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A comparison of the neo-Schumpeterian theory of Kondratiev waves and the multi-level perspective on transitions

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ABSTRACT

This paper explores the relationship of the neo-Schumpeterian theory for Kondratiev waves, also called 'Long Waves' of economic growth, to Transition theory, in particular the multi-level perspective. The two conceptual frameworks have a similar description of the development of new technologies. While they both use the ontology of co-evolution, the MLP combines this with Science and Technology Studies, Giddens' Structuration theory and neo-institutionalism. Neo-Schumpeterian theory can contribute to the consideration of landscape dynamics in the MLP, while agency in the niche-regime interactions emphasised by the MLP could be used to extend the analysis of Kondratiev waves.

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1. Introduction

This paper explores the relationship of the theory of Kondratiev waves, also called 'Long Waves' of economic growth, to Transition theory, in particular the multi-level perspective (MLP). A comparative analysis is useful because both literatures address the same general topic, that of 'radical' technological change in contrast to frameworks that deal with incremental innovation. Both conceptual frameworks are also explicitly dynamic: they seek to provide explanations of patterns of changes through time and the features (e.g. speculative bubbles, take-off of a new socio-technological paradigm, a shift to a new technological and institutional structure) of such changes. They are therefore dealing with similar social phenomena.

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Since approximately 1750, a series of fundamental changes in technology and therefore in society are argued to have determined the pattern of long run fluctuations in economic growth. These fluctuations have been called 'Kondratiev waves', after Nikolai Kondratiev's influential statistical analysis (Kondratiev, 1998). A recent strand of this literature, particularly the work of Chris Freeman (Freeman and Soete, 1997; Freeman and Louçã, 2001) and Carlota Perez (Perez, 1983, 2002) draws inspiration from the ideas of Schumpeter and is therefore referred to as the 'neo-Schumpeterian' approach. This literature considers itself to be a branch of economic history, with the objective of explaining long run patterns of growth brought about by industrial innovation.

Socio-technical transitions is a comparatively recent, but growing literature; Grin et al. (2010) is a comprehensive survey of the state of the art and van den Bergh et al. (2011) introduces a series of articles on current issues in transitions theory, with Smith et al. (2010) linking the MLP to other approaches to innovation studies. The MLP has been developed as a theory for the analysis of transitions. While it arose from considering eco-innovation, it is also used for analysis of radical technical change in the past, a similar application to that of neo-Schumpeterian theory.

The question therefore arises as to whether the insights of neo-Schumpeterian theory might be helpful in the analysis of the MLP and whether the new developments in transition theory might contribute to improved understanding of long term changes in technology and patterns of growth. There has been some discussion of how to connect the MLP to other innovation theories. Markard et al. (Forthcoming) review the conceptual frameworks used in the field of sustainability and Markard and Truffer (2008) compare the MLP and Technological Innovation System (TIS) analysis.

In Section 2, the current neo-Schumpeterian theory for analysing Kondratiev waves is summarised, drawing in particular on the extensive methodological discussion and theory of Freeman and Louçã (2001). The main features of the MLP are briefly reviewed in Section 3; Grin et al. (2010) have extensive discussions of the theoretical structure. Geels (2010) also discusses the ontology of the MLP in relation to other social science ontologies. Both conceptual frameworks have been used for the transition from horse transport to the motor car and their differences in approach to this case are discussed in Section 4. A critical comparison of the scope, the historical structure, ontologies and methodologies is then made in Section 5, in order to identify respective strengths and weaknesses in Section 6. The results of this comparison are used to suggest ways in which the conceptual frameworks might be used to overcome the weaknesses identified, in particular to advance the analysis of the potential mechanisms of sustainability transitions.

2. A summary of the neo-Schumpeterian theory of Kondratiev waves

Kondratiev or Long Wave theory has a long history, reviewed in Freeman and Louçã (2001) with a collection of influential papers in Freeman (1996a). They identify Clarke (1847) as the originator of thinking about waves of economic growth and employment; W.S. Jevons, Karl Marx and Friedrich Engels also developed the field. Van Gelderen (1913) undertook the first quantitative analysis. Schumpeter (1954) considered that Kondratiev made a decisive contribution, formulating a general theory of waves of economic growth and performing one of the first econometric analyses to test this (Kondratiev, 1998). Schumpeter (1939, 1954) argued for a view of economic development founded on the historical analysis of radical technological change – industrial revolutions. The current neo-Schumpeterian literature provides a historical analysis of long run technological and consequent social and economic structural change (Freeman and Louçã, 2001; Perez, 2002). There are also literatures on shorter economic cycles: Juglar analysed the trade cycle in the 1850s and Kuznets (1930) used statistical methods to differentiate between 'primary' and 'secondary' cycles (with a periodicity of approximately 22 years. However, these literatures did not have technological change as their focus. The modern Real Business Cycle and associated endogenous growth literatures also address technological change, but their focus is on short term change (Köhler et al., 2006).

There has been extensive debate about the methodologies that are appropriate and this is discussed in Freeman and Louçã (2001). They conclude that the appropriate method is "...reasoned history: for an approach to economic history including technological innovations, structural changes, and the co-evolution of economic and social movements within the framework of institutional settings and modes of regulation." (Freeman and Louçã, 2001, p.123). Thus the main ontology is that of co-evolution. Five

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