

# Accepted Manuscript

Design for System Innovations and Transitions: A Conceptual Framework Integrating Insights from Sustainability Science and Theories of System Innovations and Transitions

A.Idil Gaziulusoy, Han Brezet



PII: S0959-6526(15)00796-9

DOI: [10.1016/j.jclepro.2015.06.066](https://doi.org/10.1016/j.jclepro.2015.06.066)

Reference: JCLP 5722

To appear in: *Journal of Cleaner Production*

Received Date: 21 August 2014

Revised Date: 12 June 2015

Accepted Date: 14 June 2015

Please cite this article as: Gaziulusoy AI, Brezet H, Design for System Innovations and Transitions: A Conceptual Framework Integrating Insights from Sustainability Science and Theories of System Innovations and Transitions, *Journal of Cleaner Production* (2015), doi: 10.1016/j.jclepro.2015.06.066.

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Wordcount: 8390

**Design for System Innovations and Transitions: A Conceptual Framework Integrating Insights from Sustainability Science and Theories of System Innovations and Transitions**

A. Idil Gaziulusoy\*

Victorian Eco-innovation Lab  
Faculty of Architecture Building and Planning  
Melbourne, Australia

Han Brezet

Faculty of Industrial Design Engineering  
Technical University of Delft  
Delft, The Netherlands

\*Corresponding author

E-mail: idil.gaziulusoy@unimelb.edu.au

Phone: +61 3 903 55379

**Abstract**

It is increasingly acknowledged that, in order to achieve sustainability, there is an urgent need for radical and transformative restructuring of socio-technical systems that meet our needs. These transformations are referred to as system innovations for sustainability or transitions. Transitions and system innovations cover not only product and process innovations but also changes in user practices, markets, policy, regulations, culture, infrastructure, lifestyle and management of firms and have significant implications for design and innovation activity aiming to contribute to the societal endeavour of achieving sustainability. Even though theory on system innovations and transitions is now extensive, it provided explanations regarding how companies and design and innovation activities fit into the big and long-term picture of system innovations and transitions only to a certain extent. In addition, there have not been many efforts in the design for sustainability field to learn from the theories of transitions and system innovations. In this paper, we make an initial theoretical contribution into the design and innovation for sustainability field by integrating relevant insights from sustainability science and system innovations and transitions theories. The result of this integration is a proposal for a prescriptive conceptual framework which explains how wider-scale systemic changes can be addressed at smaller elements of socio-technical systems specifically focusing on the design and innovation level within companies.

**Keywords:** design for sustainability, product development, service development, design methodology, transdisciplinarity, transitions, system innovation, sustainability science

**1. INTRODUCTION**

As the discourse of sustainability has matured over the past twenty years, our understanding of the concept has evolved from being an idealized, generalized and static property of individual (system) elements to contextual and dynamic properties of systems themselves (Clayton and Radcliffe, 1996; Faber, Jorna, & Van Engelen, 2005). This dynamic conceptualization of sustainability assumes that

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