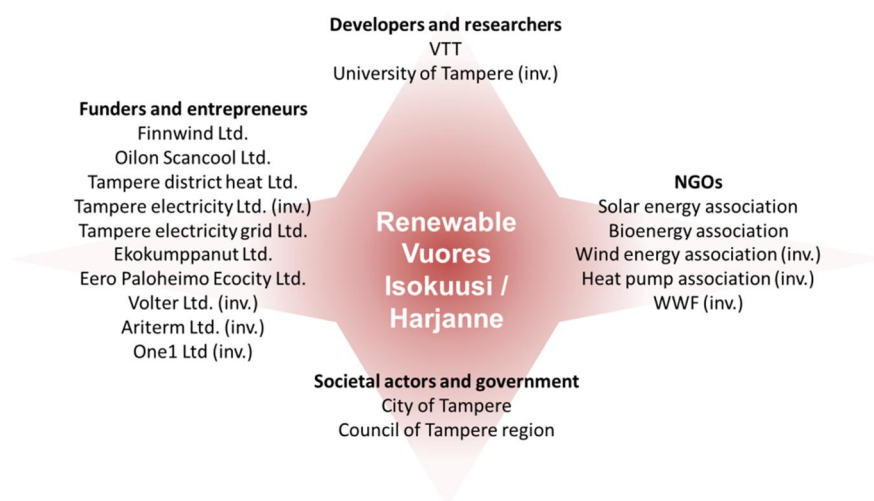


Figure 10. Stakeholder mapping in the Vuores case.

The workshop started with an introduction where the target and content of the workshop was described. Before group work, the head of the Vuores planning process and the eco-city consultant introduced the Isokuusi area and the city planning process. At the time when the workshop was held, the city plan was just about to be ready to be presented for the local government. However, despite the tight time schedule, there still was a chance to influence the plan. The head of the Vuores planning process stated that the aim is to find local energy solutions, but these solutions and ways of doing things can also be applied elsewhere in the future, especially in the Vuores area.

The participants were divided into three groups for structured brainstorming. The topic for the first two groups was renewable energy options of the Harjanne area, while the third group discussed Isokuusi as a whole with an emphasis on Puukau-punki. The brainstorming was guided by a general vision of a “renewable Har-janne/Isokuusi in 2020” and the following questions:

- What are the energy solutions?
- How are the energy solutions implemented and by whom?
- What are the drivers and barriers of the energy solution?

The participants were first asked to discuss how they understood the vision and then to answer the questions. A dedicated facilitator moderated the discussions in each of the groups. Every participant was encouraged to document the discussion on post-it notes, which were then attached to a template (see Figure 11). The template was similar to that of TAO (see Figure 4), aimed at identifying the transition (the energy solution and how it will be implemented), actors (who will implement the solution) and obstacles (the barriers). In this case, drivers who also support the energy solution and its implementation were asked about. Although the MLP model was not used as a structure, it served as a background frame for the facilitators.

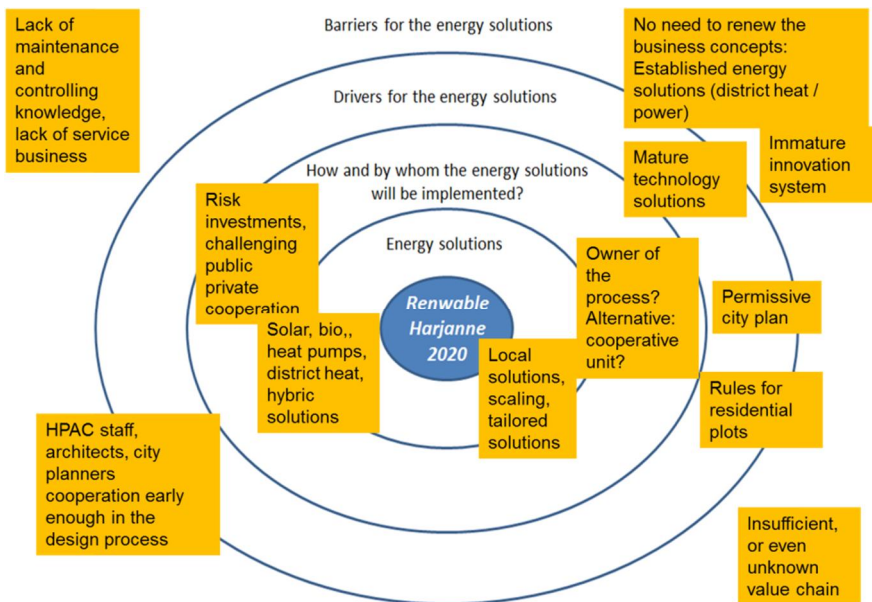


Figure 11. Template used in the group work and an example of the result.

After the group work, the results were presented and discussed. The workshop ended with a general discussion. The discussions with other participants brought new perspectives, such as the cooperation between district heating company and other energy producers.

“The question is what we [the district heat company] think about different electricity-producing options and how the district heat concept can be involved in the planning procedures early enough”

The experiences of this workshop showed that the keys for a successful workshop were:

- A clear task (the case and the vision statement): here the vision “renewable Isokuusi/Harjanne”
- The case was real and participants clearly saw the potential for creating something feasible and new in the area
- Various renewable energy actors were gathered together around the same table for the first time and they were free to discuss all kinds of issues related to renewable energy options in the area
- Facilitators also understood the context and aspects related to it

Due to these aspects, the workshop was open to creative discussions, which really opened up. At the end of the workshop, there existed a satisfied atmosphere among the participants; comments like “This really was a fruitful and good discussion” were said.

Similar to the health care case, we formulated the results of the workshop into vision paths and placed them in an MLP framework as shown in Figure 12.

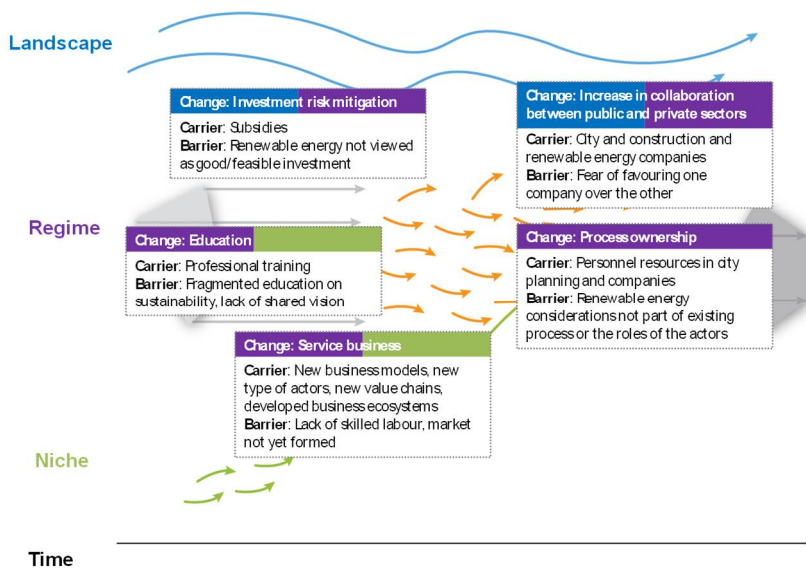


Figure 12. Results of the workshop as vision paths.

5. Case 3: Socially acceptable mining

The third case relates to the Finnish mining industry. The case is a part of the mainly TEKES-funded Sustainable Acceptable Mining (SAM) project in a Green Mining programme. The aim of the green mining programme and the SAM project is to create prerequisites for a sustainable and acceptable mining industry in Finland. In the SAM project, we intend to create and identify tools to achieve a sustainable and acceptable mine.

The mining sector is facing great change pressures worldwide – scarcity of natural resources, globalisation and urbanisation are just some drivers for the change. The demand for the products of the mining sector is increasing, but at the same time, the mineral resources are becoming scarce and there is increasing awareness of the environmental and social aspects of the mining sector, creating demands on the economic, social and environmental performance of the sector. Although the current welfare economy is unable to cope without the minerals, mining is colliding in Finland with other economic sectors, such as tourism, forestry, agriculture and reindeer economies. Keeping all of the above aspects in mind, the mines should achieve a social licence to operate from the society (see, e.g., Moffat & Zhang 2014).

The outline of the change process of Finnish mining industry is outlined in Figure 13. In the Finnish mining sector, there is currently external pressure from the landscape level concerning sustainable and acceptable mining. The biggest change pressure is addressed on communication and interaction processes with various stakeholders. There have been a series of local-level crises which have created ruptures in the existing regime, including both the routines of the mining industry and the authorities. However, changes after these crises have not yet, transferred to the whole regime. Hence, we can say that the Finnish mining industry is in between the reproduction and transformation type of change (see Figure 1). The most powerful change agents could not be defined in the process yet.

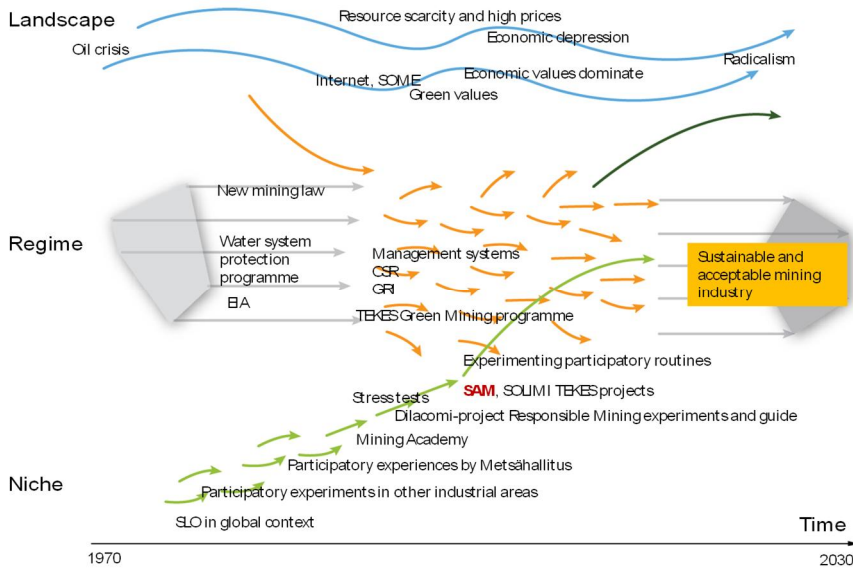


Figure 13. Rough illustration of change dynamics in the Finnish mining sector.

The first part of the project was a foresight process where we arranged two future workshops: a vision workshop and a roadmap workshop. The participants of these workshops are listed in Figure 14.



Figure 14. Stakeholder mapping in SAM case.

In the vision workshop, the aim was to outline a vision for sustainable and acceptable mining in 2030. Firstly, the participants in the workshop were asked to identify past, present and future issues important in the mining sector related to politics, economy, society, technology, the environment and values (the PESTEV framework). The results were structured into a template with time along the x-axis and the PESTEV frame along the y-axis. The idea was then to formulate paths from the issues marked into the template as seen in figures 15 and 16. These paths could be in vertical or horizontal lines. Examples of the paths are mining company as an employer, radical case effect or mine in societal paths. One interesting insight from this exercise was to notice that a radical case effect (the Talvivaara case) is seen in all PESTEV categories. The paths were created as desk research after the workshop, but they also could have been done during the workshop. When analysing the timeline task, we noticed that we can form paths from the collected issues.

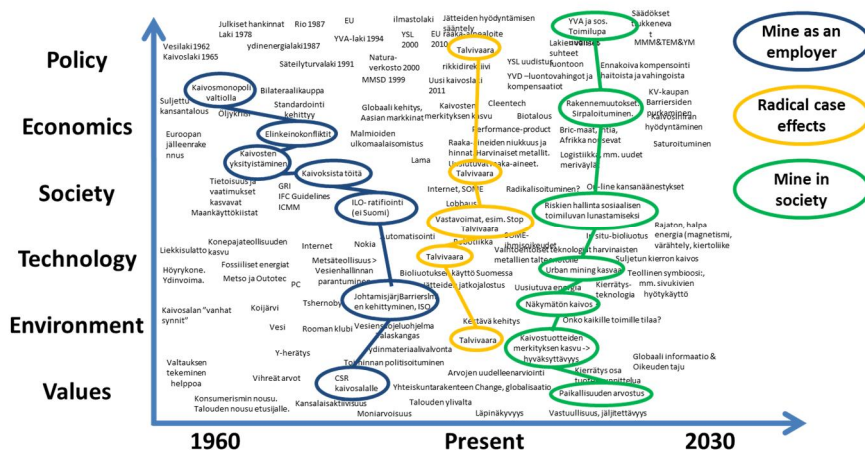


Figure 15. Sustainable acceptable mining 2030: key themes at different levels.

The idea of the timeline task was to use the PESTEV framework to place events into history and into the future. The workshop participants were encouraged to create paths to the future from the past. The historical perspective was expected to encourage discussion and link it to the weight of the past and push of the present (cf. Inayatullah 2008). In our experience, this worked well in our workshop; the discussions opened up easily and were lively. An interesting notion was that some participants were more historically oriented and to others it was easier to raise aspects to the discussion from the future. The facilitator turned this diversity of opinions into a resource for creating discussion by linking and summarising.

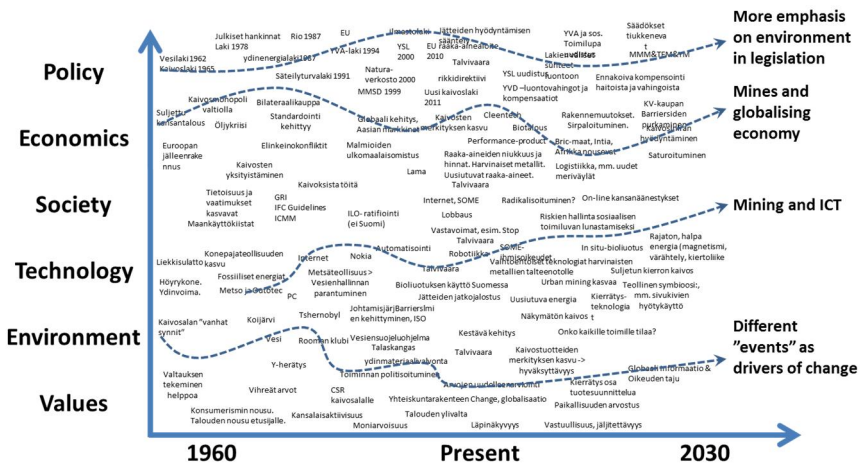


Figure 16. Sustainable acceptable mining 2030: development paths.

After the timeline task, the participants were asked to outline a vision sketch based on the discussions in the timeline task. This sketch was then written down in the middle of a "diamond" picture (Figure 17). The participants discussed the vision sketch using the PESTEV framework and asked the question of what the needed change is, who the actors are and what the barriers to change are. In other words, the PESTEV structure was enriched with the TAO template of transition, actors and obstacles. The vision was sharpened through this discussion.

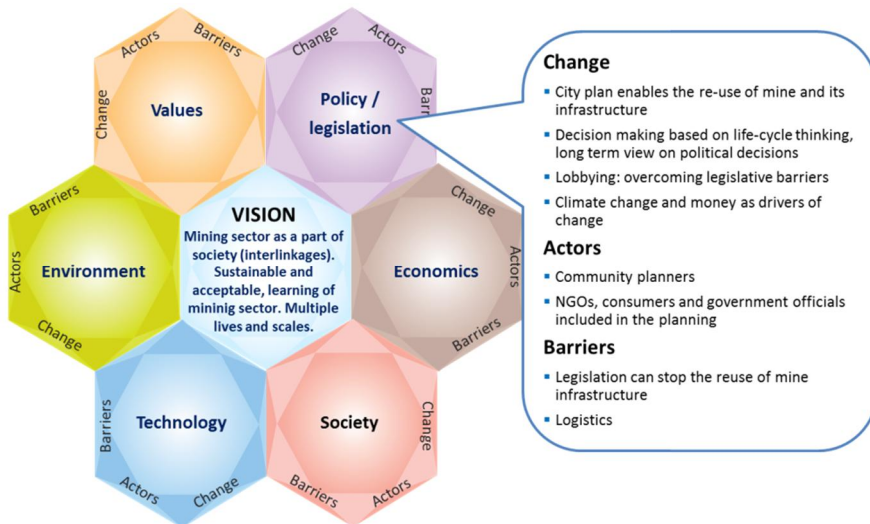


Figure 17. Sustainable acceptable mining 2030: transition diamond.

The final task was done in the roadmap workshop (the 2nd workshop) where the vision paths of the Finnish mining industry were outlined by a discussion based on the vision workshop material. We used the roadmap method as a structure to create the paths (see, e.g., Phaal et al. 2007). The sharpened vision was written into the vision box. Drivers, actors and technologies (enablers) were written based on the previous exercises (timeline and diamond). These previous preliminary results were discussed between the participants, but the main task of the roadmap process was to fill in the solutions boxes. These solution ideas were then summarised into the vision paths shown in Figure 18.

The outlined vision paths were: 1) developing activities of authority, 2) lifecycle thinking, 3) mine accepted by the community, 4) developing the company culture, 5) customised and well-timed communication and 6) learning and a creative mining industry. In the end of the process, these paths that defined the development themes for the Finnish mining industry were then placed into the MLP framework. As Figure 18 illustrates, the first three mentioned paths are more landscape-regime-level actions, while the latter three paths are situated more into the regime-niche level.

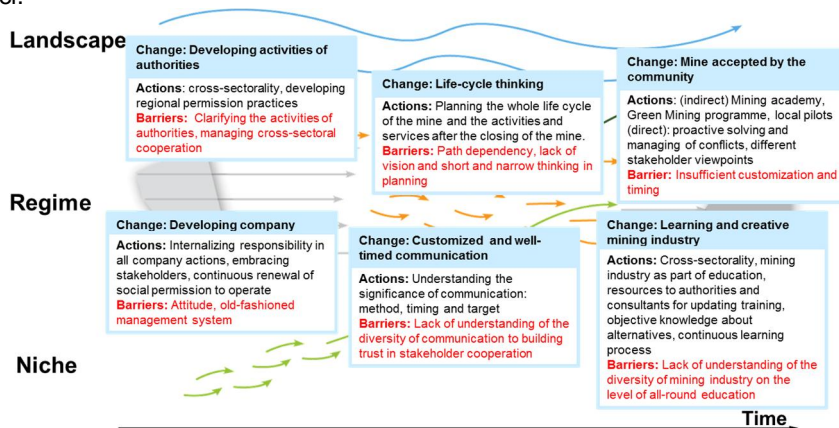


Figure 18. Sustainable acceptable mining 2030: Draft of vision paths.

5.1 The role of the facilitator in the workshops

The Finnish mining industry is in the middle of a societal discussion where the acceptability of the sector is questioned. Acceptability is discussed in all the sustainable development aspects (environmental, social, economic and cultural). In the workshops, we intended to invite different interest groups to ensure a common vision and a widely accepted roadmap. The wide inclusion of stakeholders made existing tensions between different interest groups visible. This was especially heard in the speeches of the interest groups. While this tension was a threat to the

success of the workshops, it later turned out to be a resource in creating common vision and roadmap by the facilitators; different interests were included in the vision.

The facilitators summarised the discussions in between and this encouraged stakeholders to continue the cumulative discussions. The facilitator acted as a translator and an integrator between the stakeholders and summarised but also gave feedback. The shared language was built up. Based on the feedback, the stakeholders found the discussions useful, as is demonstrated in the following quote by one of the participants: "people with different views and interests should get together and cross-pollinate their ideas".

6. Main findings and discussion

The case studies represent an iterative process of developing and refining the tools and approaches for creating common understanding and shared vision in the context of system transition. Although the case studies presented in the previous sections look at transitions in different contexts, methodologically they build on each other. For example, the approach for outlining change and vision paths was originally developed in the Strada project and developed further in the SUSER and SAM projects.

In all of the cases, there was a clear sense that a transition is needed. However, there was ambiguity and different perceptions about the development direction, required changes, change agents, etc.; in other words, there was no shared vision or path towards system change. The tools and approaches we developed in the case studies all aimed at creating a better understanding of the transition, crystallising the reasons for the need for system transition and defining the actions, paths and actors of change. In this section, we highlight the lessons learned from the case studies regarding the tools and approaches and discuss their contribution to transition management.

6.1 Participation

We emphasised participation and inclusion in all case studies. A stakeholder analysis was done in the beginning of each case study to identify the key actors. The stakeholder analysis also helped us to identify the power relations between the actors as well as consider who was absent from the discussions. This helps to understand the changes needed in the structure of the system and identify who should be the actors in the transition. For example, in the WoC case, the transition was studied by discussing who are the key actors now and who they should be in the future, i.e., who the required change actors are. In the SUSER case, the focus was on identifying the change actors and their cooperation.

The stakeholder analysis was also the basis for deciding who to invite to the workshops. We argue that bringing together different stakeholders is a key method for creating a common language and understanding which is a basis for cooperation towards system transition. The attitudes of the stakeholders towards each other differed in the case studies: in the WoC case, there was trust among the participants, while in the SUSER case the participants were somewhat suspicious of each other and in the SAM case they were downright prejudiced and there was a potential for conflict. The tools were aimed at giving everybody a voice and enabling listening to different opinions, and they worked well for this purpose.

6.2 Atmosphere and role of the facilitator

Although the initial attitudes of the participants differed in the case studies, a good atmosphere was achieved in each of the workshops. This was a key factor for

enabling creative and constructive dialogue. There was evidence of group identity formation in the cases, for example, the talk about "dream team" in the WoC project. The role of the facilitator was crucial in creating and maintaining an atmosphere of trust and creativity.

We identify at least three facets of this role that have been included and combined in various ways depending on the case. These are:

1. *Activator* in terms of reflecting the linkages of participants' everyday work experiences with transition theory. In this cumulative and iterative process, the facilitator interprets, asks questions and combines the descriptions of the overall change dynamics and returns her/his interpretation to the participants to consider. On the basis of the needs and interests and visions of the participants, the facilitator aims to outline a shared future vision and understanding of the systemic change and its prerequisites.
2. *Integrator* in terms of reflecting the linkages of niche and regime-level development processes through the TAO concept and the MLP framework. The facilitator gathers and synthesises knowledge from the participants through the use of different tools and approaches. The linking of different tools and approaches calls for creativity in practical situations.
3. *Enabler* in terms of creating a trustful and safe atmosphere for collaboration and interaction. This process is based on the facilitator's intuition and prior experiences and it calls for agility and quick reactions. The facilitator pushes the stakeholders gently out of their comfort zone, but not too far. The facilitator has to be a humble guide and a strict conductor at the same time. This calls for an ability to visualise participants' differing backgrounds, interests and attitudes towards collaboration. The facilitator needs to be capable of tailoring suitable ways of motivating the participants by, e.g., using their emotions as leverage or suggesting alternative mental models.

We argue that a key factor for creating an atmosphere of trust and creativity is the facilitator's ability to simultaneously combine these facets for understanding and enhancing change. For example, in the welfare case, the facilitator combined all these facets throughout the series of workshops. There may be different emphases depending on the context of the workshop, but all are essential for creating a shared understanding of a systemic change. By opening up the facilitator's role, we aim to shed light on some prerequisites of systemic change. Our approach emphasises everyday experiential knowledge, building on multiple voices and continuous reflection between theory and practice. It highlights the MLP framework and TAO concepts as important tools for workshop facilitation.

The facilitator engages each participant to give their insights and ideas while also enabling them to listen to each other. In some cases, this may be challenging; A participant may have adopted an opponent role or may even have anger towards the subject or other stakeholders. In these cases, the process may call for balancing between apathy and anger. The role of the facilitator is then to turn the negativity or

anger as fuel for the exploration of the topic. For example, this can mean taking the participants seriously while also using humour to lighten the mood.

In addition to the active and experienced facilitator, there were other factors which helped to create an atmosphere of trust and creativity. The participants were given clear tasks which also connected directly to their everyday experience. The tools and approaches that were used thus helped to articulate the experiences of the participants and provided a platform for discussion. All of the cases were also connected to an ongoing process of change, and there were clear possibilities to influence the process. The facilitators, although not subject matter experts in any of the cases, understood the context of the change and had an idea of the bigger picture.

6.3 Creation and dimensions of knowledge

All of the cases were based on getting knowledge from the participants and analysing and synthesising that knowledge in cooperation with the participants. However, the knowledge creation was connected to creating change through that new knowledge. The tools and approaches used supported the spiral of knowledge creation. They helped in describing the current situation and its key challenges, and also aided in identifying actions to create change and enable the transformation of the system, and to create a shared understanding of which actions are needed.

Figure 19 wraps up the cases from the point of view of shared knowledge production by following the SECI model (Nonaka 1994; Eerola & Joergensen 2008). The figure explains how the different phases contributed to creating a new shared understanding of the change. We can perceive all the cases as arenas of *socialisation*, where the project team's common terminology or "language" has been formed. The thematic interviews and the workshops served the *externalisation* of the tacit knowledge of various experts. The written reports and articles as well as the final seminars were means of *combining* different explicit knowledge to new kinds of shared explicit knowledge of the change to customer centred service model. This explicit knowledge has been utilised through *internalisation* in the ongoing regional process to promote the change.

The SECI model considers knowledge creation at an organisational level. While it describes knowledge creation and therefore learning, it is not focused on analysing change that happens through the learning. We applied the SECI-model at a micro-level of interaction between stakeholders or participants of a workshop and in the context of systemic change. The micro-level focus brings with it an emphasis on stakeholders as a source of knowledge as well as the users of knowledge. The context of systemic change, on the other hand, frames the knowledge creation process as a prerequisite of system transitions. The spiral of knowledge creation enables the creation of shared understanding, and thus aids in identifying the actions required for a system transition.

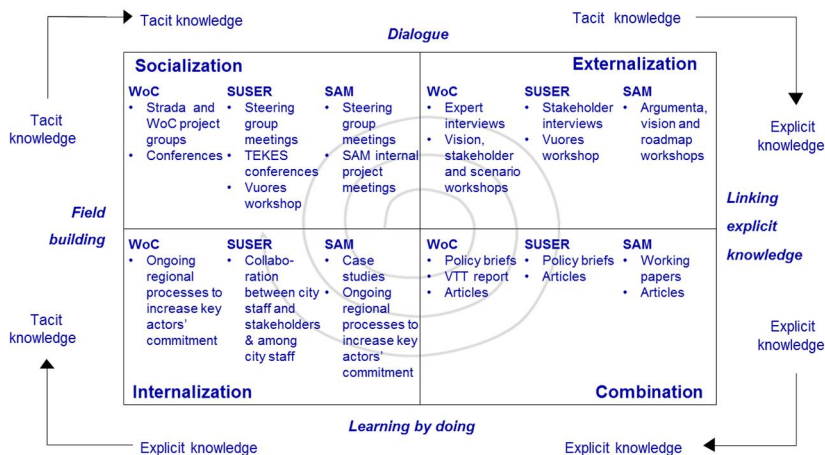


Figure 19. Description of the intervention from the point of view of creation of novel shared knowledge (adapted from Eerola & Joergensen, 2008).

The atmosphere of trust and creativity was an essential feature of the workshops. In the SECI model, the knowledge conversions take place in different bas, which are different mental, physical and virtual spaces (Nonaka and Takeuchi 1995; Nonaka et al. 2000). In our cases, the ba or space or atmosphere not only enabled the creation and conversion of knowledge, it also enabled the creation of shared understanding of systemic change. Here again, the role of facilitator as the link between the everyday experience of the participant and the systemic context was crucial.

6.4 Understanding the systemic change in time

A key aspect of understanding change was putting the events onto a timeline. Often a system transition is considered to be a giant amorphous process that just happens. Our approach was to look at this process from different angles and identify key parts of the change. Defining how the changes relate to each other with regards to time helped clarify the transition pathways.

We used the multi-level perspective to consider different levels of change. We found MLP to be a good general framework for structuring and illustrating the drivers, barriers and developments within a given topic, be it welfare, construction or mining. We enriched the MLP frame by explicitly considering the actors, obstacles and drivers. In the SAM case study, we also used the PESTEV frame for structuring the developments and making the vision more concrete. All of these frames were aimed at deepening the understanding of the system transition.

The vision paths illustrated how there are several simultaneous change processes overlapping in a system transition. All of them may be needed, but the actors, timespan and level of change differ. For example, some of the changes may

be only at the niche level, e.g., piloting, and some on the regime level, e.g., legislation. Often the changes may span two different levels, such as the creation of a service business. This sort of illustration is highly relevant for decision makers, since it helps with prioritising and planning.

Linking the changes to specific actors proved to be challenging. It is much easier to focus on the problems than it is to solve them. We nonetheless pushed the participants to take responsibility for creating the change, since they represented all of the relevant actors.

In all of the cases, understanding systemic change was the key goal. While this has been considered in the transition management literature as well as in foresight and societal embedding, our tools and approaches bring a new viewpoint to the discussion: that of a micro-level process. Through combining methodologies and frameworks from foresight, societal embedding, knowledge management and transition management, we have shown how the creation of a shared understanding can be supported with the right kind of tools and approaches. The main idea is to deconstruct the big transition into smaller changes, look at them in more detail analysing the drivers, carriers and barriers and then reconstruct a shared understanding of the systemic change. This enables understanding of the needs of the stakeholders better than, e.g., just the MLP frame, and still connects to the overall transition better than, e.g., just a conventional foresight exercise. However, it should be noted that the tools and approaches described do not offer a ready-to-use solution, but should be customised to the context. In addition, the competence of the facilitator is important, since the facilitator has to be sensitive to the atmosphere of the workshop and the attitudes of the participants.

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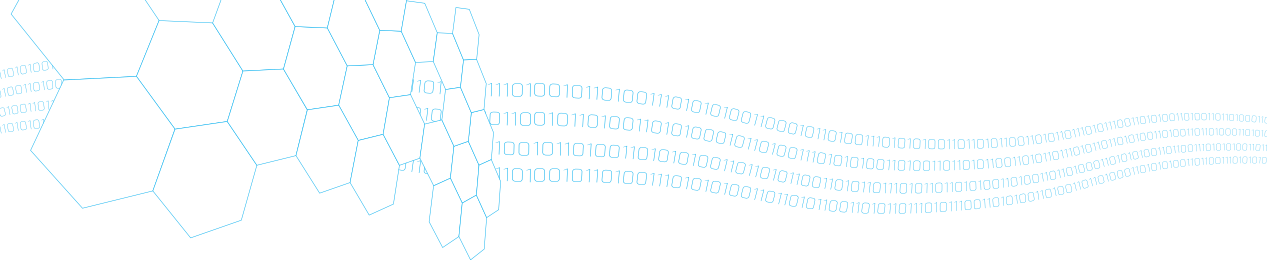
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Abstract	<p>In this report, we have developed and illustrated how to facilitate the building of a shared understanding of systemic change among multiple stakeholders. We have used frames, tools and approaches from transition management, stakeholder engagement, knowledge management and foresight. The main approach is based on the multi-level perspective frame, which has been useful for structuring and illustrating the drivers, barriers and developments in a given topic. Moreover, we have emphasised the facilitator key role as an activator of reflection, integrator of niche and regime developments and an enabler of trust. The three case studies are based on VTT research projects on system-level change in social sector renewal, the mining sector and the energy sector.</p>
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Tiivistelmä	<p>Tässä raportissa olemme kehittäneet ja kuvittaneet muutoksen ja sen eri vaiheet eli miten muutosta ohjataan, rakennetaan yhdessä eri toimijoiden kanssa ja mikä on fasilitoijan rooli muutoksessa. Olemme käyttäneet lähestymistapoina ennakoitua, juurruttamista, sidosryhmäanalyysiä ja tietojohdantamista. Näiden avulla olemme kuvanneet muutosta, sitä estäviä ja edistäviä tekijöitä sekä muutoksentekijöitä eri aiheissa. Erityisesti olemme ottaneet esiin fasilitoijan eri roolit muutoksen ohjaamisessa. Raportti perustuu kolmeen VTT:n tutkimushankkeeseen sosiaali- ja terveysalan muutoksesta, kaivannaisteollisuuden muutoksesta ja energia-alan muutoksesta.</p>
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