Environmental Innovation and Societal Transitions 22 (2017) 50–62

Contents lists available at ScienceDirect

Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist

Original Research Paper

A transition to a denser and more sustainable city: Factors and actors in Trondheim, Norway

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ARTICLE INFO

Article history:
Received 16 April 2015
Received in revised form 19 June 2016
Accepted 28 June 2016
Available online 22 July 2016

Keywords:
Densification
Urban sustainability
Transition theory
Multilevel perspective
Norway
Trondheim

ABSTRACT

This paper analyses urban densification in Norway as a key element of sustainable city policies. The city is viewed as a system in which changes of material aspects, such as density, are linked with social and technological aspects. Densification targets in Trondheim are used as a case study to explore the main actors and factors involved in urban development. A multilevel perspective approach used in sustainability transitions studies is applied as a model to describe them. The aim is to illustrate interactions and barriers arising in the implementation of densification policies. The argument suggests that despite a shift of paradigm in planning towards sustainability, urban regimes have remained rather stable. Some progress has been made, but further advancing the sustainability agenda may require new rules in the regime – for example, new planning policies integrated with taxation and financial instruments, and transport regulations – and a stronger emphasis on niche developments.

1. Introduction

Density has been regarded as an important quality of the urban form at different periods. Concentrating population and functions facilitates the provision of infrastructure and the proximity to diverse urban services (Steemers, 2003). In most cases, economic purposes have been behind densification processes and urban containment strategies (Berg et al., 2012; Burton, 2002; Roberts and Sykes, 1999). However, since sustainability, with the objectives of protecting environmental resources and combating climate change, became a central issue, interest in denser urban areas has gained new strength. Denser city settings demand fewer environmental resources to function—not only less land, but also less energy for transportation and for the operation of buildings and infrastructure (Newman and Kenworthy, 1996; Karathodorou et al., 2010; Newman, 2014). Therefore, compact urban areas are considered a precondition for decreasing motorised travel, potentially reducing the use of fossil fuels and thus decreasing CO_2 emissions (Liddle, 2013; Moriarty and Honnery, 2008).

The Norwegian planning guidelines towards sustainability have embraced this idea. Urban densification has been one of the main targets in municipal policies on city development for at least two decades. However, despite the constancy in the targets, the advances have been uneven (Hernández-Palacio, 2014). The application of such policies appears increasingly challenging and tests governance at the municipal level. The lack of feasibility in the implementation of densification policies is related to the functioning of the planning system and its relation with the regime behind urban development. Despite the new challenges, planning practices and instruments have remained much the same as decades before. It seems that planning

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http://dx.doi.org/10.1016/j.eist.2016.06.002
2210-4224/

as it currently operates in market-oriented societies has serious limitations in fostering increases in urban density (Gordon, 2008). A transition to a more sustainable city might therefore be hindered by the absence of change in procedures.

This paper presents an exploration of the actors and factors that influence the transition to denser cities in Norway by applying transition theory and the multilevel perspective to the case of Trondheim. The city of Trondheim had an estimated urban population of 170,242 inhabitants in 2012. In that year, its average urban density was 2592 inhabitants per km^2 (SSB, 2015a); this is quite low in comparison to the average population density in the built-up areas of Europe at approximately 4345 inhabitants per km^2 (Dodman, 2009). The analysis uses Trondheim densification policies as a case study. It combines quantitative and qualitative information from publicly available sources, such as documentation on municipal spatial policies and national white papers, but also draws from the academic literature. The central question guiding the argument is:

- What factors and actors influence a transition to denser cities in Norway?

The remainder of the paper is organised as follows. Part 2 presents theoretical considerations for city change towards sustainability from a transition theory perspective. Urban densification is discussed from a socio-technical standpoint; the idea of transition from a multilevel perspective and the concept of socio-technical system are explored as tools to analyse city change. Part 3 presents the paper's case study: the city of Trondheim and its background facts and densification targets. Then the key factors and actors associated with city densification and urban development projects are outlined using a multilevel perspective approach. Part 4 provides analysis and key findings. Part 5 makes conclusions and sets out recommendations for future research.

2. Urban densification from a socio-technical standpoint

Urban form has been highly influenced by transportation technologies. The existing socio-technical context, especially the fact that larger distances can be covered by car, in less time, at affordable prices, makes it particularly challenging to achieve densification targets in planning for the sustainable city (JRC, 2006; Næss et al., 2011). Private car usage has been one of the main forces determining the sprawl of urban areas as well as social behaviour with regard to the use of urban space (Geels, 2005). Urban sprawl and suburbanisation have mainly been driven by the mass use of cars and subsequent enhanced personal mobility (Brueckner, 2000; JRC, 2006; Oueslati et al., 2015). For instance, land uses and land prices are strongly connected to transportation and accessibility (Cheshire and Sheppard, 1995; Srour et al., 2002). Consequently, there are many economic interests around expanding and improving infrastructure for the car, and enabling new areas for urban extension, which in turn generate greater car dependency (Dieleman and Wegener, 2004; Kenworthy and Laube, 1999). A car-based transport system is antagonistic to urban densification.

Transportation, being a major contributor to CO_2 emissions, has become a central issue in sustainability transition studies (Nykvist and Whitmarsh, 2008; Geels et al., 2011; Geels, 2012; Carvalho et al., 2012). There are two main transition pathways proposed in this debate. The first is an enhanced and cleaner technology for the automobile of the future; the second is a behavioural change towards less emphasis on personal mobility in favour of an intermodal, more collective-oriented system (Geels et al., 2011; Vergragt and Brown, 2007). Sustainable city policies belong to the second strand. Urban densification, mixed land uses, and transit-oriented development are the main planning strategies in the shift towards sustainability (Dempsey et al., 2012; Carvalho et al., 2012; Valderrama Pineda and Vogel, 2014). This spatial dimension in the transition towards sustainability in cities involves several other aspects, such as governance, energy, buildings, urban form, production, consumption, and everyday habits. Transition studies, however, have put a greater emphasis on the technical aspects of transition while the behavioural side has been analysed less (Whitmarsh, 2012). This paper seeks to contribute to this second strand by exploring the factors and actors influencing the development of denser cities to enable cleaner transportation systems.

2.1. Transition and the multilevel perspective

Transition is, according to the *Oxford English Dictionary* (3rd edn. 2010), the "process or a period of changing from one state or condition to another". Transition towards sustainability is probably the most important target in current urban planning. A denser urban environment, less dependent on car usage, is one of the significant characteristics of the sustainable city. How such a process may take place is a fundamental question for designing and implementing different strategies to enable the transition. Transition studies have already analysed these processes in the case of technological transitions, identifying some particular patterns and mechanism of change. The shift from one technology to another has been described by Geels (2002) using a multilevel perspective approach. The multilevel perspective provides an integrated description of technical evolution, in terms of variation, selection, and retention; simultaneously, it describes a process of social reconfiguration around the new technologies, a shift in the socio-technical regime. Several examples of the multilevel perspective of transition have been described by Geels, including the transition from sailing ships to steamships (Geels, 2002), the replacement of horse-drawn carriages by cars (Geels, 2005), and the change from cesspools to sewerage systems in the Netherlands (Geels, 2006).

According to the multilevel perspective approach, transition is the result of the interaction of factors in three layers: (a) landscape, (b) regime, and (c) niches (Rip and Kemp, 1998). The landscape is defined as the macro-scale. This is the general environment composed of material elements such as networks of cities and large infrastructure, and the availability of natural