

Institution: University of Sussex		
Unit of Assessment: 17 – Business and Management Studies		
Title of case study: Informing United Nations guidance to countries on sustainable development: new innovation approaches for achieving the SDGs		
Period when the underpinning research was undertaken: 2008 – 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Adrian Ely	Reader in Technology and Sustainability	2002 – present
Johan Schot	Professor in History of Technology and Sustainability Transitions	2014 – 2018
Andy Stirling	Professor of Science & Technology Policy	1993 – present
Adrian Smith	Professor of Technology and Society	1997 – present
Ed Steinmueller	Professor of Information & Communication Technology Policy	1997 – present
Erik Millstone	Professor of Science Policy	1987 – 2017 (now Emeritus)
Chux Daniels	Research Fellow in Science, Technology and Innovation Policy	2011 – present
Period when the claimed impact occurred: 2017 – 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact <p>Research insights from Dr Adrian Ely and colleagues have been adopted by the United Nations, shaping the way that governments worldwide use science, technology and innovation to reduce poverty and achieve the United Nations' Sustainable Development Goals. Through a specially commissioned report, consultancy and partnership work, the researchers have influenced the sustainable development approach of the UN Conference on Trade and Development (UNCTAD), as well as the UN's recommendations to its 193 Member States. Dr Ely also used his research insights to develop a new framework for UNCTAD's science, technology and innovation policy (STIP) reviews of developing countries. The new framework, which has so far been applied in STIP reviews in Ethiopia and Zambia, is resulting in policy changes that will have significant long-term impacts on poverty alleviation, environmental sustainability and economic development.</p>		
2. Underpinning research <p>In 2015, the United Nations launched its 17 Sustainable Development Goals (SDGs) in a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These goals require unprecedented levels of partnership between governments, private sector, civil society and citizens. Research by Dr Adrian Ely and colleagues, as part of the Sussex-based ESRC Social, Technological and Environmental Pathways to Sustainability (STEPS) Centre, the Transformative Innovation Policy consortium (TIPC) and other initiatives, has clarified the role of science, technology and innovation (STI) policy in the SDG agenda.</p> <p>Between 2008 and 2010, Dr Ely convened an award-winning international project – 'Innovation, Sustainability and Development: A New Manifesto' [G1] – which engaged international, regional and national stakeholders in collaborative research, policy roundtables and a seminar series,</p>		

and resulted in publications including [R1] and [R2], the latter of which was published just before the Rio+20 Conference in 2012, from which the SDGs emerged. The project brought together insights from the STEPS Centre's research into the role of STI in addressing sustainability challenges across food, energy, water and health.

A key conceptual contribution of the Manifesto project research was its attention to the *directionality* of innovation. This involves a shift in emphasis from the quantitative rate of innovation to its qualitative contributions to sustainable development. The research drew on multiple case studies to highlight how the directionality of innovation – the qualitative characteristics of particular trajectories of innovation, including their drivers (for example, economic or regulatory incentives) – is a key factor in determining societal outcomes (for example, positive or negative impacts on the environment) [R1, R2]. Applying the concept of directionality to the SDGs includes, for example, prioritising innovations that contribute to enhanced energy or water efficiency (illustrated by SDG indicators 7.3.1 and 6.4.1 respectively).

The research also brought new insights about *grassroots innovation* – that is, innovation conducted by the informal sector, NGOs, communities and other actors outside the conventional 'innovation system' and which conventional research and policy struggle to understand [R3]. The researchers studied six diverse grassroots innovation movements in India, South America and Europe, analysing how and why each movement frames innovation and development differently. The innovations studied included: community water projects in Brazil; maker spaces in the UK; and the Indian Honeybee Network, which collects and shares information about rural inventions that respond to the needs of poor people. These grassroots innovations differ from high-tech approaches in terms of actors, values, mechanisms and knowledge dimensions. This is important in the context of sustainable development, and raises new dilemmas for science and technology policymakers, who usually focus on policy instruments that target the formal research system and the private sector but overlook grassroots movements. This comparative work, conducted in collaboration with colleagues across the STEPS Centre's international consortium, provided context-specific responses to these dilemmas.

In the aftermath of the Rio+20 Conference, Dr Ely published a paper with STEPS colleagues [R4], which highlighted the importance of *hybrid innovations* that combine both high-tech and grassroots approaches, and of combining government/private sector initiatives with local innovative solutions. Applying the concept of directionality to these hybrid innovations provides policymakers with a means to navigate this challenging new domain. The Pathways transformative knowledge network (associated with the STEPS Centre), which Ely co-leads, has undertaken research in India, Argentina, China, Kenya and the UK, exploring approaches that can combine different forms of innovation from within and outside the conventional 'innovation system'.

Other research by colleagues Schot and Steinmueller [R5] and Daniels et al [R6] has taken forward the notion of directionality, applying it to transformative innovation policy – a distinct approach that the authors argue is necessary for addressing the SDGs.

3. References to the research

- R1** Ely, A, Leach, M, Scoones, I and Stirling, A.C (2010) 'A New Manifesto for Innovation, Sustainability and Development – Response to Rhodes and Sulston', *The European Journal of Development Research*, 22(4), pp. 586-588. <https://doi.org/10.1057/ejdr.2010.35>
- R2** Leach, M, Rockström, J, Raskin, P, Scoones, I, Stirling, A C, Smith, A, Thompson, J, Millstone, E, Ely, A, Arond, E, Folke, C and Olsson, P (2012) 'Transforming Innovation for Sustainability', *Ecology and Society*, 17(2): 11. <http://dx.doi.org/10.5751/ES-04933-170211>
- R3** Smith, A, Fressoli, M, Abrol, D, Arond, E and Ely, A (2016) *Grassroots innovation movements*, Abingdon: Routledge. Available on request.
- R4** Ely, A V, Smith, A G, Leach, M, Stirling, A C and Scoones, I (2013) 'Innovation politics post-Rio+20: hybrid pathways to sustainability?', *Environment and Planning C: Politics and Space*, 31(6), pp. 1063-1081. <https://doi.org/10.1068/c12285j>

R5 Schot, J and Steinmueller, W E (2018) 'Three frames for innovation policy: R&D, systems of innovation and transformative change', *Research Policy*, 47(9), pp. 1554-1567.
<https://doi.org/10.1016/j.respol.2018.08.011>

R6 Daniels, C, Schot, J, Chataway, J, Ramirez, M, Steinmueller, E and Kanger, L. (2020) 'Transformative innovation policy: insights from Colombia, Finland, Norway, South Africa, and Sweden'. In: Cele, Mlungisi B G, Luescher, Thierry M and Fadji, Angela Wilson (eds.) *Innovation policy at the intersection: global debates and local experiences*, Africa: HSRC Press. <http://sro.sussex.ac.uk/id/eprint/92373/> Available on request.

Key grants / funding include:

G1 ESRC via the £9m [STEPS](#) (Social, Technological and Environmental Pathways to Sustainability) Centre, [2006-11](#), [2011-17](#), [2018-21](#). Funded 'Innovation, Sustainability and Development: A New Manifesto' project (winner of EASST Ziman award 2012 for "the most innovative cooperation in a venture to promote the public understanding of the social dimensions of science").

4. Details of the impact

4.1 Influencing UN thinking and recommendations on sustainable development

Dr Ely formally participated in the 2012 United Nations Conference on Sustainable Development – known as Rio+20 – by leading the STEPS Centre's contribution to the 'zero draft' outcome document (which itself framed the process through which the SDGs were adopted in 2015).

Following the 2013 publication of **[R4]**, Ely was approached by UNCTAD – which provides the Secretariat for the UN Commission on Science and Technology for Development (CSTD) – to be the academic lead on a report entitled 'New innovation approaches to support the implementation of the SDGs' **[S1]**. The report, which Ely presented to the Commission in January 2017, presents five new approaches to innovation – mission-oriented; pro-poor and inclusive; grassroots; social; and digitally-enabled open and collaborative – and highlights how they can contribute to the SDGs, proposing concrete policy considerations. It draws heavily on the research **[R4, R3]**, including the concepts of *directionality*, *grassroots* and *hybrid innovation*.

This report has been extensively drawn upon in numerous follow-up reports from the session, including a report from the Secretary-General **[S2]** published in February 2017. Prepared in response to the UN Economic and Social Council's request to "raise awareness among policymakers of the process of innovation and to identify particular opportunities for developing countries to benefit from innovation, with special attention placed on new trends in innovation that can offer novel possibilities for developing countries", this report cites and incorporates key concepts, terminology and definitions from Ely's research **[R3, R4]** and his related report on new innovation approaches **[S1]**. The summary explains that the report "examines new approaches to innovation, including... mission-oriented; pro-poor and inclusive; *grass roots*; social; and digitally enabled open and collaborative" and "emphasizes the need for greater attention to be paid to the role of grass-roots and marginalized communities in the innovation process." Echoing **[R4]**, it highlights the importance of *hybrid innovations*, stating that "many of the most marked impacts will come from hybrids of new approaches and more conventional approaches... Hybridization can occur when initiatives created at the grass-roots level... subsequently receive support from more conventional science and technology institutions. Attention to hybrid innovation approaches involves widening the policy focus of innovation systems, both in terms of the actors involved and their means of interaction and collaboration" **[S2, p12]**.

The UN CSTD intersessional panel meeting in May 2017 acted on **[S2]** to deliver several recommendations, advising how these new innovation approaches can best be implemented. These include:

- a) [to Member States] "Adopt policy mixes across various government actors that enable *hybrid* forms of traditional, pro-poor, *grass-roots* and social innovation, while prioritizing innovation that is both socially inclusive and environmentally sustainable"
- b) [to the UN CSTD]: "Advise the international community of the importance of new innovation approaches that provide socially inclusive and environmentally sustainable"

solutions to achieving the Goals” and “encourage new innovation approaches and enhance *hybrid approaches* to innovation”. [S3]

4.2 Developing the framework for UNCTAD’s science, technology and innovation reviews

Following the above reports, UNCTAD commissioned Ely to produce a new framework for its science, technology and innovation policy (STIP) review programme – the formal process through which UNCTAD provides tailored technical advice to developing countries, helping them to establish strategic priorities for development. Ely completed this work in August 2018, drawing on an expert meeting that he and Professor Schot helped UNCTAD to convene, as well as subsequent consultations and discussions.

The final framework [S4] incorporates the most important concepts from the research: directionality, grassroots and hybrid approaches [R4], describing policies for grassroots innovation [R3], and applying the notion of transformative innovation policy, drawing directly from R5. Shamika Sirimanne, Director of UNCTAD’s Division on Technology and Logistics and Head of the UN CSTD Secretariat, explains the scale of the Sussex team’s influence:

“Dr Adrian Ely led the research that has underpinned the new thinking in the framework, including an extended focus on *grassroots* innovation, attention to *directionality* in STI and development, and participatory approaches to technology policy formulation and implementation. The framework also drew upon inputs from Prof Johan Schot.” [S10]

On publication of the framework by the UN, Ely presented it at the UN Commission on Science and Technology for Development in May 2019. The framework was well-received, and the UN CSTD submitted a recommendation to the UN Economic and Social Council that the framework should be adopted. Subsequently, in July 2019, the UN Economic and Social Council agreed a resolution which encouraged UNCTAD to “implement as widely as possible its new framework for national science, technology and innovation policy reviews in order to integrate the Sustainable Development Goals.” [S5]

4.3 Applying the framework in national STIP reviews

UNCTAD has so far undertaken STIP reviews based on the new framework in Ethiopia and Zambia, and is currently planning reviews in Botswana and the Dominican Republic. The report of the Ethiopia review [S6] states that it was “based on the Framework for Science, Technology and Innovation Policy Reviews” [S5]. Michael Lim, UNCTAD’s co-lead for Ethiopia’s STIP Review, describes how the Sussex research has directly influenced policy changes:

“On the basis of the STIP Review, the Ethiopian government has decided to revise the national STI policy. The research underpinning the STIP Review played a significant role in enabling support to the government of Ethiopia that will lead to policy action that affects patterns of innovation and the adoption of technologies and ultimately contribute to more sustainable development.” [S7]

Drawing on his experiences of applying the above concepts in other countries [R6], Dr Chux Daniels took part in the Zambia STIP Review in 2019/2020 as a core member of the team, working alongside UNCTAD and colleagues from the Zambian government [S9]. Using the new framework described above, the team met with government ministers in charge of STI, as well as investigating grassroots innovation, with the aim of meeting specific challenges relating to food systems, digitalisation and mining. [text removed for publication] at UNCTAD, described the novelty of the review’s approach, which drew upon Ely’s earlier research on grassroots innovation:

“The STIP Review is based on UNCTAD’s 2019 Framework... produced by UNCTAD with the support of Adrian Ely and Johan Schot... The [review] team investigated grassroots innovation as well as innovation in firms, for the first time including a broader range of actors into the innovation system.” [S8]

As a result of the Review, the Zambian government has begun to address its pressing development challenges in a sustainable manner, with a focus on the SDGs. [text removed for publication] explained the influence of the review on Zambian politics and society as follows:

“Both the process and findings of the STIP Review have contributed to the policy debates across government about the rightful place of STI in development policy. The enhanced awareness about real-world innovation activities... acquired through participating in the STIP Review process, has better equipped them [government staff] to improve the design and implementation of Zambia’s innovation policies, and also contribute in the country’s response to Covid-19 and policy learning... In particular, decisions are contributing to improved and greater employment opportunities generated from an increasingly innovative and diversified economy and export sector, reduced poverty and eradicated hunger, increased health and well-being, as well as reduced negative externalities of the mining sector and overall improvement in sustainable practices by firms and industries.” [S8]

Chongo John Lukonde of the Zambian Ministry of Higher Education, which is responsible for STI, explains how the review “adopted a transformative innovation lens” and influenced the way in which SDG issues such as hunger and carbon emissions are being brought into the country’s National Development Plan and Zambia’s Vision 2030 [S9]. Furthermore, he writes:

“Without the process underpinning the STIP Review, the country would have continued to follow policies that... contributed to unsustainable patterns of development that might cause the country to lag behind in the fourth revolution (4IR) technologies. The true beneficiaries of this work are Zambia’s 17 million citizens. The impact is already being felt and can be expected to improve the lives of Zambians for generations to come.” [S9]

Shamika Sirimanne, Director of UNCTAD’s Division of Technology and Logistics and Head of the Secretariat of the UN CSTD, confirms the significance of the STIP Review process:

“The reformulation of the science, technology and innovation policies in each of these countries will have significant long-term impacts on poverty alleviation, environmental sustainability and economic development – impact that links directly to the research conducted by Dr Adrian Ely at the University of Sussex.” [S10]

5. Sources to corroborate the impact

- S1** UNCTAD, New Innovation Approaches to Support the Implementation of the SDGs, 27 Feb 2017 https://unctad.org/en/PublicationsLibrary/dtlstict2017d4_en.pdf
- S2** United Nations Economic and Social Council (2017). Report of the Secretary-General on new innovation approaches to support the implementation of the SDGs http://unctad.org/meetings/en/SessionalDocuments/ecn162017d2_en.pdf
- S3** United Nations Commission on Science and Technology for Development (2017), report of the intersessional panel meeting http://unctad.org/meetings/en/SessionalDocuments/ecn162017crp1_en.pdf
- S4** UNCTAD (2019) Harnessing Innovation for Sustainable Development: A Framework for Science, Technology and Innovation Policy Reviews https://unctad.org/system/files/official-document/dtlstict2019d4_en.pdf
- S5** Resolution of the UN Economic and Social Council, adopted on 23 July 2019
- S6** UNCTAD (2020) STIP Review, Ethiopia https://unctad.org/system/files/official-document/dtlstict2020d3_en.pdf
- S7** Statement from Michael Lim, UNCTAD, co-lead of the Ethiopia STIP Review
- S8** Statement from [text removed for publication] at UNCTAD
- S9** Statement from Chongo John Lukonde, Assistant Director Science and Technology, Department of Science and Technology, Zambian Ministry of Higher Education
- S10** Statement from Shamika Sirimanne, Director of UNCTAD’s Division on Technology and Logistics and Head of the UN CSTD Secretariat.