
Preschool remodelling through systemic (ex)change

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Abstract: Based on the experiences from a social innovation process of Swedish preschool remodelling – aiming to enhance equal and inclusive learning and play – the study investigates socio-material dimensions in complex multi-actor/level (ex)change. Previous studies on systemic change through social innovation ecosystems help reveal dynamics and challenges in the co-ordination of varying logics and interests among the involved preschools, municipality, architectural firm, universities and innovation agency. The shared appreciation of equal preschools as universally good and desirable, served to conceal contestations of the principal aspirations of innovative socio-material transformation, instead conceptualising it as conflicting institutional logics and lacking cross-institutional coordination. The study further confirms that the large complex systems that characterise formal education may hamper innovation by its high degree of inertia, while distinguishing a potential for enhanced innovation through participatory, empowering approaches in social innovation ecosystems.

Keywords: education; equality; participatory research; preschool; social innovation; systemic change.

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1 Introduction

Formal education is in Western societies generally organised in large complex systems, where renewal is hampered by the system's high degree of inertia. Extensive regulations and divisions of responsibilities between multiple actors on multiple levels, make innovation in the education system a matter of complex coordination and negotiation (cf., Schröder et al., 2018). As social innovation – in terms of new figurations or combinations of social practices that meet societal challenges or other social needs – is esteemed as pivotal for maintained and improved welfare in Western societies, knowledge on such innovation may shed light on the dynamics and challenges of innovation processes in the education system, as part of the encompassing welfare system (cf., Copus et al., 2017; Lindberg, 2017; Martinelli, 2013; Schröder et al., 2018).

Studies on social innovation characterise such processes as complex multi-actor and multi-level endeavours, matching the complexity of the societal challenges they address, e.g., unemployment, poverty, ill-health, migration and demographic changes (Brandsen et al., 2016; Howaldt et al., 2018; Nicholls et al., 2015). Increased theoretical engagement with complexity has consequently been called for in social innovation studies, scrutinising the dynamic processes, discontinuous and unpredictable systems and social-material interplay, through which social innovations are formed and established as part of organisational and societal infrastructures (Haxeltine et al., 2017; Moulaert et al., 2013; Westley et al., 2017). This paper responds to that call by exploring socio-material

dimensions in social innovation transformation, based on a single case study of preschool remodelling in a Swedish municipality. The remodelling implied extensive reconstruction of interiors in three preschools, including walls, furniture and toys, in order to enhance equal and inclusive learning and play, in line with Swedish school regulations regarding children's equal rights and opportunities. The main purpose of the study is to advance the knowledge on socio-material dimension of complex systemic (ex)change in multi-actor and multi-level innovation processes within the education system.

The paper is initiated with an outline of the theoretical framework of social innovation studies, with a specific focus on systemic change via social innovation ecosystems. The research design as a single case study, using a participatory research approach, is thereafter described. This is followed by a presentation of the empirical findings regarding dynamics and challenges in the stakeholders' joint quest of remodelling preschools to become more equal and inclusive. Finally, conclusions are drawn regarding the complex systemic (ex)change in social innovation and implications for theory and practice are outlined.

2 Theoretical framework

Social innovation is regarded to be 'omnipresent' in welfare-related policy areas, including education, health and social care, poverty reduction and employment (Howaldt et al., 2018; Martinelli, 2013). In regard to the welfare area of education, the knowledge on social innovation is however still scarce and scattered. Some studies have explored new learning arrangements, alternative forms of educational activities and training, new digital and virtual learning environments, reduction of educational disadvantages, etc. (Howaldt et al., 2018). As formal education generally is organised in large complex systems in Western societies, with extensive regulations and divisions of responsibilities between multiple levels and actors, there is a need for studies that specifically investigate complex coordination and negotiation in this particular welfare-area (cf., Schröder et al., 2018).

Increased theoretical engagement with complexity has also been called for in social innovation studies, scrutinising the dynamic, unpredictable and socio-material processes, by which social innovations are formed and established as part of organisational and societal infrastructures (cf., Haxeltine et al., 2017; Moulaert et al., 2013; Westley et al., 2017). Addressing multifaceted societal challenges, social innovation processes generally constitute complex multi-actor, multi-level and multi-dimensional endeavours (cf., Brandsen et al., 2016; Howaldt et al., 2018; Nicholls et al., 2015). In order to innovatively address these challenges, social innovation seeks to satisfy unmet social needs, reconfigure social relations and empower disadvantaged and marginalised groups (*ibid*). The aspired social change encompasses both material and non-material dimensions, in line with the sociologist William F. Ogburn's classic conceptualisation of social innovation as "a combination of existing and known elements of culture, material and/or non-material, or a modification of one to form a new one" [Howaldt, (2018), p.88].

2.1 Systemic change

Studies conceptualise the complex dynamics of social innovation in terms of ‘systemic change’, ‘structural change’, ‘social change’ or ‘transformation’ (Haxeltine et al., 2017; Howaldt et al., 2018; Westley et al., 2017). The notion of ‘transformative social innovation’ has been introduced to capture the social innovation process of “challenging, altering, or re-placing the dominance of existing institutions in a specific social and material context” [Haxeltine et al., (2017), p.2]. Such changes are perceived to be determined by interplay between structure and agency. Structure refers to “the recurrent patterned arrangements of rules and resources, habits, conventions, institutions and cognitive frameworks that influence or limit the choices and opportunities available to societal actors” [Holtgrewe and Millard, (2018), p.71]. These extend to welfare-regimes, political cultures, governance models, organisational arrangements, prescriptions, identities and roles, etc. (Cattacin and Zimmer, 2016; Haxeltine et al., 2017; Howaldt et al., 2018; Westley et al., 2017). Agency refers to “the capacity of individuals and groups to make sense of structures, to act upon them, to reason and make choices” [Holtgrewe and Millard, (2018), p.71]. It encompasses individual actors’ roles, functions, interactions, empowerment, etc. (Cattacin and Zimmer, 2016; Haxeltine et al., 2017; Howaldt et al., 2018; Westley et al., 2017).

The dynamics of systemic change have been further specified as involving:

- 1 empowerment of people and collectives
- 2 network formation processes
- 3 institutional dynamics
- 4 the socio-material context (Haxeltine et al., 2017).

The empowerment dimension acknowledges qualities of interpersonal relations, organisational forms supporting autonomous motivation and articulation of a common identity. The network dimension encompasses collective empowerment through socio-spatial relations, discourses and communication infrastructures. The institutional dimension pinpoints how multi-stakeholder and multi-level institutional set-tings enable or constrain specific strategies of change. The socio-material dimension high-lights patterned realities and path dependencies, where social innovation initiatives have to ‘navigate’ or ‘play into’ specific ‘action fields’ or ‘arenas’, characterised by the historical development of their wider socio-material context (*ibid*). Material dimensions have in social innovation studies primarily been studied in terms of urban regeneration (cf., Moulaert and Van den Broeck, 2018).

The complex dynamics of systemic change imply mutual impact of the delineated dimensions, where social innovations “change their institutional, social and cognitive environment, through the agency of all involved, whilst their respective environment – through its structures and institutions – changes the social innovation” [Holtgrewe and Millard, (2018), p.71]. This ‘paradox of embedded agency’ means that social innovation is “strongly shaped by the very same institutions and structures that they seek to challenge” [Haxeltine et al., (2017), p.20]. The initial aim and configuration of a social innovation may consequently be altered through-out the process, as part of a balance act between the original vision and the wider political and institutional systems (Brandsen et al., 2016; Haxeltine et al., 2017; Westley et al., 2017). Such balance acts may be

especially evoked in social innovation processes within the education systems, as it is depicted as ‘institutionally dense’ where “interlocked regional, national and federal state-level responsibilities have strong path dependencies and vested interests that encourage the development of rather compensatory than transformative social innovations” [Schröder et al., (2018), p.171].

2.2 Social innovation ecosystems

Systemic change is depicted as “multi-dimensional, complex and results from multiple inter-related actions, modes of learning, conflicts, tensions and diverse forms of cooperation and compromise” [Holtgrewe and Millard, (2018), p.71]. In line with the complexity of the addressed challenges, social innovation is perceived to require simultaneous shifts in multiple institutions, norms and practices, as well as multiple kinds of complementary innovations (Howaldt et al., 2018; Westley et al., 2017). In order to delineate the diverse institutions and relations involved in the change process, several studies explore ‘social innovation ecosystem’ of policy, economy, science and civil society (BrandSEN et al., 2016; Howaldt et al., 2018). These ecosystems consist of “actors from different societal sectors and their environments with legal and cultural norms, supportive infrastructures and many other elements” [Domanski and Kaletka, (2018), p.208]. They are perceived to enhance or inhibit the successful development and institutionalisation of social innovations, as it requires ‘ensemble performances’ and ‘coalition building’ by several actors (Cattacin and Zimmer, 2016; Howaldt et al. 2018). Ecosystems may thus be fundamental for finding or creating an ‘institutional home’ for social innovations, as “an intermediate stage between a non-institutional and institutionalised existence” [Haxeltine et al. (2017), p.15].

The ecosystem approach aligns with the general trend of co-production and partnerships in societal development, engaging stakeholders across organisational and sectoral boundaries in joint innovation processes (Cattacin and Zimmer, 2016). The broad involvement is perceived to enhance a multifaceted understanding of the addressed challenges, deepened in-sights into actual needs among citizens and users and more creative generation of new ideas and solutions (Sørensen and Torfing, 2015). It is noted that “social innovation initiatives en-gage a wide variety of actors and networks in a diversity of roles and functions, which is part of what allows the initiatives to respond to social problems” [Butzin and Terstriep, (2018), p.78].

Mappings of social innovation ecosystems across the globe reveal that they generally involve a broad range of actors, from all societal sectors, including the public, private and civil sectors (cf., BrandSEN et al., 2016; Haxeltine et al., 2017; Howaldt et al. 2018; Moulaert et al., 2013; Nicholls et al., 2015; Westley et al., 2017). Findings from a global mapping of over 1,000 social innovations expose that public authorities and civil society organisations are most frequently involved (in 46% and 45% of the mapped cases), whereas private companies are somewhat less involved (in 37% of the cases) (Butzin and Terstriep, 2018). Almost half of the initiatives actively involved users or beneficiaries, as part of the civil society (Howaldt et al. 2018). This reflects the main focus of social innovation on empowerment and agency among citizens (Howaldt et al. 2018; Sørensen and Torfing, 2015). The mapping further ex-poses that researchers and other university officials are less frequently involved (in 15% of the cases) (Butzin and Terstriep, 2018). This contrasts to their prominent role in traditional innovation processes, potentially

explained by the grass roots character of many social innovations, where users and beneficiaries replace researchers as knowledge providers (Butzin and Terstriep, 2018; Domanski and Kaletka, 2018). Another study notes that other types of experts and consultants also provide insights, ideas and resources in social innovation processes (Sørensen and Torfing, 2015).

The delineated actors play various roles social innovation ecosystems, e.g., as developers, facilitators, policy-brokers, catalysts, promoters, supporters or knowledge providers (Butzin and Terstriep, 2018; Cattacin and Zimmer, 2016; Sørensen and Torfing, 2015). Developers initiate and operate the social innovation process, translating insights in needs and challenges into innovative and implemented ideas of improvement (Butzin and Terstriep, 2018). Facilitators enable collaboration by coordinating the involved actors and negotiating their various interests (Sørensen and Torfing, 2015). Policy-brokers mediate between different policy orientations and ideologies of various actors and coalitions (Cattacin and Zimmer, 2016). Catalysts forces the involved actors to think creatively and develop and implement new and bold solutions, by bringing them out of their comfort zone (Sørensen and Torfing, 2015). Promoters provide infrastructures, funding or networks (Butzin and Terstriep, 2018). Supporters facilitate the spread and diffusion of social innovations through dissemination or lobbying activities (*ibid*). Knowledge providers provide special knowledge required to inspire and anchor the process (*ibid*).

The global mapping of over 1000 social innovations expose that civil society organisations most frequently take the roles as promoter (in 80% of the cases) and developer (60%) (Butzin and Terstriep, 2018). Public authorities most frequently take the roles as promoter (in 57% of the cases), funder (56%), knowledge provider (55%) and developer (45%). Private companies most frequently take the role as provider of infrastructure (in 60% of the cases) and developer (38%). Besides public authorities, users often take the role as knowledge provider in social innovation ecosystems, which is also the most common form of user involvement. Users thereto take the roles as solution providers, co-creators and adapters. Researchers and experts also take the role as knowledge provider, although to considerably less extent than in traditional innovation processes (*ibid*).

2.3 Negotiating institutional logics

The actors involved in the social innovation ecosystem bring their specific institutional and sectoral logics into the interplay (Brandsen et al., 2016; Haxeltine et al., 2017; Howaldt et al., 2018; Moulaert et al., 2013; Nicholls et al., 2015; Westley et al., 2017). This includes various modes of action and interaction, as well as specific social, cultural and institutional frames and norms (Butzin and Terstriep, 2018; Domanski and Kaletka, 2018). Social innovation thus “emerge in the context of different institutional logics, e.g., ‘market’, ‘state’, or ‘community’ logics”, where they “travel” across different institutional logics and may work with all sorts of hybrid institutional forms and with the reinventing, recombining and trans-posing of different institutional elements” [Haxeltine et al., (2017), p.16].

As the private sector has been the primary focus in traditional innovation studies, most is known about the logics and modes that private companies bring into social innovation ecosystems, including a primacy of commercialisation, privatisation, industrialisation, digitalisation, etc. (cf., Lindberg, 2017). Less is known about the logics

and modes of public sector innovation, although recent studies have contributed with insights regarding the impact of its politically governed organisations, lack of economic incentives, complex regulations and services, etc. (cf., Rønning and Knutagård, 2015; Sørensen and Torfing, 2015; Windrum and Koch, 2008). Civil society innovation is least explored, where some pioneering studies delineate its emphasis of idealistic incentives, democratic procedures, stakeholder involvement, non-profit models, etc. (cf., Lindberg and Nahnfeldt, 2017; McDonald, 2007; Osborne et al., 2008; Pestoff, 1998).

A distinction is made between cooperation, coordination and collaboration in social innovation ecosystems, where cooperation refers to the exchange of information and knowledge between organisations and sectors, coordination refers to efforts to create synergies diverse institutions and institutional logics and collaboration refers to sustained interaction with common solutions to shared challenges (Sørensen and Torfing, 2015). Differences between the involved actors in this cooperation, coordination and collaboration need to be managed in a constructive way, in order to reach agreement about the aim and management of the joint innovation process. Agreement does not equal consensus, however, but rather “provisional and disputed agreements”, making room for “the differences and passions that fuel the processes of creativity and innovation” (*ibid*, p.155).

Some scholars convey that conflict, resistance and opposition is downplayed in social innovation studies, as such processes tend to be regarded as universally good and desirable (cf., Cattacin and Zimmer, 2016; Nicholls et al., 2015; Segnestam Larsson and Brandsen, 2016). It is noted that social innovations may create value for some people, while engendering negative consequences for others, making ‘transformation’ an ambivalent aspiration (Nicholls et al., 2015). Opposition to social innovations is consequently often regarded as reactionary and in conflict with public interest, instead of a matter of legitimate political dispute (Segnestam Larsson and Brandsen, 2016). A distinction is made between the ‘absorptive capacity’ of a community to recognise the value of new solutions to address societal challenges and its ‘social serendipity’ of systematically encouraging and supporting the development, test and implementation of such solutions (Domanski and Kaletka, 2018). It is discerned that ‘local epistemic communities’ have a central role in determining the legitimacy and desirability of various innovative solutions to improve welfare practices and social cohesion (Cattacin and Zimmer, 2016).

3 Research design

As a single case study design has been proven rewarding when studying contemporary, complex real-life phenomena (Yin, 2009), an empirical case of preschool remodelling in Sweden is in this paper employed to advance the knowledge on complex systemic (ex)change among stakeholders in social innovation. It was considered an appropriate case to study due to its socio-material focus and multi-actor/level approach to social innovation in the education system. The process involved a municipality, three preschools in the municipality, an architectural firm, two universities and a national innovation agency. The study was carried out as part of a R&D project, managed by one of the universities and funded by Sweden’s national innovation agency VINNOVA during 2016–2019. The project aimed to enhance equal and inclusive learning and play

through reconstruction of preschool interiors, as all public schools in Sweden are obliged to actively and systematically ensure equal rights and opportunities among children.

In order to gain nuanced, continuous insights into the complex (ex)change among the involved stakeholders, a participatory research approach was employed, where knowledge is jointly developed by researchers and practitioners (cf., Aagaard Nielsen and Svensson, 2006). The municipality representatives were involved via regular meetings with the project manager and architects, as well as via individual interviews by the researchers (authors of this paper). The preschool managers and teachers were involved via meetings with the project manager and via individual interviews by the researchers. The architects were involved via regular meetings with the project manager, municipality, preschool staff and researchers, respectively. The researchers were involved via project management meetings, data collection and data analysis. The children at the preschools – 3–5 years old – were thereto involved, as they were given cameras to take pictures of their preschool interiors, which they then discussed with one of the researchers.

The empirical data was collected through interviews, participatory observations and document studies. Semi-structured interviews were carried out by the researchers at various points during the remodelling process, with eight preschool teachers, two preschool managers, four municipality representatives, two architects and the project manager. Each interview was recorded and transcribed in full. Participatory observations were carried out by the researchers at all preschools, documenting in video recordings and field-notes how children and staff were using the facilities before and after the remodelling. Document studies were carried out by the researchers, including written project material from meetings and other project activities. This triangulation of data collection methods coheres with Yin's (2009) observation that the empirical richness in single case studies requires multiple data sources in order to cross-validate the results.

4 Findings

4.1 Multi-actor/level approach

The studied remodelling process of three preschools in a Swedish municipality aimed to enhance equal and inclusive learning and play through remodelling of preschool interiors, in line with Swedish regulations prescribing active and systematic measures to ensure children's equal rights and opportunities. The ambition to address the societal challenge of inequality in public welfare services through socio-material transformation of preschool interiors, reflects previous conceptualisations of social innovation as new configurations or combinations of material and/or non-material components that meet societal challenges or other social needs (cf., Brandsen et al., 2016; Howaldt, 2018; Howaldt et al., 2018; Nicholls et al., 2015). As common in social innovation, the process is organised as a complex multi-actor and multi-level endeavour, engaging a cross-sectoral constellation of one municipality, three preschools, one architectural firm, two universities and one national innovation agency (cf., Brandsen et al., 2016; Haxeltine et al., 2017; Howaldt et al. 2018; Moulaert et al., 2013; Nicholls et al., 2015; Westley et al., 2017).

However, as the process was managed by one of the universities, with one of its senior researchers as project manager (also co-author of this paper), it differs from the

most common constellations in social innovation processes, where universities seldom are involved and if so, primarily as knowledge provider (cf., Butzin and Terstriep, 2018; Domanski and Kaletka, 2018; Sørensen and Torfing, 2015). In this case, the university played the additional roles of developer and facilitator, initiating and operating the process and coordinating the involved actors and interests (cf., Butzin and Terstriep, 2018; Sørensen and Torfing, 2015). As common in social innovation, users served as knowledge providers, as the staff and children at the pre-schools actively contributed with insights into needs and solutions (cf., Butzin and Terstriep, 2018). The architectural firm also served as a knowledge provider, contributing with expertise in inclusive design. The primary role of the municipality was promoter, providing infrastructures and networks necessary for the remodelling (cf., *ibid*). The civil sector was least prominent in the process, as no civil society organisations were involved and as the children – and indirectly their legal guardians – were the only ones not formally representing public or private sector organisations (cf., Butzin and Terstriep, 2018; Sørensen and Torfing, 2015).

In congruence with the extensive regulations and divisions of responsibilities between multiple levels characterising the public education system (cf., Schröder et al., 2018), a multi-level approach was employed in the remodelling process. It involved preschool facilities and operations at the local level, publicly owned and managed at municipal level, following public school regulations set at the national level. National regulations prescribe that preschools are to provide care for children from 1–5 years of age, before entering elementary school. The regulations further specify that preschools may be managed either by public sector actors (municipalities), private sector actors (private companies) or civil society actors (non-profit organisations, cooperatives, etc.). All preschools in Sweden are obliged to actively and systematically ensure equal rights and opportunities among the children. This encompasses prevention of discrimination and limitations due to gender, ethnicity, religion, disability, age, sexual orientation and transgender identity/expression. Such prevention especially applies to children's play, learning and development at the preschools. Together with the various levels of organisations and governance involved in the project, these regulations may be understood as part of the 'social innovation ecosystem' of the studied case (cf., BrandSEN et al., 2016; Howaldt et al., 2018).

4.2 Remodelling preschool interiors

Most preschool facilities in Sweden date back to the 1960s and 1970s, designed for the initial mission of preschools to provide public childcare as a supplement to private homecare. As the mission was expanded to equal and inclusive play, learning and development during the 1990's and 2000's, the preschool facilities were increasingly experienced as restrictive and obsolete. Preschool staff has consequently expressed a need for theoretical knowledge and practical tools to fulfil their new pedagogical missions. Municipalities and other preschool managers correspondingly emphasise their legal incentives to make the facilities and operations more inclusive. Researchers – mainly in pedagogy and gender studies – have shown growing interest in studying and facilitating equality in preschool contexts. Public agencies funding research and innovation thereto underline the need for new knowledge to enhance organisational and systemic renewal of public welfare, including education. Multiple perspectives and

interests thus intersect in the complex societal challenge of ensuring equal pre-schools, similar to other social innovation processes (cf., Brandsen et al., 2016; Howaldt et al., 2018; Nicholls et al., 2015).

The project idea was formulated at the intersection of these various interests in pre-school renewal, focusing one of the least explored aspects in the Swedish education system so far: remodelling of preschool interiors for inclusive purposes. This reflects the socio-material dimension of social innovation, highlighted in previous studies (cf., Haxeltine et al., 2017; Howaldt, 2018). The remodelling implied extensive reconstruction of preschool interiors, including walls, furniture and toys, in order to enhance equal and inclusive learning and play. As a first step, researchers at the university that later became project manager, reached out to its proximate municipality with a suggestion to join forces for innovative preschool remodeling. As the national innovation agency that later would fund the project had launched a call to fund ‘norm-innovative’ R&D projects, external financial means were available for such an endeavour. The university and municipality agreed on engaging a selection of local pre-schools, with the intention to enhance equal and inclusive learning and play through remodelled interiors. Three preschools were subsequently singled out by the municipality to participate. An architectural firm with expertise in inclusive design was thereto engaged, alongside an additional university with expertise in social innovation. The prerequisites for an ‘ensemble performance’ and ‘coalition building’ by multiple actors were thus set, which in previous studies are linked to successful development and institutionalisation of social innovations (cf., Cattacin and Zimmer, 2016; Howaldt et al. 2018). By the initiation of the project, an ‘institutional home’ for socio-material preschool renewal was created, forming a bridge between its non-institutional outset and institutionalised ambitions at the intersection of the involved organisations (cf., Haxeltine et al., 2017).

4.3 Complex systemic (ex)change

The ‘ensemble performance’ in the project encompassed complex coordination and negotiation of multiple actors and levels (cf., Cattacin and Zimmer, 2016; Howaldt et al. 2018). As the project was initiated, the remodelling process was planned and discussed at separate meetings with the project management, municipality representatives, preschool managers, pre-school teachers, architects and researchers. The meetings with the preschool teachers also included lectures by the project manager, based on her scientific expertise in preschool equality work. In parallel, interviews and participatory observations were carried out at the pre-schools, in order to identify elements in the facilities that restricted equal and inclusive learning and play. As a complement, the preschool staffs were encouraged to formulate their own suggestions on how to remodel the interiors for equal and inclusive learning and play.

Based on the identified elements and formulated suggestions, the architects produced sketches on how to remodel each preschool. These were then discussed with the preschool staff, municipality representatives, researchers and project manager and revised accordingly. Ultimately, the final sketches were decided upon by the municipality. The remodelling was thereafter initiated, although with a few months delay due to reasons explained in subsequent sections. During and after the remodelling, new interviews and participatory observations were carried out, in order to gain insights into the feelings evoked by the revised plans, as well as to identify changes in the usage of the facilities by children and staff. The results ex-pose more varied patterns of action and interaction in

the facilities than before the remodelling, allowing more equal and inclusive learning and play. Some instances of restoring actions by children and staff were also noted, seemingly compensating for the inclusive interior design by re-establishing previous patterns (cf., Abrahamsson, 2014). These observations highlight the complex, unpredictable interplay between the social and material dimensions of social innovation transformation (cf., Haxeltine et al., 2017). Simultaneous shifts in multiple institutions, norms and practices thus seemed necessary to match the complexity of the addressed challenge of preschool equality, as noted also in previous studies (cf., Howaldt et al., 2018; Westley et al., 2017).

4.4 Conflicting logics

Similar to previous depictions of social innovation as dynamic, discontinuous and unpredictable, with diverse forms of cooperation, compromises and conflicts (cf., Haxeltine et al., 2017; Howaldt et al., 2018; Moulaert et al., 2013), the studied remodelling process was experienced as both energising and strenuous by the involved actors. Excitement was expressed by all stakeholders over the project's equality aspirations and remodelling efforts. The staff and the architects particularly expressed their appreciation of the participatory approach, as they were accustomed to considerably less user-involvement in such development processes, where the municipality normally decides unilaterally. Correspondingly, the municipality representatives expressed their inexperience in participatory development processes, where the interests of several stakeholders are to be considered and coordinated. The project's participatory approach may be understood as part of the interplay between structure and agency, identified as pivotal for systemic change in social innovation processes (cf., Cattacin and Zimmer, 2016; Haxeltine et al., 2017; Howaldt et al., 2018; Westley et al., 2017). The active involvement of stakeholders from various organisations and levels, may empower them to alter prevalent pre-school structures, at the same time as being influenced by these structures, in line with the 'paradox of embedded agency' (cf., Haxeltine et al., 2017).

The previously identified challenge of coordinating various institutional and sectoral logics in social innovation processes (cf., Brandsen et al., 2016; Haxeltine et al., 2017; Howaldt et al., 2018; Moulaert et al., 2013; Nicholls et al., 2015; Westley et al., 2017), is characterising for the studied case. The municipality's established role as main manager of their development processes was for example challenged by the university's role as project manager. As a consequence, the university's project manager wasn't fully aware of the fact that the municipality's internal procedures regarding decision-making, budgeting and procurement didn't match the initial project planning. This was further complicated by the internal division of responsibilities within the municipality, where the educational unit, the development unit and the property management unit were involved. As the formulation and coordination of each unit's tasks in the project was deficient, misunderstandings arose and acute revisions of the initial remodelling plans had to be made. This reflects previous conclusions regarding the organisational complexity of public sector innovation (cf., Rønning and Knutagård, 2015; Sørensen and Torfing, 2015; Windrum and Koch, 2008), which may clash with innovation based on idealistic incentives and stakeholder involvement (cf., Lindberg and Nahnfeldt, 2017; McDonald, 2007; Osborne et al., 2008; Pestoff, 1998) and also with traditional associations of innovation to commercialisation and privatisation (cf., Lindberg, 2017).

In retrospect, the initial time-plan with remodelling only six months after the project's initiation, was perceived as too tight by all stakeholders. To finalise the remodelling blue-prints in time, the project manager, researchers and architects initially prioritised the collection of data and suggestions at the preschools, as well as the design and discussions of blue-print drafts with the preschool staff. As the elaborated blueprints were presented to the municipality, they were perceived as too extensive in both economical and practical respects. They were also presented too late in relation to the established municipality procedures for decision-making, budgeting and procurement. This resulted in acute reductions and delays in the original remodelling plans. Several elements were removed from the remodelling blue-prints for each preschool and the remodelling was postponed from the summer – when the preschools were conveniently empty during vacation – to late autumn – when they were in full operation. These revisions provide new insights into the socio-material complexity of social innovation, in line with the previously noted alterations of initial aims and configurations as the process navigates and plays into the specific arena or action field (cf., Brandsen et al., 2016; Haxeltine et al., 2017; Westley et al., 2017). The revisions may be understood as a new provisional and disputed agreement between the involved actors regarding the extent of and balance between social and material change, constructively negotiated as full consensus was neither realistic nor desirable due to conflicting institutional logics (cf., Sørensen and Torfing, 2015).

4.5 Divided epistemic community

The preschool staff expressed disappointment and frustration over being denied parts of the anticipated remodelling and the prolonged wait for improved facilities. Their work-situation was further aggravated by high personnel turnover, replacing several of the initially involved managers and teachers. This reduced both their time and energy for innovative renewal and hampered the synchronisation of the innovation process and the preschools' ordinary operations. These negative consequences for the staff – and by extension the children – provide further insights into the negative and unintended effects that social innovations may have, from a socio-material perspective (cf., Cattacin and Zimmer, 2016; Nicholls et al., 2015; Segnestam Larsson and Brandsen, 2016). These effects evoked both guilt and compassion among the other project partners, as they cherished the mutual trust and agreements established in the preceding interactions.

Some of the involved researchers and architects perceived the municipality's procedures as too rigid for innovative preschool renewal, primarily serving the interest of the property managers, rather than the children and staff at the preschools. On the other hand, some of the municipality representatives regarded the project's ambitions of innovative preschool renewal as too radical in relation to established municipal procedures and preschool designs. The 'lo-cal epistemic community' of project partners was thus divided in their determination of the legitimacy and desirability of the socio-material reconfiguration (cf., Cattacin and Zimmer, 2016; Haxeltine et al., 2017). As the project's ambitions of enhancing equal preschools were generally perceived as universally good and desirable, this division tended however to be understood as conflicting institutional logics and lacking cross-institutional coordination, rather than contestations of the project's principal aspirations of innovative socio-material transformation (cf., Cattacin and Zimmer, 2016; Haxeltine et al., 2017; Nicholls et al., 2015; Segnestam Larsson and Brandsen, 2016).

The hierarchical relation between the preschools and the municipality may have further expanded the divide, as the involved preschool managers were perceived to enjoy a less independent mandate than their peers in other Swedish municipalities. The preschools singled out to participate were thus the ones that the municipality perceived as in most need of improved facilities and equality-efforts, rather than the ones most motivated to take part in an innovative, norm-challenging process. The preschool staff reported simply being informed by the municipality of their participation, although a more interactive selection process was depicted by the municipality representatives. This may have hampered potential synergies between the four main dimensions identified as crucial for systemic change in previous studies of social innovation, including empowerment, network formation, institutional dynamics and socio-material context (cf., Haxeltine et al., 2017).

According to the preschool staff, their primary motivation for participating in the process was improved work-environment for themselves and the children. They thereto anticipated improved equality and inclusiveness in the children's play and learning. These aspirations reflect their own autonomous motivation as part of the empowerment dimension of systemic change (cf., Haxeltine et al., 2017), differing somewhat from the project's primary focus on innovative, norm-challenging change. It also reflects the socio-material dimension of patterned realities and path dependencies (cf., ibid), by the emphasised need for improved work-environment. The preschool staff thereto regarded innovation as a rather abstract notion and the project manager deliberately avoided using it when communicating with them, instead emphasising the equality prescriptions in public preschool regulations. This reflects the con-strains set by the institutional dimension in social innovation, as well as the network dimension of socio-spatial relations and discourses (cf., ibid), downplaying innovation in favour of perceptively less abstract matters of work-environment and equality-efforts.

These dimensions of systemic change help pinpoint the 'absorptive capacity' and 'social serendipity' of the social innovation ecosystem in the studied case, i.e., its inclination to recognise and appreciate the value of innovative approaches to societal challenges and to systematically encourage and support innovation (cf., Domanski and Kaletka, 2018). As all participating actors saluted the project's equality and remodelling aspirations in a general sense and dedicated time and energy to participate in it, appreciation and support is distinguishable to some extent. The project's innovative agenda of socio-material transformation was how-ever contested by the municipality's established procedures, inexperience in participatory processes and scepticism towards too radical reconfigurations, as well as by the preschool staff's focus on work-environment and equality-efforts. The project has thus managed to establish 'cooperation', 'coordination' and 'collaboration' only to some extent, in terms of information and knowledge exchange between the involved actors, synergies between diverse institutions and institutional logics and sustained interaction with common solutions to shared challenges (cf., Sørensen and Torfing, 2015).

5 Conclusions and implications

In order to advance the knowledge on socio-material dimensions of complex systemic (ex)change in multi-actor and multi-level innovation processes within the education

system, this study has investigated a case of Swedish preschool remodelling with inclusive purposes. Previous studies on systemic change through social innovation ecosystems, helped reveal dynamics and challenges in the complex coordination of conflicting institutional logics and socio-material interplay. Identified dynamics include the multi-actor constellation of a municipality, three preschools, an architectural firm, two universities and a national innovation agency, as well as the multi-level involvement of national school regulations, municipal ownership and management and local preschool facilities and operations. By creating an ‘institutional home’ for socio-material preschool renewal at the intersection of the involved actors and levels, the project set the prerequisites for an ‘ensemble performances’ and ‘coalition building’, matching the complexity of the addressed challenge of preschool equality. Identified dynamics further include an interplay between structure and agency, as the project’s participatory approach intends to empower stakeholders to alter prevalent preschool structures – in both a material and social sense – at the same time as they are restrained by these structures. The enforced revisions of the original project plans, in terms of blueprint reductions and postponed remodelling, divulge the socio-material dynamics between institutional constraints and path dependencies, on the one hand and the empowerment dimension of autonomous motivation and network dimension of socio-spatial relations and discourses, on the other.

Identified challenges include complex coordination of conflicting logics and interests in the social innovation ecosystem of preschool renewal. The university’s roles as project manager, developer and facilitator challenged the municipality’s established role as main manager of their development processes and the municipality’s established procedures and the pre-school staff’s focus on work-environment challenged the project’s innovative aspirations, participatory approach and time-planning. This may be understood as clashes between the organisational complexity in public sector innovation, the focus on commercialisation and privatisation in traditional innovation and the idealistic and inclusive incentives in the project’s innovation process. Articulated opinions of municipality procedures serving the interests of property managers rather than preschool staff and children and of the project’s overly radical and time-pressured agenda in relation to these procedures, may however also be understood as conflicts and opposition regarding the project’s principal aspirations of innovative socio-material change. These tensions are however masked by the general perception of the project’s ambitions of equal preschools as universally good and desirable. They are further masked by the contested extent and pace of the remodelling, presumably preserving the socially stabilising function of existing material components in the preschools’ and municipality’s daily operations, thus counteracting destabilising changes in the socio-material context.

By identifying these dynamics and challenges, the study exemplifies and explains the socio-material dimension of complex systemic (ex)change in the multi-actor and multi-level process of preschool renewal, requiring simultaneous shifts in multiple elements of the social innovation ecosystem to match the complexity of the addressed challenge of preschool equality. The study thus provides further insights into enhancing and hampering factors in education system innovation, as part of the more encompassing welfare system that is perceived to require social innovations for maintained and improved welfare in Western societies. The study confirms that the large complex systems – with extensive regulations and divisions of responsibilities between multiple actors on multiple levels – that characterise formal education may hamper innovation by its high degree of inertia, at the same time as distinguishing a potential to enhance

innovation through complex coordination of social innovation ecosystems, using a participatory, empowering approach.

The study may inspire future studies of innovative renewal in the education system, by providing further insights the previously cited conception of systemic change as “multi-dimensional, complex and results from multiple interrelated actions, modes of learning, conflicts, tensions and diverse forms of cooperation and compromise” [Holtgrewe and Millard, (2018), p.71]. In order to fully grasp the complex dynamics and challenges of education system innovation, future studies may scrutinise the relation between structure and agency in other geographical contexts than Sweden, as well as in other educational settings than preschools. Such studies could also deepen the analysis of conflicting institutional logics versus opposing desires of social change in social innovation ecosystems.

The main practical implications of the study concern the need for combined cooperation, coordination and collaboration to enhance the absorptive capacity and social serendipity of social innovation ecosystems in the educational area. This includes sustained interaction with cross-institutional synergies, solutions and knowledge exchange, systematically encouraging, supporting and appreciating innovative solutions for improved welfare services.

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