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# Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study

Frank W. Geels

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## Abstract

This paper addresses the question of how technological transitions (TT) come about? Are there particular patterns and mechanisms in transition processes? TT are defined as major, long-term technological changes in the way societal functions are fulfilled. TT do not only involve changes in technology, but also changes in user practices, regulation, industrial networks, infrastructure, and symbolic meaning or culture. This paper practices ‘‘appreciative theory’’™ [R.R. Nelson, S.G. Winter, *An Evolutionary Theory of Economic Change*, Bellknap Press, Cambridge, MA, 1982] and brings together insights from evolutionary economics and technology studies. This results in a multi-level perspective on TT where two views of the evolution are combined: (i) evolution as a process of variation, selection and retention, (ii) evolution as a process of unfolding and reconfiguration. The perspective is empirically illustrated with a qualitative longitudinal

case-study, the transition from sailing ships to steamships, 1780â€“1900. Three particular mechanisms in TT are described: niche-cumulation, technological add-on and hybridisation, riding along with market growth.



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## Keywords

Technological transitions; Regime shifts; Evolutionary theory; Multi-level analysis; Sailing ships and steamships

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