



# Giving direction to innovation policy: a transformative innovation policy approach

Rebecca Hanlin, Glenda Kruss, Il-haam Petersen and Erika Kraemer-Mbula



## Key messages

1. Innovation is a catalyst for economic and social change if innovation efforts are directed to enable transformation.
2. Enabling transformative innovation requires directed planning. National and municipal development plans are insufficient if not supported by real engagement with the surrounding political economy.
3. One way to do this is to utilise the transformative innovation policy (TIP) approach which starts by thinking about 'socio-technical systems' or how people, technology and institutions interact. It then considers the system-level change required to ensure an innovation policy or project is successfully executed to transform the lives of people or the planet.
4. The first step is to train staff in TIP and the second is to engage in TIP experimentation. These provide the basis for longer-term engagements within government to ensure innovation is transformative and long lasting.

# Introduction

Innovation – introducing new technologies, products, processes and ways of working into new environments – is not only aimed at enterprises and economic growth. It can transform economies, reduce inequalities, move people out of poverty and address environmental challenges. At the global level, innovation is harnessed to achieve the UN's Sustainable Development Goals, and governments across the world now routinely plan for transformation through national and local development plans.

In South Africa, most government strategic and work plans routinely include a section on how activities contribute to meeting the goals of the National Development Plan (NDP), through alignment with Medium Term Strategic Frameworks and the SDGs. For example, the national Department of Science and Innovation's 2020-2025 Strategic Plan focusses on six outcomes geared to: *"Enabling South Africa's sustainable and inclusive development in the face of rapid technological change and innovation"*. It sets out how its science, technology and innovation activities and interventions will tackle issues facing the country, including inequality, poverty and unemployment. A provincial example is the Gauteng Department of Economic Development, mandated to facilitate, promote and develop economic growth in the Gauteng City Region. Its vision is "a radically transformed, modernised and re-industrialised economy, manifesting decent work, economic inclusion and equity in the region". It reports regularly against a set of quarterly and annual performance indicators aligned with the NDP.

The challenge is that a government policy actor is expected to implement an innovation strategy that sets out policy intents and desired changes, but not the pathways to achieve these changes. Successful innovation requires government, policy and civil society actors to plan and direct activity, to ensure that the changes they wish to see do indeed take place.

The push now is for policy actors to identify and actively plan *how* their activities and interventions will lead to a series of outputs, or immediate results. And, how these will help achieve the desired outcomes, in the form of medium to long-term changes in practice. Such strategic planning, using a theory of change and embodied in detailed work plans, will set the conditions for the realisation of development strategies, plans and goals.

There are different models and approaches to design a theory of change, and this is the subject of the second policy brief in this series. In South Africa, the Department of Performance, Monitoring and Evaluation supports all government agencies to use a logical framework model to develop a theory of change that can be incorporated into regular strategic planning processes and reviews.

This policy brief introduces one way to augment and strengthen the existing interventions. It introduces the perspective of transformative innovation policy, as a valuable model and set of tools to review planned policy activities, and their direction.

# A new way of working: transformative innovation policy

Science, technology and innovation policy has changed over the past decades. Traditional models for designing interventions were based on a linear science-push approach, that focused heavily on promoting research and innovation for economic growth. Now, it is widely accepted that innovation policy design and implementation must start from a commitment to address the grand developmental challenges faced by society. If innovation policy is to be transformative, attention shifts to the directionality and impact of programmes, interventions and mechanisms. New models should recognise the complexity of policy actors and systemic influences, and the need to think more systematically about how to achieve desired outcomes.<sup>1</sup>

The transformative innovation policy approach focuses on ensuring that policy activities and interventions to promote and facilitate innovation can be transformative. That is, innovation can lead to long-lasting and positive societal change, such as reduced greenhouse gas emissions, clean air and sustainable resource use, or enhanced human sustainability through the creation of jobs and skills development.

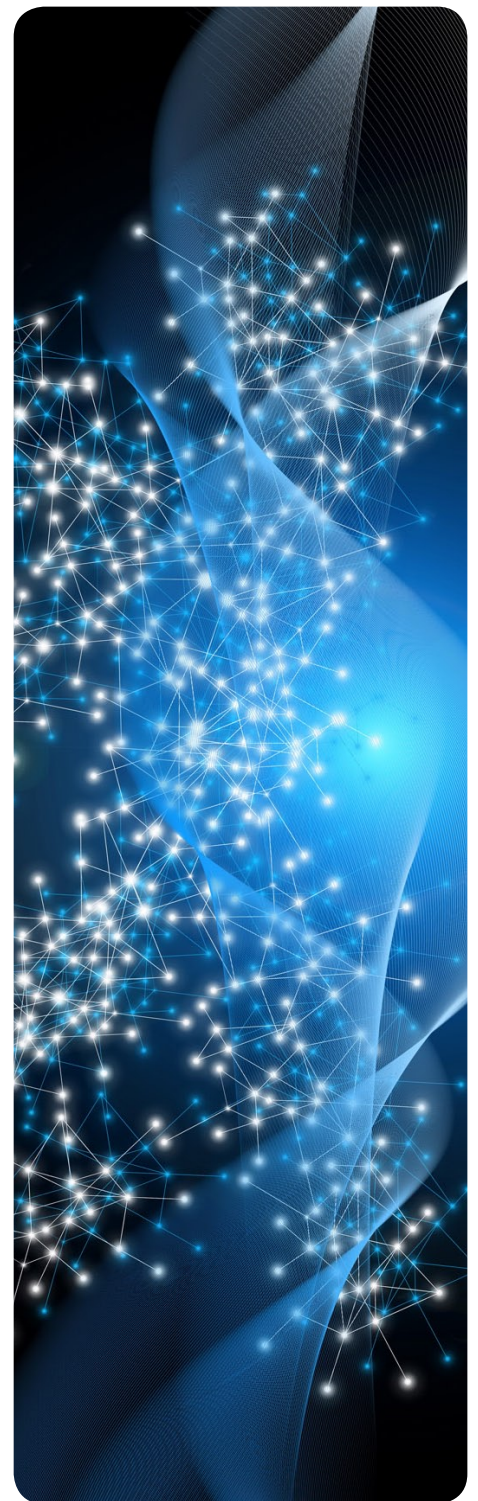
Essentially, the TIP approach provides tools to help an organisation embed a new, changed mindset across their team. It asks actors involved in innovation policy to:

- think about the world as a *socio-technical system*
- consider change as something that takes time, and requires dedicated action through the development of a *transformative theory of change*
- define *transformative outcomes* that can lead to the desired change
- conduct *engaged policy experiments* to build niches of new practice

In the sections that follow we explain how innovation policy designers and implementers can use these ideas as critical tools to improve their practice.

## Socio-technical systems and transitions

New technologies such as solar energy, ChatGPT, or green hydrogen are introduced all the time – but how do some technologies come to be adopted and widely used, while others never really take off? The idea of a ‘socio-technical system’ can explain this. It is based on the premise that technology and society interact; how this interaction takes place determines the successful uptake, diffusion and use of a particular technology. Often, the system of actors and institutions are so used to particular technological solutions that it is difficult for a new solution to break through. Take the shift from the technology of fossil fuels to that of electric cars. The design of engines needs to change, fuelling stations may go out of business, there are new business opportunities in charging facilities, drivers need to learn how to manage their cars in different ways and so on. Or, environmentalists may actively resist the replacement of fossil fuel powered cars with electric technology, in favour of even cleaner technologies.



<sup>1</sup> Schot, J., and Steinmueller, W.E. 2018. Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy* 47(9): 1554-1567.

In the current transport socio-technical system, regulations, training specifications and user expectations, are all focused on what exists already.<sup>2</sup> The result is a 'regime' or set of rules that regulates actors within the system and how they interact with a new or existing technology. The technological regimes that predominate – such as fossil fuel powered transport – determines what kinds of innovation can happen.

These 'dominant technological regimes' are impacted by a broader 'landscape' of factors such as climate change, gender, dominant political or cultural values, global regulatory systems, or pricing arrangements. These influence the shape and direction of a regime, but change usually occurs in a very slow manner. The dominant regimes often allow only incremental innovations, such as greener oil-based fuels. Radical new breakthroughs, such as the shift to electric transport systems, are difficult to achieve, because the socio-technical system is not ready or accepting of them. Analysing regimes leads to a better understanding of the power relations and dynamics impacting innovation systems, which are typically hidden and can inform the design of a transformative theory of change.

In contrast, it is possible to influence a regime, or the ways things operate, to enable new innovative activity, or drive change to use new technologies. This is done through processes of deliberate 'niche-building'. This means that a protected space is created, where a new innovative process is tested and experimented with, and policy levers to unblock transformation can be identified. Electric cars were introduced in this way, to build more widespread openness to use this new technology. By strategically managing such a niche, innovators create an opportunity to highlight the benefits of the innovation. If more actors articulate and support the innovation, it grows in legitimacy and more widespread use. The challenge then is to scan the landscape and regime to identify opportunities to enable the niche to grow, and drive change across the socio-technical system – a transition to electric car use, in our example.<sup>3</sup>

A policy actor who wishes to drive change to new green technologies for sanitation, housing or water can build on these ideas. For example, a new low-cost green sanitation technology may be designed by science councils or universities and funded by a government agency. The policy actors responsible may assume their task is over once they funded the R&D and have a technology output. But the desired outcomes of improving service delivery and peoples' lives may not be achieved – because the potential users and beneficiaries prefer the dominant sanitation technology, for example, or the municipal building regulations cannot accommodate the new technology.

This could be avoided if the policy actor had considered critical factors in the dominant regime that block change, and critically identifying what it takes to facilitate change.



**2** Geels, F.W. 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy* 31(8-9): 1257-1274.

**3** Schot, J., and Geels, F.W. 2008. Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technology Analysis & Strategic Management* 20(5): 537-554.

# Transformative processes through policy experimentation

Building on these ideas, the TIP approach proposes the use of 'engaged policy experiments'. These are essentially trials of new approaches to policy to support the development of an innovation niche. Policy experimentation is a multi-stakeholder process, as researchers and policy actors bring a range of skills and experiences, to enable agility and complex thinking.

Policy experiments are based on the definition of specific transformative outcomes, designed to actively take into account the regime and landscape changes needed for transitions. Testing innovation policy activities in niches means actively specifying ways to address blockages and drive change in cultural values, regulatory or cost factors that are not typically considered, or that may require coordination with other government departments. Implementation plans can be designed to ensure that change occurs in multiple dimensions, for a better chance of success.

By surfacing tensions, policy experiments can enable an alternative and stronger foundation for policy action oriented to ensure uptake of new technology and purposively drive large-scale transitions in socio-technical systems to achieve transformation.

## A transformative policy experiment in South Africa

The case of the 'Living Catchments' project illustrates how innovation policy experiments can work. Water is a scarce resource that requires careful management, but typically, there is little coordination between those responsible for managing water use at the local level, and those responsible for ensuring the protection of the ecological infrastructure of rivers. This misalignment gave impetus to the DSI to fund a project that aimed to:

...enhance research, innovation and impact through the establishment of better-resourced communities of practice involved with managing the physical *and* ecological infrastructure within four South African rivers" (TIPC, 2021: 5).

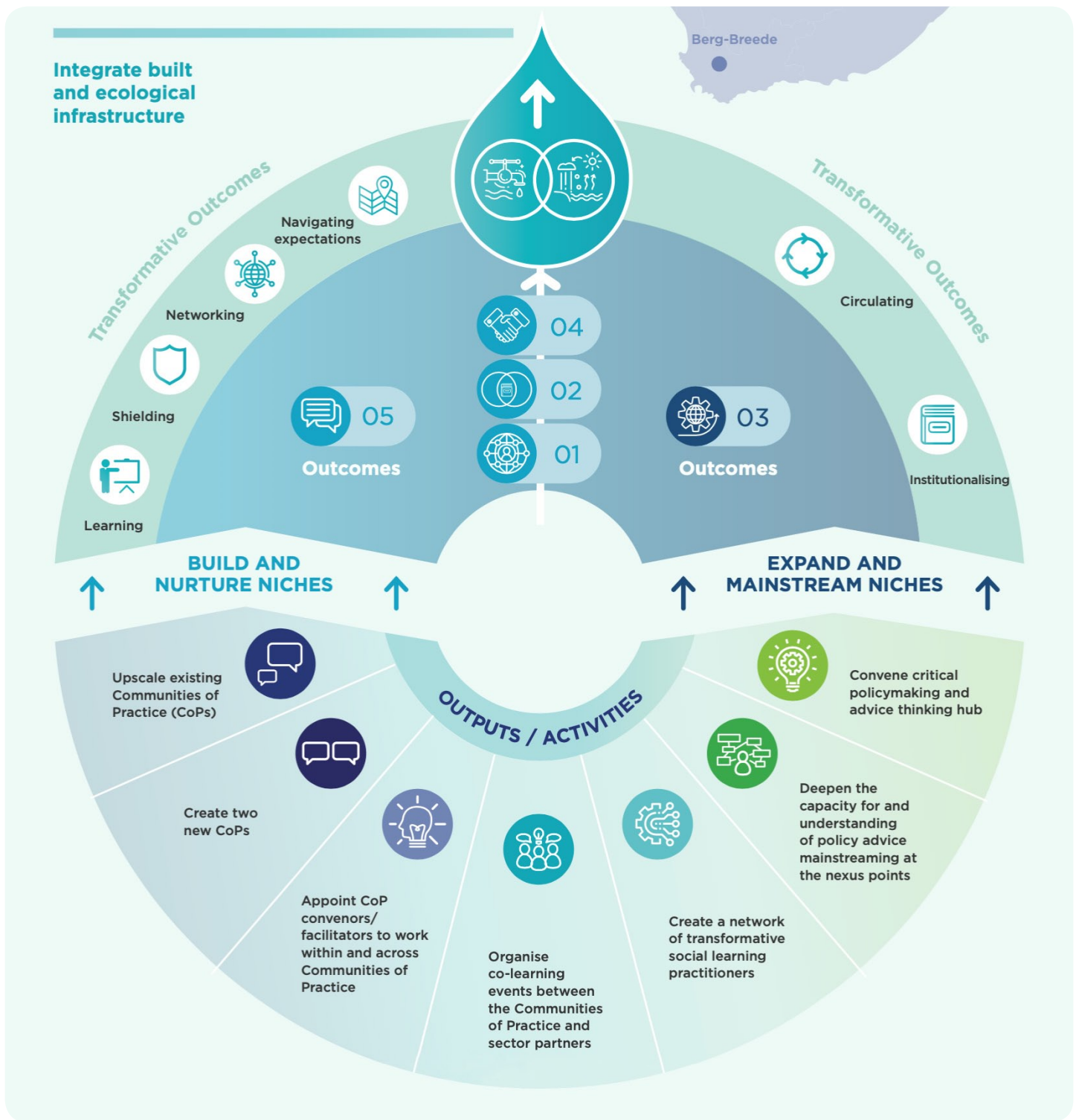
The project was implemented by the South African National Biodiversity Institute (SANBI), with expertise in environmental protection and management, and the South African Water Research Commission (WRC).

The project leads were encouraged to adopt a transformative innovation policy approach, to build a niche to demonstrate innovative water management practices, through policy experimentation. Team members from SANBI and the WRC worked with researchers from the Transformative Innovation Policy Consortium (TIPC) in a series of co-creation sessions, over an extended period. The aim was to use a transformative innovation policy lens to systematically and strategically plan how the project's ambitions could be achieved. It took some time for the Living Catchments team to learn the TIP model, become familiar with the tools and think differently about their own work. Second order learning in these settings serve to embed new ways of implementing policy.

One of the project outcomes was defined as *policy advice and mainstreaming (operating at the nexus of water and ecosystems), articulating and working in a way that is responsive to current needs, co-owned by key stakeholders and implementable*. Transformative outcomes were identified and elaborated to build and nurture the niche ([Figure 1](#)). For example, for learning transformative outcomes, the team proposed to orient activities towards these changes:

- Policy makers working at the nexus of water and ecosystems engage on how to better provide policy advice and deepen mainstreaming.
- Skills and capacity for policy advice and mainstreaming increased.
- Policy advisors have a better understanding of how to integrate existing insights and public policy developments into the work of policy advice and mainstreaming.

These transformative outcomes provide the foundation to design a monitoring and evaluation framework to assess progress. Within this framework, the team systematically used co-learning and co-creation to implement their planned policy intervention more effectively. By bringing together the efforts of different water and environmental networks, they are better able to bring about policy alignment and the desired practices in fragile ecosystems.



**Figure 1** Living Catchments project theory of change

Source: TIPC

## Recommendations for using a transformative innovation policy approach

The TIP model can catalyse alternative modes of innovation policy design and implementation. How can government departments and policy design and implementation teams use the model to change mindsets?

First, it is important to be trained in the TIP concepts and tools, to shift the linear policy assumptions that tend to predominate. This is a necessary but insufficient step, as the complexities of real-life policy tasks do not fit neatly into models and frameworks. The new skills and tools acquired can be deepened and expectations redesigned, through the process of engaged policy experimentation.

Second, once a critical body of TIP expertise has been built up across a policy programme or team, the tools can be used to deepen planning in priority or strategic projects. Initially, this may take the form of one or more niche-building policy experiments, conducted in partnership with researchers, for co-learning. The balance between theory and practice is vital to surface ways of structuring change and impact.

TIP models can also be used at a higher level across a programme, to interrogate theories of change, and identify values, culture or regulations that may need to be addressed to shift regimes. Ultimately, the goal is to elaborate detailed and explicit transformative outcomes that embody the desired policy objectives and include these in annual performance plans. Programme monitoring and evaluation can then be extended to include the assessment of outcomes in practice, in addition to counting outputs to meet targets.

Third, researchers, policy actors and practitioners must understand their roles very differently, and work in new ways when using TIP tools critically in their own settings. Policy experiments require time and resources for co-creation. These are not typically funded or accommodated in current work models, which need to make allowance for transformative policy processes.

Finally, the emerging TIP South Africa community of practice is an important support for the kinds of mindset change required. No one disagrees with the STI goals to drive transformative, sustainable and inclusive change in South Africa. Nevertheless, there is little space to change policy and governance processes themselves, in ways that may have a greater chance of success. A community of practice, of like-minded individuals and organisations connected in co-learning networks, using similar policy models and tools, is a powerful lever to imagine and enact alternative solutions.



## About TIP-SA

Over the past four years South Africa has participated actively in the **Transformative Innovation Policy Consortium (TIPC)**, which brings together policymakers, academics and practitioners to experiment with new approaches to policy design, implementation and evaluation.

Efforts to promote transformative innovation policy in South Africa have been managed on a day-to-day basis by the South African Transformative Innovation Policy (TIP-SA) working group – with members from the HSRC's Centre for Science, Technology and Innovation Indicators (CeSTII), the DST/NRF/Newton Fund Trilateral Chair in Transformative Innovation, the 4IR and Sustainable Development at the University of Johannesburg and the Department of Science and Innovation. The working group is developing ways to address priorities facing South Africa such as promoting sustainable and inclusive human settlements, shifting to a hydrogen and sustainable-energy economy, adopting sustainable and inclusive sanitation technologies, and enabling a transformed and innovative public sector.

To use the tools of transformative innovation policy, our websites provide the resources you need:

Transformative Innovation Policy South Africa (TIP-SA):  
<https://tinyurl.com/2r64bwxz>

Transformative Innovation Policy Consortium (TIPC):  
<https://www.tipconsortium.net/>

If you are currently engaged in a transformative initiative or interested in learning about TIP, please join our community of practice by emailing [tipsouthafrica@uj.ac.za](mailto:tipsouthafrica@uj.ac.za).