THE THEORY BEHIND TIPC'S WORK

A TOP-LINE GUIDE TO SUSTAINABILITY TRANSITIONS

UNIVERSITY OF SUSSEX | SPRU SCIENCE POLICY RESEARCH UNIT

TRANSFORMATIVE INNOVATION POLICY CONSORTIUM

INTRODUCTION

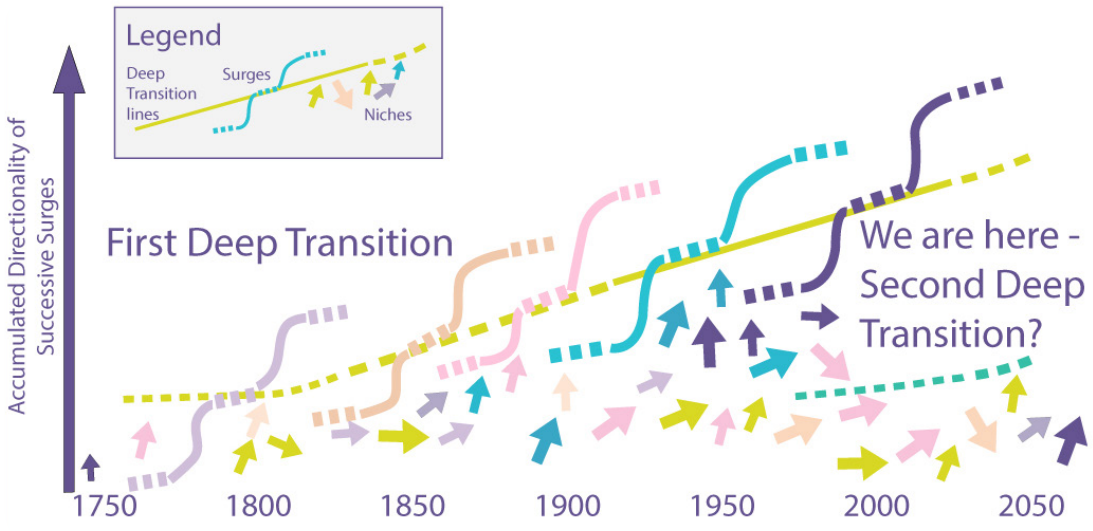
In order to inform the work of the Consortium in driving Transformative Innovation Policy (TIP), the theory behind how societies change over time, and what compels these changes, must be explored. Much of TIPC's work is drawn from two areas within transitions studies; Deep Transitions Theory makes sense of what has happened in the past, while Sustainability Transitions enables reflection on future transformations. This guide is an introduction to the Transitions Theories underpinning TIPC's work, including a glossary of key terms used by the Consortium.

WHAT ARE DEEP TRANSITIONS?

Johan Schot, founder of TIPC and a key pioneer within Transitions Studies, defines Deep Transitions as "a series of connected individual transitions in a wide range of socio-technical systems." These connected transitions interrelate and interdepend to inform a series of rules and meta-rules shared amongst different socio-technical systems that in turn provide the backbone of contemporary societies. A series of transitions can be defined as one "Deep Transition" when they meet a three-point criteria:

- That the related transitions change an already established and embedded set of met-rules within existing socio-technical systems
- That the changing of these meta-rules inform a new phase in the history of industrialisation, modernity or industrial consumption
- That the transitions and shift to a new phase is a gradual process taking longer than a century

LONG TERM CONTINUITY IN DEEP TRANSITION DYNAMICS



WHAT IS THE FIRST DEEP TRANSITION?

The First Deep Transition is the transition that led to industrial modernity and informs all our of current socio-techno systems today. The First Deep Transition evolved across five "great surges of development", that can be thought of as separate technological revolutions. This begins with the Industrial Revolution of the 1800s and continues across history until the adoption of information systems and telecommunications in the 1970s. The unfolding of this industrial progress has informed the socio-technical systems that create our contemporary societies.

The First Deep Transition has led to great industrial progress, and the age of "modernity" as we know it. It has created great wealth. With it, however, have come new, complex problems and challenges, known as "wicked problems". Most notably, industrial consumption and production has led to growing inequality and poverty across the globe, while the fundamental change in our planet has left us with the consequences of unprecedented climate change and inequality of resource distribution.

WHAT IS THE SECOND DEEP TRANSITION, AND HOW DOES IT RELATE TO THE IDEA OF SUSTAINABILITY TRANSITIONS?

It is some scholars' belief that we are currently in the Second Deep Transition, which has manifested as a fundamental re-ordering of the First Deep Transition as a response to the problems created by modernisation. Beginning in the 1970s, we have witnessed a growing comprehension amongst key actors (governments, international organisations, businesses, and NGOs) that any future industrial progress must be sustainable in that it provides wealth and economic growth to all without exceeding our environment's limits. This has led to policies and initiatives directly tackling the issues of climate change and inequality, with the most notable recent initiative being the wide-scale acceptance of the UN's Sustainable Development Goals.

THE GLOBAL GOALS FOR SUSTAINABLE DEVELOPMENT

DEEP TRANSITION DYNAMICS

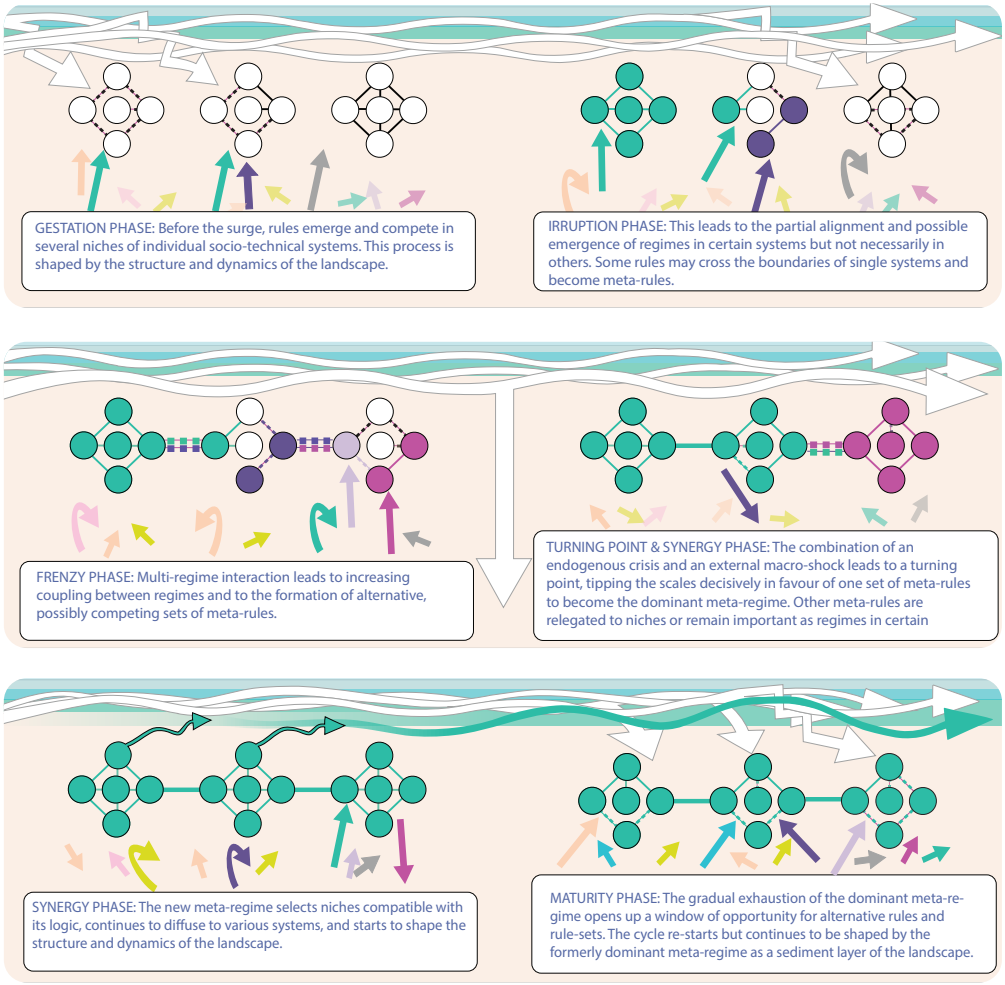
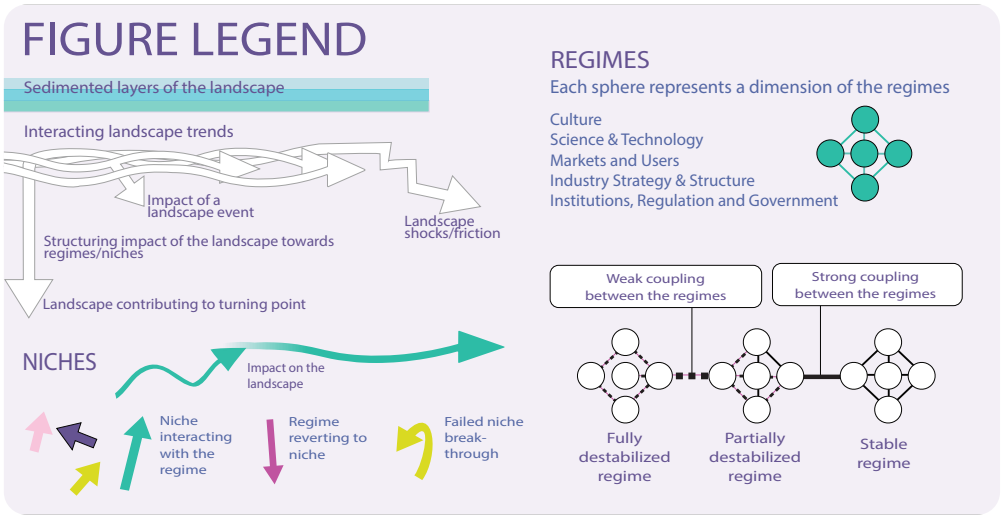


FIGURE LEGEND



HOW DOES THIS RELATE TO TIPC'S WORK?

TIPC believes that in order to tackle the huge social and environmental challenges facing humanity, the Second Deep Transition must be sustainable. This requires a complete re-thinking of our current socio-technical systems and societies. The next Deep Transition must differ from the first in that its starting point must be sustainability, rather than directionless, unchecked progress. One method that could provide direction to future transitions could be Transformative Innovation Policy (TIP).

We focus here on terms which underlie the rationale for TIPC and those that have received some attention in TIPC discussions and analysis.

ACTORS

The proponents of and opponents to transformative change that respectively seek to accomplish or seek to block, divert, or slow transformative change for a variety of reasons including a perception or the reality that such change will disadvantage their current interests. Actors can be individuals, groups of individuals working within organisations and across organisational boundaries (so networks or coalitions) and organisations.

ACTOR-MAP

Overview of proponents and opponents as well as included and excluded actors and how they relate to each other and interact with each other. The actor-map would include attention to power-dynamics between actors (their dependencies, struggles, conflicts, divergent rationales and values).

CO-CREATION

A process in which participants attempt to reach a common understanding based upon reasoned discussion with attention to the opportunities and barriers for conveying this understanding to others. The aim is not consensus, but a better understanding of points of differences and overlap. Other words used sometimes are co-production, and co-construction. In our research process these words have a similar meaning.

DEEP TRANSITION

Series of connected and sustained individual transitions in a wide range of socio-technical systems towards a similar direction

DEMOCRATISATION

In our project this refers to participation. It is expected that achieving transformative change may require participation by many actors and drawing on their innovative potential. Participation also means that many actors have a voice and the least powerful are in the position to challenge the most powerful actors.

DIRECTIONALITY

Based upon one of the stylised facts of innovation research we can say that innovation is cumulative (building upon the past), innovation can be said to have a direction. Only certain solutions are looked for while others are typically ignored. This direction (sometimes called a trajectory or pathway) can be altered by transformative innovation that establishes a new direction and thus process of accumulation (also a new trajectory or pathway). A corollary is that a change in directionality involves the abandonment or destruction of an

older direction (trajectory or pathway) (although it may involve the old pathway becoming much less prominent and influential). The process of change can follow a range of patterns. Two major ones: 1) substitution so competition between directions and in the end full or almost full replacement; 2) hybridisation (or reconfiguration) where several directions are combined, so elements of the old regime persist.

GREAT SURGE OF DEVELOPMENT

Combinations of technological revolutions and techno-economic paradigm leading to major economic and social impacts

INCLUSIVENESS

Closely coupled with democratisation, this refers to the inclusion of all actors in decision making processes, but goes beyond that since it also refers to actors having the access and capabilities to participate. So it includes a consideration of the context in which actors interact.

Consideration of interests, democratisation, and inclusiveness is linked to the politics of innovation policy and therefore to issues of legitimacy (the extent to which innovation policies are seen as legitimate roles for state actors) and accountability (how the outcomes of policies are assessed).

INNOVATION

An idea, or process whose novelty distinguishes it from prior ideas and processes and is taken up and utilised (including processes of articulation, adaptation, or customisation) by people other than the originator(s). The idea of process can be a re-invention or re-use of older ideas and processes. Innovation is basically a process of renewal. Please note that for us innovation does not refer to a product or process technology, but of course includes the development of new artefacts (products). In the context of transformative innovation policy we are interested in innovation which builds up new socio-technical systems.

LANDSCAPE

Exogenous events and trends that shape niche-regime dynamics.

NICHE

Spaces for radical innovation that are protected by specific selection criteria.

REFLEXIVITY

This notion refers on the one hand to the ability of actors to reflect on their own routines, and worldviews, the routines, position and worldviews of other actors, and the rationality.

REGIME

Relatively stable and aligned set of rules directing the behaviour of a set of actors along a trajectory of incremental innovation.

SECOND ORDER LEARNING

Or deep learning refers to a process in which routines are questioned. This includes a fundamental rethink of how problems are defined, and what solutions are considered appropriate. First order learning refers to a process in which routines are sharpened and become better defined. For example in a project on carbon calculations the actors can seek to optimize the calculations but also more fundamentally question the design and use of these calculations.

SOCIO-TECHNICAL REGIME

In our project we look at sets of routines which are often aligned. This is what we call a socio-technical regime. We can make a distinction between heuristics (design rules, search rules); policy routines, user routines (preferences), cultural routines (expectations, perceptions, frames). These routines can be formal and informal. An example of formal ones are published standards; examples of informal ones are rule of thumbs or norms people follow.

SOCIO-TECHNICAL SYSTEMS

Norms, routines, and standards (regimes) become expressed in socio- technical systems. Such a system is a configuration of actors (their knowledge, skills), technologies (products, infrastructures), and institutions (regulations, cultural symbols, markets) for fulfilling a certain societal function (mobility; or inland mobility; urban mobility).

Example: The socio-technical system of grid distributed electricity includes the power plants, the electrical power cabling, the safe wiring of newly constructed buildings, and the existence of public or private arrangements for generating and distributing electrical power. Markets are: use of electricity in homes or businesses for purposes of illumination, heating, motors or powering electronic devices. This is a large system with many different societal and technical features. It is over a century old and although it is not universal, about 85% of the human population participates in this system.2 In terms of relations between people, large numbers of people participate in this system as consumers using a myriad of electricity using technologies while a much smaller number of people are responsible for the generation and distribution of electrical power.

One might imagine an alternative socio-technical system involving household generation of electrical power without connection to the grid. In this system there are very different relations between people (e.g. there are not separate groups of people engaged in the supply of electrical power). This alternative system would also create different relations between people and technology (e.g. it is likely that one would have to more carefully plan for how much electrical energy one uses and when it is used) and this alternative system is likely to be associated with different social, cultural or political models.

In some countries supply is intermittent rather than continuous and, of course, there are significant differences in the prices for use of electricity in different countries. The poor in a number of countries may have to pay in advance for access.

TECHNO-ECONOMIC PARADIGM

A set of best practices for the employment of technological revolutions

TECHNOLOGICAL REVOLUTION

Systems of systems; sets of interrelated, radical breakthroughs, forming a major constellation of interdependent technologies

TRANSFORMATIVE

In our context, there are two important meanings for this adjective as applied to innovation: 1) a break or distinction from past practices or routines which opens new possibilities for further innovation across a broad front or over a wide variety of contexts (i.e. this definition is a qualitative statement of the potential or an achievement being large as compared to other innovations) and 2) further to 1), a process that establishes a new directionality.

TRANSITION

In its simplest form, the change from one socio-technical system to another (which thus also implies a change of regime, e.g. rules). The term is usually built on the premise that current socio-technical systems are not socially or environmentally sustainable and there is a social and/or economic need for a specific type of transition, one whose directionality is more compatible with social or environmental sustainability.

EXPLORE FURTHER

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FURTHER READING

Framing Innovation Policy for Transformative Change:
Innovation Policy 3.0

JOHAN SCHOT, W. EDWARD STEINMUELLER (2016)

Deep Transitions: Emergence, Acceleration,
Stabilization & Directionality

JOHAN SCHOT, LAUR KANGER (2016)

Enacting Transformative Innovation Policy:
A Comparative Study

CHATAWAY, DANIELS, KANGER, RAMIREZ, SCHOT, STEINMUELLER (2017)

All can be found at **www.johanschot.com/publications**