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ADDRESSING THE SUSTAINABLE DEVELOPMENT GOALS THROUGH TRANSFORMATIVE INNOVATION POLICY

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SUMMARY

The 17 Sustainable Development Goals (SDGs) set out in the United Nations 2030 Agenda and broken down into 169 associated targets and 232 indicators (United Nations, 2016) summarise the major challenges for our world. Their implementation requires important contributions from Science, Technology and Innovation (STI) policy as recognized by the UN which explicitly includes STI in SDG 9 and identifies it as a key implementation mechanism for all SDGs (United Nations, n.d.).

However, it is clear that addressing the SDGs is also a challenge for STI policy, since business as usual will not be sufficient. Within the Transformative Innovation Policy Consortium (TIPC) members have embraced this challenge, working together transnationally to provide a new transformative foundation for STI policy. They recognize that it requires openness and willingness to

explore new transformative principles and ideas¹. This briefing, inspired by discussions within TIPC and from participation in an UNCTAD expert workshop, builds on a scientific paper by Schot and Steinmueller, and on the work of other academics (see note 2), to propose a way of viewing the implementation of the SDGs from a Transformative Innovation Policy (TIP) perspective, which is simultaneously different and complementary to the ongoing process of mainstreaming SDGs into current policies. TIP offers an integrated and systems approach which targets the underlying connections and trade-offs among the SDGs. Rather than treating the SDGs as individual targets or seeing them as missions, it focuses on transformation processes that format specific outcomes as defined by the entire collection of SDGs. A Transformative Innovation Policy approach offers potentially game-changing opportunities in the definition of a national implementation strategy for Agenda 2030.

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The Transformative Innovation Policy Consortium (TIPC) is a group of policy makers and funding agencies working together to give substance to this new framing for STI policy to address global societal challenges, as encapsulated in the SDGs.

Co-ordinated by the Science Policy Research Unit (SPRU) at the University of Sussex in the UK, TIPC Members are: South Africa – The South African National Research Foundation – NRF; - Swedish Governmental Agency for Innovation Systems – VINNOVA; Colombian Administrative Department of Science, Technology & Innovation – Colciencias; Finland – Business Finland; Mexico – National Council of Science and Technology of Mexico – CONACYT. There are associate projects with: Panama - National Council of Science and Technology of Panama – SENACYT; China - Chinese Academy of Science and Technology for Development – CASTED; Norway – The Research Council of Norway; Brazil – Ministry of Science, Technology, Innovation and Communications – MCTIC. For more information on member organisations visit www.tipconsortium.net

WHY ADDRESSING THE SUSTAINABLE DEVELOPMENT GOALS NEEDS TRANSFORMATION

The formulation of the 17 SDGs is not only an expression of a desire for a better future, but also a reflection of the need for transformation, as expressed in the subtitle of the Agenda 2030 logo – ‘17 Goals to Transform our World’. For example, the SDGs go beyond the Millennium Development Goal (MDG) objective of halving extreme poverty by demanding a complete solution. The SDGs are not about building islands of new dynamic economic growth areas; they focus on leaving no one behind. This is hugely important and challenging for a world with marked differences in the development of its regions. Fundamental change is needed but, two key questions remain: what is meant by fundamental change or transformation, and how do we achieve it?



“Fundamental transformations in the way the world lives, works, and does business are needed for building the low carbon, climate resilient, green and inclusive economies and societies of the future.”

Former UNDP Director Helen Clark, 2015, *Transforming Societies: People, Planet and Prosperity; the New Global Sustainable Development Agenda* at The Global Transformation Forum



“Transformations must directly tackle the roots of poverty, inequality and environmental destruction instead of the symptoms.”

2016 report on “Policy Innovations for Transformative Change” from the UN Research Institute for Social Development

The implementation of the SDGs into policy and action remains a challenge for all countries. Building on lessons learnt from previous agendas such as the Johannesburg plan, Agenda 21, and the MDGs, a main strategic direction is mainstreaming the SDGs into existing institutional structures, programmes and indicators - a commonly adopted pathway. While this can be a strength, it can also

lead to a focus on technicalities and silo thinking, inducing unjustified simplification and abstraction, diverting attention away from important overall objectives, and in particular, of transformation³. Such an approach may treat the SDGs as individual targets, instead of working on the many important systematic linkages between them. It may focus too much on the end-state at the expense of the process dimension of sustainable development⁴.

In 2016, The International Council for Science and the International Social Science Council noted in their report *Review of Targets for the Sustainable Development Goals* that: “It is clear from system science that goal areas overlap, that many targets might contribute to several goals, and that some goals may conflict. It is possible that the framework might not be internally consistent – and a result not be sustainable (ICSU, ISSC, 2015). They suggested the formulation of an overarching goal, to develop interlinking targets and a compelling narrative of development. The work of TIPC takes as a starting point that this compelling narrative is expressed by the very notion of transformation, which is present in the SDG debate but not well articulated.

STI POLICY IS KEY FOR DELIVERING ON TRANSFORMATION

In TIPC the formulation and implementation of a Transformative Innovation Policy (TIP) is proposed not only as a contribution to the transformation narrative of Agenda 2030 but also as a key success factor for overcoming the implementation failure of ambitious challenge-driven policy ambitions such as Agenda 2030. TIP can play this role because it offers an integrated and systems approach, which targets the underlying connections and trade-offs among the SDGs. It does not treat the SDGs as individual targets to engage with through a checklist exercise. With a focus on technological progress for promoting inclusive and sustainable industrial development. However, it is a central argument of TIPC that science, technology and innovation can be a game-changer for realizing the other 16 goals and, thus, a driver for achieving positive transformations. For example, addressing climate change (no 13), achieving responsible production and consumption (no 12) and working towards affordable and clean energy (no 7) requires radical new science, technology and innovation. This critical role for science, technology and innovation was recognized by the 2017 UN High Political Forum on Sustainable Development

synthesis report on voluntary national reviews, where STI is pictured as a “great enabler for SDG implementation and to help countries to deal with emerging issues” (United Nations High Level Political Forum on Sustainable Development, 2017). For this reason, SDG 17 explicitly includes technology as an important means of implementation and countries are invited to report on this. The TIP approach attempts to articulate the emerging UN vision that STI can serve as a cross-cutting activity contributing to achieving all SDGs. Such a strategy asserts that the role of STI in the SDGs could go much further than SDG 9 and even 17. It opens up the possibility to address Agenda 2030 from a transformative perspective and to achieve the SDGs in an integrated way.

STI POLICY NEEDS TO TRANSFORM ITSELF

If STI can be positioned as one of the key success factors, a relevant question to ask is whether current STI policy is fit for purpose? Can it indeed address all SDGs and be a force for transforming the world? The members of TIPC recognize that STI policy needs to take new steps and are experimenting with these. Over the last decades the interest of policymakers and researchers has mainly focused on STI as drivers for economic growth, innovation and job creation. However, innovation has also become connected to green growth, eco-innovation, social innovation, and inclusive innovation to serve other, non-economic goals although the framing of these initiatives has usually been subordinated to directly stimulating economic growth. TIPC builds on the growing realization that environmental and social goals should no longer serve mainly as static framework conditions for innovation, something they may help to accomplish. Instead environmental and social goals can be seen

as strategic and dynamic drivers of long term growth and competitiveness⁵. Economic growth will result from focusing innovation on social and environmental goals. This will be a qualitatively different type of economic growth, which is captured by the notion of sustainable development, and requires new development paths which go far beyond business as usual and give new types of GDP growth measurements (such as the UN Human Development Index, or OECD Well-Being index). Eventually the UN SDG framework may evolve into a new index⁶.

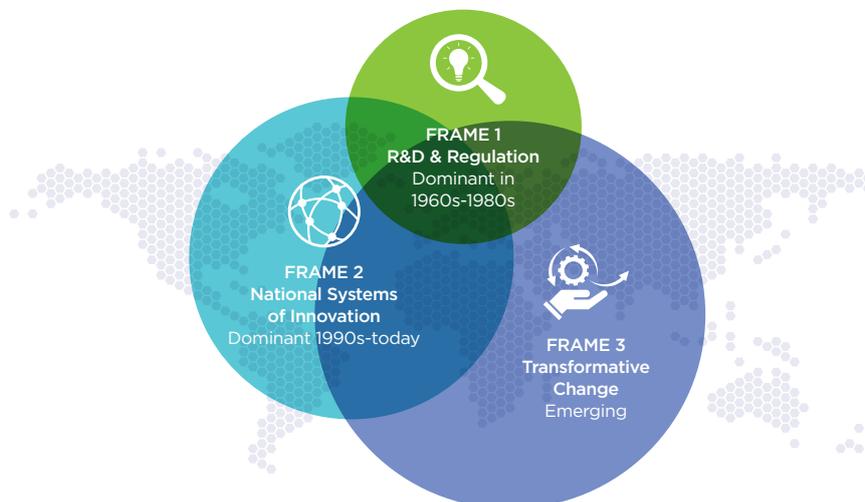
Three main phases and framings of STI policy development are identifiable: 1) R&D, 2) National System of Innovation (NSI) and 3) Transformative Change. This third framing is relatively new and needs articulation, not only in terms of strategy and policy process but also in terms of instruments. Frames 1 and 2 are well established but require more alignment with Frame 3 to ensure all policies work towards transformations and lead to better SDG outcomes.



R&D

In the first framing, which emerged during the 1950s-1980s, STI policy developed to overcome market failure resulting from low R&D investments of firms. The aim was to provide incentives for the market to produce socially and economically desired levels of science knowledge (R&D) or for government investment in public facilities, including universities and research. The assumption is that firms will not themselves invest, since the returns on investment

THE THREE FRAMES OF INNOVATION



are too long term and too risky. Market failure is the justification for governments to step in. Investing in R&D is key to economic success and job creation, helping to generate tax income for funding other social public purposes. STI policy here is mainly science and technology policy and leaves innovation to the market. This type of policy is implemented by providing various R&D incentives (subsidies, tax credits etc.) and, for example, the creation of an IPR regime.



NATIONAL SYSTEMS OF INNOVATION

During the late 1980s STI policies began to evolve. A second STI framing emerged that aims to make better use of knowledge production, support commercialization and bridge the gap between science, technological discovery and application or innovation. This framing makes central various forms of learning, including learning by using, producing and interacting, linkages between various actors, absorptive capacity, (STEM) skills, and firm capability formation, and entrepreneurship. In particular, in developing countries a central focus became building local absorptive capacity to be able to use and build on foreign technology. The rationale for policy intervention is system failure: the inability to make the most out of available knowledge, including R&D but not limited to it, due to missing or malfunctioning links, and to framework conditions between the main actors in the innovation system: between firms, governments, and universities. Innovation policy began to focus on building national, regional and sectoral systems of innovation, stimulating entrepreneurship, and promoting public-private partnerships.



TRANSFORMATIVE CHANGE – AN EMERGING THIRD FRAME

In the first two framings negative social and environmental consequences of innovation are externalities to be managed through regulation. The assumption is that science, technology and innovation are to be encouraged since they are the motor for producing economic growth and competitiveness. A third frame for innovation policy, transformative change, began to emerge during the first decade of the twenty-first century, taking as its starting point that the first two are important for building a knowledge base, technological upgrading and constructing productive capacity but do not address sustainable development. This led to attempts to focus more on environmentally and socially sustainable

innovation, for example clean technologies, pro-poor innovations, inclusive innovations, grassroots innovation and social innovations. STI policy began to broaden its understanding of innovation including civil society and citizens as not only consumers and adopters of innovation but as promoters and sources for innovations which address social and environmental needs. It also started to include new forms of innovation that focused on organizational change, new business models, and new collaborative arrangements between actors, with environmental and social benefits that move beyond public-private partnerships, to include civil society actors into the mix. However, it is clear that these broader understandings of innovation and the inclusion of new forms of innovation are not sufficient.

To create STI policy that responds better to social and environmental needs and becomes transformative both on the national and regional level, STI policy needs to change focus and acquire new characteristics. Following the sustainability transitions literature, we argue that the focus should be on transformations/transitions of socio-technical systems which requires embracing notions such as experimental delivery and learning, directionality, and inclusivity. These notions can be integrated in Frame 1 and Frame 2 policies too. Frame 1 R&D policies could focus more on realizing specific SDGs goals. Frame 2 policies could become more experimental and inclusive. However, this is insufficient if developed in isolation from dedicated Frame 3 type policies. Here the overarching purpose is to enable a transformative change process which address the SDGs. This may simultaneously build up knowledge infrastructure or a system of innovation and enhance entrepreneurship but is not the main goal.

SOCIO-TECHNICAL SYSTEM CHANGE

From an STI policy perspective, the UN Agenda on to 'Transform our World' can thus be interpreted as a call for a new form of innovation. This is what is called system innovation by the OECD, among others (2015)⁷. Such innovations provoke a broader system change not only in the technology used, but also in consumer practices and needs, skills and capabilities of all actors involved, infrastructures, governance, regulation, industry structure and cultural meaning of the system. To emphasize this broad scope, including both social and technological elements, these systems are called socio-technical systems. Each economy has a large number of socio-technical systems in place that fulfil important societal functions in application areas such as energy, food, healthcare, mobility and communication. Transformative Innovation Policy aims to change these socio-technical systems to a more sustainable direction. Transforming these systems implies transforming the economy, social relationships and the relationship between people and their natural environment.

EXAMPLE 1 – SYSTEM INNOVATION, COLOMBIA

TIPC work in Colombia (via Colciencias) included a case-study on the introduction of speciality coffee.⁸ These coffees are valued by consumers for their consistent, verifiable, and sustainable attributes, and for which consumers are willing to pay higher prices which translates into a greater well-being for producers. The speciality characteristics relate to the coffee's origin (origin category), its production in harmony with the environment (sustainable category) and a commitment to social development of communities (social category)⁹. Colombia is currently the world's third leading exporter of coffee, and since 2002 Colombia's speciality coffee production has grown significantly, from 2% of total coffee exports in 2000 to 28% in 2013. The shift has altered producer practices, strategies, norms and routines, led to more vertical control in relationships between producers and other value chain actors for a globally traded agricultural commodity, and more relationships with research and innovation institutions, via funding from a new General

System of Royalties (GRS), implemented at the regional level. For example, the Antioquia department was able to fund experimental research (with a particular emphasis on woman and youth) in building new capacities crucial for speciality coffee. Overall it was not a policy induced process but was a bottom-up change process led by farmer associations. It involved changing farmers' perceptions of themselves, what they produce, how they produce, and their role and possibilities for experimentation. The introduction of speciality coffee led to the empowerment of small producers and new collective relationships between all producers, new skills around tasting, and experimenting for quality and climate adaptability and exporting, and there is growing potential for the establishment of local distribution chains and peri-urban producer-consumer networks, and more research and development in service of rural development, particularly in the context of post-conflict Colombia.

EXAMPLE 2 – MOBILITY IN FINLAND

Work in Finland focused on the application area of mobility. The TIPC Transformative Innovation Learning History (TILH, Kanger, Kivimaa, 2017) case study shows that socio-technical system transformation is very different from just developing new radical technological solutions. For example science, technology and innovation policy can focus on the introduction of electric vehicles and its weak spot: overcoming the limited range through battery development. However, if only the electric vehicle is a substitute for the current car, and the mobility system continues to be car dominated, the low carbon and inclusive economy will remain a distant vision. Industry structures are transformed but SDGs are not met. It would be more effective therefore

to focus innovation policies on supporting the emergence of new mobility systems in which, for example, private car ownership is less important, other mobility modalities such as small taxi vans, public transportation, walking and bicycling are used more in combination with, for example, electric vehicles provided by types of companies dedicated to the provision of mobility services using ICT capabilities. In this new system, mobility planning and thus also reduction of mobility has become an objective of all actors, and even a symbol of modern behaviour. Only then it becomes an example of transformative change since it involves social, behavioural and technological change in an interrelated way.

DIRECTIONALITY AS A STARTING POINT

The transformative change frame takes directionality as a starting point and engages actors with a process of opening up, engaging with all consequences, and setting collective priorities. Such a process involves the creation of visions about the sustainable future of the sector and connecting these visions to specific development trajectories and technical options. In the Colombian example, the change in coffee production entailed a shift from a focus on productivity and homogeneous offer of a single type of coffee to an increasing focus on taste and differentiation through speciality coffees, which requires different production techniques and greater attention to

cultivation and processing practices. The coffee producers, consumers, regulators and policy-makers had to open up to new opportunities. This is a critical aspect of Transformative Innovation Policy; the ability to open up to new radical alternatives which are often not perceived as feasible or even desirable. These alternatives should not be seen as only technological solutions. On the contrary they involve social choices too with environmental consequences. The aim is to make the connections between specific options, and the environmental and social consequences that are visible. Speciality coffee and single type coffee represent different development options with different consequences for people and the environment.

In other words, they contain a different directionality. Similarly, the choice between electric vehicles or mobility services results in different social and environmental consequences. It is important to note that directionality as a policy principle does not imply that the aim of the policy making is to define the direction (or a mission). On the contrary, the aim is to open up for many directionalities, embedded in a wider range of options, and to enable a process of critical appraisal and learning.

EXPERIMENTATION AND NICHE DEVELOPMENT AS A MODE OF INNOVATING

The opening up of new options may promise success in new directions, however, exploring this requires experimentation. Transformative change is a search process which has been informed by experience and deep learning. This refers to learning about the mindsets and assumptions embedded in the dominant practices - for example, in the coffee case the assumption around the possibilities of moving from production of quantity to quality, about taste, about the use of fertilizers, about good farming practices and opportunities for collaboration. Coffee farmers had to experiment with different aspects of their practices in order to improve coffee quality. This type of experimentation is crucial for any transformative change process. It is the best way to build an alternative practice or niche which can begin to compete with the dominant unsustainable practice or socio-technical system. These alternative practices start to develop at a local and regional level because the proximity of actors creates a space for experimentation and for different social groups to work together. Transformative STI policies could therefore be easily combined with a strong regional focus. At the same time, public policies may play a strong role in the upscaling and acceleration of local initiatives for transformative change. This often requires new intermediation between many local initiatives, new regulatory, and institutional frameworks, and alignment between a range of policies, from the local to the national and international level, and horizontally between various areas. For up-scaling, acceleration purposes, and to enable socio-technical systems in various application areas, STI policies need to include the alignment with various sector policies for transport, mobility, energy, agriculture, and healthcare. This will not be an easy process because many of these policies will support existing socio-technical systems which are replaced by new systems. The alignment thus should be selective and include the destabilization of existing policy mixes in the process of designing the new policy mix.

INCLUSION AS A PREREQUISITE OF TRANSFORMATIVE CHANGE

For transformative change to happen it is important to bring not only dominant actors but also niche actors who represent new possible directions into the process, as well as actors from various sectors including producers,

civil society, users/consumers and policy-making. The process of experimentation needs to be inclusive in terms of participation and outcomes. It needs to have a positive impact on the livelihoods of all involved actors. Inclusive does not just mean to be informed about developments, but also be empowered to have influence on it. Inclusive processes may lead to incorporation of conflictual views and, rather than be avoided, this should be seen as a necessary condition for transformative change. Public policy should take on an important responsibility for creating the right kind of framework conditions for inclusive participation and helping actors to navigate conflicts, and to generate more trust in the process.

TRANSFORMATIVE STI POLICY AND SDGS

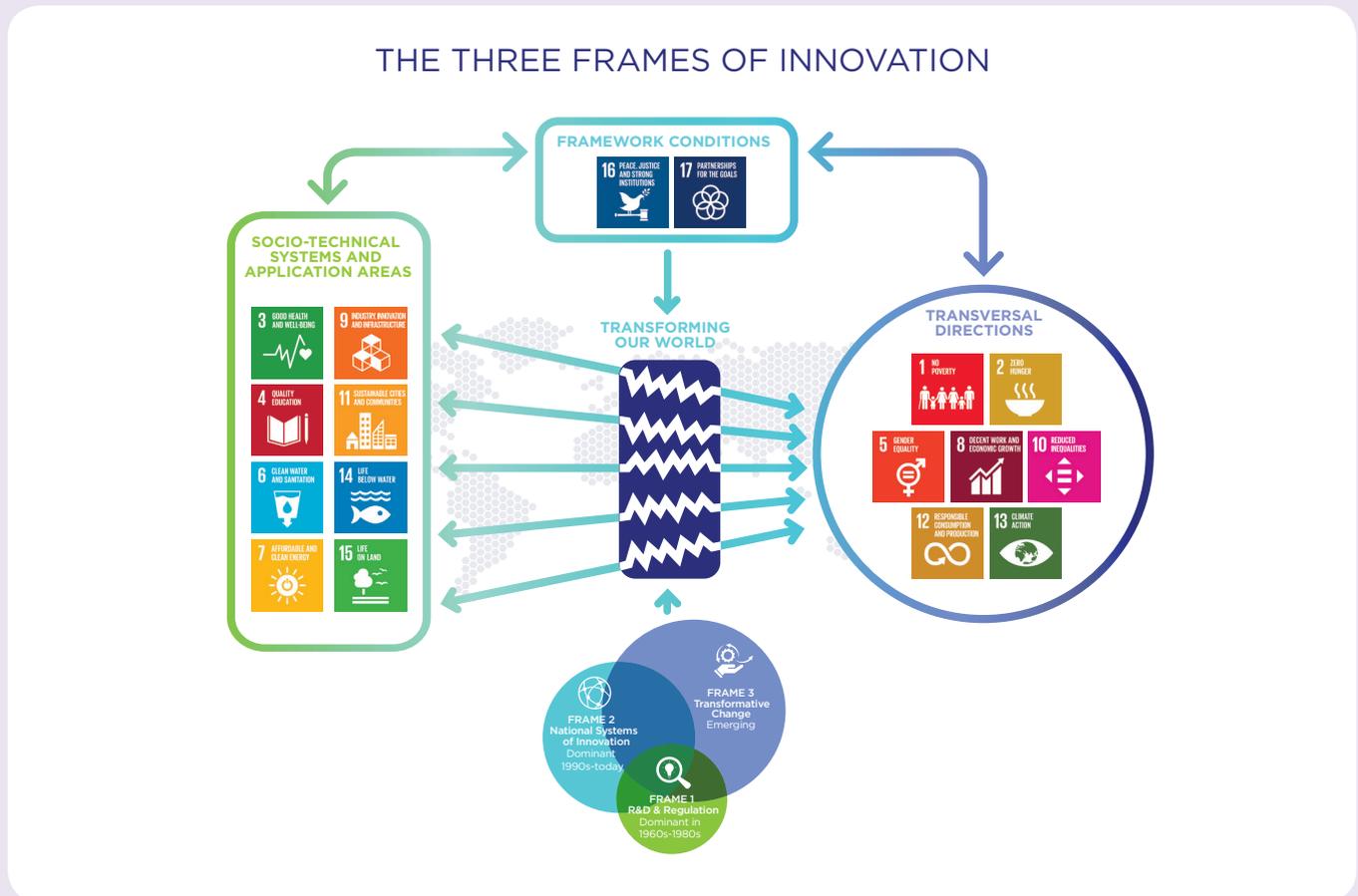
TIPC assumes that the SDGs require a new and fundamental challenge to STI policy. The SDGs need – not only a focus on a new type of innovation, the transformation of socio-technical systems – but also require a rethinking of STI policy itself. The formulation and implementation of such a STI policy can be a key strategic action for delivering on Agenda 2030. If transformation is understood as the need to fundamentally change multiple socio-technical systems (Schot, Kanger 2018), TIP offers a new way of looking at the SDGs and their mutual relationships, one which is different from the ongoing process of mainstreaming SDGs into current policies.

From a transformative STI policy point of view, three types of SDGs can be distinguished (see figure 3):

1. SDGs which cover specific or a wider range of socio-technical systems or application areas. For example, SDG 3 on health, SDG 4 on education, SDG 6 on clean water and sanitation, SDG 7 on affordable and clean energy, but also SDG 9 on Innovation, industry and infrastructure, SDG 11 on sustainable cities and communities, SDG 14 life below water and SDG 15 life on land are directly linked to a range of systems.
2. SDGs which emphasize 'transversal directions' or directionality. SDGs 1 No poverty; SDG 2 Zero hunger; SDG 5 Gender Equality; SDG 8 Decent work and economic growth; SDG 10 Reduced inequalities; SDG 12 responsible production and consumption, and SDG 13 Climate Action.
3. SDGs which focus on structural transformation in framework conditions necessary for realizing transformation. This includes changing governance arrangements among the state, the market, civil society and science. These are expressed in the remaining two SDGs: SDG 16 Peace, Justice and Strong Institutions and SDG 17 Partnerships for the SDGs.

These distinctions would allow both countries, and also regions and international organizations, to focus their efforts on transforming socio-technical systems, using the SDGs not only to decide on which systems, but also which directionalities to include in the process. It would also lead to questioning whether the framework conditions, including transformative capabilities, are in place to deliver

on the transformations. The starting point for the process would not be to mainstream existing policies, but instead the creation of spaces, expectations, coalitions and deep learning for transformative change. We expect that this process may confront existing policies and framework conditions, and thus should not be dominated by incumbent forces which may stifle transformative change.



CONCLUSION

Transformative STI policy is starting to emerge in various contexts but there is limited experience of implementing Transformative Innovation Policy in practice – the policy itself is experimental. It will change the role of policymakers in this area. They need to become strategic catalysts for transformative change, and thus acquire new capabilities. This is the case in the developing as well as the developed world. Frames 1 and 2 of innovation assume that developing countries need to catch-up and that science, technology and innovation policy is a tool for this process. Frame 3 does not assume that innovations which address SDGs will necessarily come from the Global North or that other countries need to play catch-up with

those innovations. On the contrary, the assumption is that both the Global North and Global South are in a good position to contribute to transformative change and that mutual policy learning can be beneficial. Colombia has in fact become the first country to publish a green paper which proposes to orient STI policy towards transformative change¹⁰. In any case, international exchange and sharing of experience will be a crucial success factor. The work of the Transformative Innovation Policy Consortium aims to advance this and welcomes discussion and debate with the wider research and policy community interested in these emerging ideas.

REFERENCES

- C., Durand-Delacré, D. and Teksoz, K. (2017) *SDG Index and Dashboards Report New York*: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- Elisa Arond, Matias Ramirez, Cristian Armando Yepes, Diego Chavarro & Oscar Romero (2017) TIPC Transformative Innovation Learning History (TILH) Country Report: Colombia - Transformative Innovation Policy in/for Speciality Coffee www.tipconsortium.net/materials.
- ICSU, ISSC (2015) *Review of the Sustainable Development Goals: The Science Perspective*. Paris: International Council for Science (ICSU).
- Johan Schot, Laur Kanger (2018) Deep Transitions: Emergence, Acceleration, *Stabilization and Directionality*. *Research Policy*, 47 (6), 1045-1059
- John Grin, Jan Rotmans and Johan Schot (2010) *Transitions to Sustainable Development. New Directions in the Study of Long Term Transformative Change* New York, London: Routledge.
- Laur Kanger, Paula Kivimaa (2017) TIPC Transformative Innovation Learning History (TILH) Country Report: Finland - The Emergence and Consolidation of Mobility-as-a-Service in Finland www.tipconsortium.net/materials
- Le Blanc, D (2015) *Towards Integration at Last? The Sustainable Development Goals as a Network of Targets*. *Sustainable Development*, 23(3), 176-187.
- Nannan Lundin, Sylvia Schwaag Serger. (2017) 'Agenda 2030 and a Transformative Innovation Policy. Conceptualising and Experimenting with Transformative Changes towards Sustainability' presented at Vinnova, Stockholm, November 7, 2017. This is available at <http://tipconsortium.net/publications-and-library/TIPC Working Paper-WP 2018-0>
- OECD (2017) *How's Life? 2017: Measuring Well-being*, OECD Publishing, Paris. http://dx.doi.org/10.1787/how_life-2017-en
- Schot, J., & Steinmueller, E. (2017) 'Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change', *Research Policy* 2018, forthcoming (Also available as working paper www.johanschot.com/publications)
- UNDP, United Nations (2015) Helen Clark, Director, Speech: 'Transforming Societies: People, Planet and Prosperity; the New Global Sustainable Development Agenda at The Global Transformation Forum' – <http://www.undp.org/content/undp/en/home/presscenter/speeches/2015/10/21/helen-clark-speech-on-transforming-societies-people-planet-and-prosperity-at-the-global-transformation-forum.html>
- United Nations (2016) Report On "Policy Innovations For Transformative Change" From The UN Research Institute For Social Development - [http://www.unrisd.org/80256B42004CCC77/\(httpInfoFiles\)/2D9B6E61A43A7E87C125804F003285F5/\\$file/Flagship2016_FullReport.pdf](http://www.unrisd.org/80256B42004CCC77/(httpInfoFiles)/2D9B6E61A43A7E87C125804F003285F5/$file/Flagship2016_FullReport.pdf)
- United Nations (n.d.). *The Role of Science, Technology and Innovation (STI) to Foster the Implementation of the Sustainable Development Goals*. European Commission Expert Group.
- United Nations High Level Political Forum on Sustainable Development (2017). Synthesis of Voluntary National Reviews 2017.
- Weber, K. M., & Rohracher, H. (2012) *Legitimizing Research, Technology and Innovation Policies for Transformative Change: Combining Insights from Innovation Systems and Multi-level Perspective in a Comprehensive 'Failures' Framework*. *Research Policy*, 41(6), 1037-1047.

¹ See www.tipconsortium.net and [www.twitter.com/tipconsortium](https://twitter.com/tipconsortium)

² Inputs and comments provided by Diego Andres Chavarro, Alejandro Olaya Davila, Lilianna Pinzon Vargas, Claudia Obando Rodriguez, Maria Isabel Velez Agudelo. This briefing is inspired by discussions in the various meetings of the Transformative Innovation Policy Consortium, and as well as by discussions at an UNCTAD expert workshop on November 2017 in Geneva on 'Rethinking the role of Science, Technology and Innovation Policy for SDGs for Inclusive and Sustainable Growth'. It builds on Johan Schot and Ed Steinmueller, 'Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change', *Research Policy* 2018, forthcoming (Also available as working paper www.johanschot.com/publications) We also owe a lot to reading Nannan Lundin and Sylvia Schwaag Serger, 'Agenda 2030 and a Transformative Innovation Policy. Conceptualising and Experimenting with Transformative Changes towards Sustainability' presented at Vinnova, Stockholm, November 7, 2017. This is available at <http://tipconsortium.net/publications-and-library/TIPC Working Paper - WP 2018-0>. See also Rohracher and Weber.

³ This has been argued for the MDGs, see Sakiko Fukuda-Parr, Alicia Ely Yamin and Joshua Greenstein, *Journal of Human Development and Capabilities*, 15 (2014) 2-3.

⁴ See Le Blanc (2015) *Towards Integration at Last? The Sustainable Development Goals as a Network of Targets*.

⁵ For this argument see Nannan Lundin and Sylvia Schwaag Serger (2017).

⁶ See OECD (2017) *How is Life-Measuring Well-being*.

⁷ OECD is building on the work of sustainability transitions research field, see Grin, Rotmans and Schot (2010).

⁸ Arond, Ramirez, Armando Yepes, Chavarro & Romero (2017) Transformative Innovation Policy in/for Speciality Coffee. A Transformative Innovation Learning History, <http://tipconsortium.net/materials>

⁹ Definition of speciality coffee from the National Federation of Coffee Growers of Colombia website -<https://www.federaciondecafeteros.org/particulares/en/>

¹⁰ <http://tipconsortium.net/news/colombia-embraces-new-innovation-theory-from-spru-as-national-strategy-for-post-con-ict-development/>



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