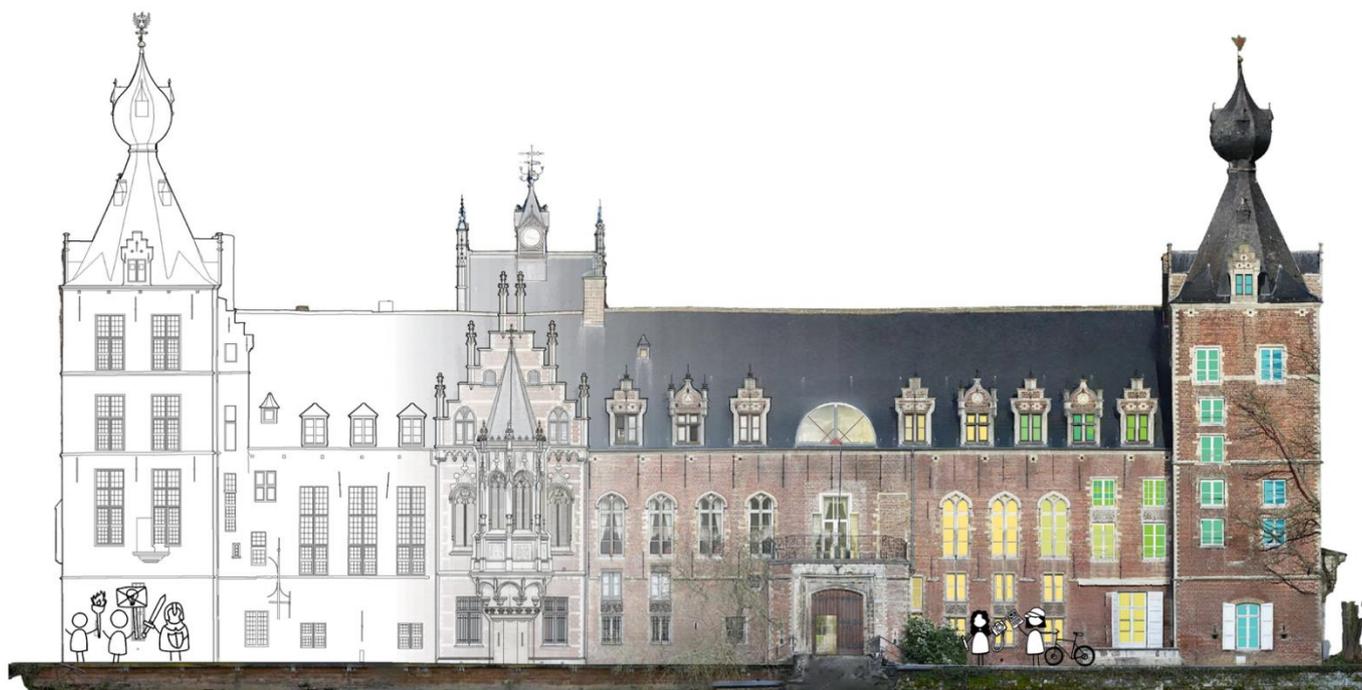


# ILUCIDARE

## Innovation Handbook

Supporting Evidence-Based Research

### The innovation framework to analyse heritage-led innovation mechanisms



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## Table of Content

Introduction.....	1
Categories to analyse heritage-led innovation mechanisms .....	1
Bibliography.....	3

### INTRODUCTION

The following is a summary of the evidence-based research conducted throughout the ILUCIDARE project. The purpose is to provide a more detailed record of the information, the backbone, that was used to develop the ILUCIDARE Innovation Handbook.

This document supports Chapter 2 of the Innovation Handbook, and focuses specifically on the lessons learned from mapping and analysing a variety of long-term innovation case studies from a variety of industries and sectors. The summary of findings showcases differences in the innovation process and its underlying mechanisms, the bibliography indicates the variety of cases studies which were analysed.

Different variables can influence the innovation process, e.g. range of selection pressures, speed of technological discontinuity emergence, magnitude of development required before innovations can compete with existing technologies and services, levels of demand pull and science push, rate of innovation or the expected outcome of different groups in society (Vandesande 2017). Moreover, it has been noted that the unfolding innovation process can be divided into different phases, e.g. emergence, take-off, acceleration and stabilisation (Rotmans et al. 2001).

Therefore, the ILUCIDARE evidence-based research aimed to categorise differences in innovation processes and define which mechanisms can be used to operationalise new ideas. Herewith, it is important to keeping in mind that innovations start as niches, thus options that promise change but which are not all bound to become applied in the future (see: ILUCIDARE Innovation Handbook, Chapter 4). In order to gain an optimal understanding of the innovation process, it was therefore opted to base the categories of innovation mechanisms on long-term innovation case studies which entail more dynamics and insights than avalanche innovations.

### Categories to analyse heritage-led innovation mechanisms

Within a large body of exiting research, different key points can be identified that raise questions about the standardisation of an innovation. The dynamic process, interactions between different analytical levels and incremental innovations at the regime level all point to differentiated innovation patterns. This observation was confirmed by analysing and structuring 20 different long-term innovation case studies according to the 5 'sensitising categories' developed by Van de Ven and Angle (1989) (Table 1). The initial aim of these categories developed by Van de Ven and Angle was to provide innovation managers and researchers with 'a core set of constructs to guide and unify different field studies of innovation and gather 'rich' longitudinal data on these concepts' (Van de Ven and Poole 1990: 317). Whereas the researchers are experts in the field of process research, the term 'sensitising' refers to the motivation and coordination of actors and users in developing and implementing new ideas. Within this research, the framework is used to categorise the identified differences between the transition archetype and the 20 long-term innovation case studies analysed during the research process.

Table 1: Differences between the innovation archetype and long-term innovation case studies, structured within the process research grid-categorisation by Van de Ven and Angle (1989: 11), developed by Vandesande (2017).

Innovation categories	Innovation archetype	Long-term innovation case studies
<b>Ideas</b>	From one specific idea to an operational innovation	<p>Ideas are subjected to reinterpretation, profiling and adjustments.</p> <ul style="list-style-type: none"> <li>- cascade dynamics: macro-innovations that are developed through a series of (non-related) micro-innovations (Summerton 1994)</li> <li>- socio-cognitive evolution and learning algorithms (Geels and Raven 2007)</li> <li>- redefining initial radical ideas in context of regime (Verbong and Geels 2007)</li> </ul>
<b>Actors</b>	Innovators in niches and their relation with relevant actors	<p>Roles and institutional ties of all innovators and actors are dynamic and can evolve or even disengage</p> <ul style="list-style-type: none"> <li>- role of pioneers and the strategic alliances in different sectors (Rothaermel 2001)</li> <li>- producer-initiated process (van Driel and Schot 2005)</li> <li>- actors interpretation of a specific idea (Elzen et al. 2011)</li> </ul>
<b>Transactions</b>	Innovator communities in niches or firms developing ideas into technologies and services	<p>Expanding and contracting networks through engaging transactions with exogenous actors</p> <ul style="list-style-type: none"> <li>- completely new social groups that enable innovation (Geels 2002)</li> <li>- innovations through network destabilisation (Marvin and Perry 2004)</li> <li>- co-evolving actor networks (Geels 2005b)</li> </ul>
<b>Context</b>	regimes and landscapes provide opportunities and constraints	<p>Dynamic open-system boundaries where different regimes and landscapes can correspond</p> <ul style="list-style-type: none"> <li>- interaction between systems (Braun and Joerges 1994)</li> <li>- crossing regimes enabling innovation through integration (Robischon 1994, Geels 2007)</li> <li>- multiple regime interactions (Konrad et al. 2008)</li> </ul>
<b>Outcomes</b>	Orientation towards final result and new stable regime	<p>Open-ended boundaries can imply intermediate, multiple in-process, spinoff or integration results</p> <ul style="list-style-type: none"> <li>- one innovation's outcome can be the momentum of another or the springboard for new markets (Freeman and Perez 1988)</li> <li>- competition between old and new technology or service is replaced by a symbiosis (Pitorius and Utterback 1997)</li> <li>- innovation adds-on knowledge and rides along with old technology or service (Geels 2006)</li> </ul>
<b>Process</b>	Dynamic sequence of different stages towards operational innovation	<p>Multiple, divergent, parallel and sometimes related processes</p> <ul style="list-style-type: none"> <li>- specific change within larger transformation process (Ginsberg and Bucholtz 1990)</li> </ul>

		<ul style="list-style-type: none"> <li>- evolution over revolution: radical innovation is analysed as a stepwise process and series of adaptations in regime (Van den Ende and Kemp 1999)</li> <li>- regular change within the regime (Siggelkow 2002)</li> <li>- innovation gradually infiltrates regime (Smith 2006)</li> </ul>
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The different innovation case studies were found to bring about many deviating – and above all unique – patterns. The general innovation pattern whereby niches enter the regime is present in every case study. However, as can be observed, different variables can influence the pattern, e.g. range of selection pressures, speed of technological discontinuity emergence, magnitude of development required before innovations can compete with existing technologies and services, levels of demand pull and science push, rate of innovation or the expected outcome of different groups in society. Moreover, it has been noted that the unfolding innovation process can be divided into different phases, e.g. emergence, take-off, acceleration and stabilisation (Rotmans et al. 2001).

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