Science, Policy & Diplomacy – Can We Accelerate Progress on the SDGs?

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The following address was given by Sir Peter Gluckman in August 2018 to the Academy of Science of South Africa (ASSAF) in Pretoria.

The 2030 agenda is encapsulated within the 17 SDGs and their 169 targets. This agenda has been criticized as being too broad to be meaningful and too aspirational rather than having the concrete, focused and very specific nature of their predecessor MDGs. We are almost halfway through the 20 year period for which they were framed – there is only another 11 years to 2030 - and there is a general sense that momentum is not being sustained at a desirable pace. Geopolitical issues have shifted much of the global agenda away from the fundamentals that led to their establishment in the first place.

But we are seeing some signs of growing focus ahead on the high-level review that is scheduled for next year – some countries such as Japan have a domestic SDG agenda and the SDG focus is intensifying in some countries' ODA agendas and that is flowing through to the research.

But irrespective of where we are, the SDGs remain a critical framing device for progressing both national and the global agenda. It is important to note that the SDGs are distinct from the MDGs in several ways – they are no longer just an agenda for low income countries

but were an agenda for every country – developed and less developed and they attempted to encompass a broader range of objectives and at much higher level of analysis than MDGs. And it is from this framing that I will make my comments.

I will address the question of how science relates to the SDGS in three ways: first the changing scientific and technological context in which they must be considered
Second how science can help deliver on the SDGs. But most of my time will be spent on an issue that does not get enough attention; namely how to use science and the science-policy nexus and science diplomacy to better integrate the SDGs into domestic policy

I was recently honoured to be elected the president-elect of the newly formed International Science Council – the premier global science body formed by the merger of the International Council for science and the International Social Science Council working alongside the its first president – Daya Reddy of Cape Town. This merger reflects the critical importance of promoting multi-disciplinary research. I strongly believe must be much more seamless boundaries between the scientific disciplines including all the natural and social sciences. In nearly all of the SDGs, natural science, social science, data science, technology, economic and political science and particularly implementation science will be needed.

But both the SDGs and the so-called 4th industrial revolution - a term I do not like because it is a much broader transition than industrial - speak to a critical juncture in human history. We are using our evolutionarily derived skills as irrepressible and continual innovators to develop technologies, to change our environments, our human societies and behaviours at a pace that makes the implications difficult to fully comprehend. It would be a mistake to assume a technologically deterministic approach to the challenges we face. The skills of historians, philosophers, ethicists and others are needed as much as scientists. The challenge is how to make deliberative and informed decisions about how technologies are deployed in our best interests.

The SDGs confront us at a time when there is much instability and change and in thinking about how we approach the SDGs we must acknowledge the change of the nature we face is both an opportunity and a challenge. And while our minds might turn to the current geopolitical instability there is a deeper and perhaps not unrelated factor that I will spend some time on. Over the last year I have been leading an INGSA project, initiated at the request of the OECD, on the meaning and assessment of wellbeing in the digital age. This was not a trivial exercise. It became clear that digital technologies including the internet and its children, artificial intelligence, automation and many others were impacting on every impact of human existence. In assessing the impact of these technologies on human wellbeing it became clear that we had to look not just at the individual, but the social relations and indeed the impacts on the rules -based societies we live in.

We chose to look at this issue through three lenses – that of the institution of self, that of the institution of social life and that through the institution of civic life; using Eleanor Ostrom's concept of institution to fame the conceptual analysis

In each we broke it down into some of its constituent paths and examined its state prior to the digital transformation, how it is changing, where it might end up and what are the opportunities and challenges it creates, what research is needed and what are the policy implications

For example if we look at the dimension of human development. Traditionally in most societies early learning has been by experience and imitation from family and care givers aided by formal instruction and the importance of physical play to build social skills and non-cognitive functions has been recognized. However there is increasing use of digital device-based learning in place of interpersonal learning and less interactive and potentially less inter-human play with less 'reality testing' in interactions. Now within this transition there are some potential opportunities; a broader range of learning possibilities and skills development is possible especially for allowing disadvantaged or isolated communities access to quality education. But there are also potential negative impacts on the acquisition of key skills – for example interpersonal competencies. What will be the impact of exposure to unreal and hyper stylised experiences on interpersonal skills development. Does the documented change in attention time affect learning? Does it induce a change in risk taking behaviour or a change in personality development with increased narcissism and less self-control and a changed view of nurturing and authority roles? How will they respond under stress? What will be the long-term impact on mental health?

Put simply basic concepts of autonomy, privacy, agency, of the relationship between citizen and nation state and indeed the concept of the nation state are all being affected by this transformation. It is not a matter of whether this is good or bad it is the pragmatic reality of this technological change and it must impact on how we look at the SDGs – the world is changing around us because of us.

In an expert multidisciplinary workshop in London we identified 5 areas where urgent research and policy development will be needed. Early childhood and education, mental health, social inclusion, concepts of security and risk and issues of governance.

I have made this parenthetic diversion because it highlights how pervasive our technological capacities have become in determining who we are and how we live and this must have a critical bearing on how we look at and address the sustainable development goals. Too often we look at technology as simply solution forming and not enough at understanding how it changes our world and ourselves. I am neither a technological optimist nor pessimist – we must be pragmatic – we have always been an experimental species living in experimental

societies – where technological and social innovations have continually defined and redefined us. They have bought population explosions, planetary compromise and climate change on one hand and on the other they have brought us longer and healthier lives and empowerment for many people

Let me make on more relevant diversion. It is sobering to remind ourselves of how many view evidence and science. Evidence to most people, including often policy-makers, does not mean robust science alone. It can refer to knowledge that comes from religion or tradition, to dogma that persists in a community, to local knowledge, or to personal observation, experience or anecdote or the view of social media network that has been selected by the individual precisely because it reinforces the views already held. When we talk about science we need to remind ourselves that science is not a compilation of facts, rather it is a set of processes that aim to discover relatively reliable information about the world around and within us. There are many different definitions of science but virtually all of them focus on the processes, its inherently provisional nature and its essential value of institutionalised scepticism.

These issues are becoming more acute in the post-trust, post-expert world that now seems to be taking shape at least in the global north. While science appears to have been largely immune from the loss of institutional trust to date, we cannot take that for granted. It is not just the obvious issue of scientific malfeasance, it is more the enormous academic 'industry 'centred on bibliometrics rather than knowledge generation and societal impact and the complexity of the changed relationships that follow that generate concern and can invite contestation

So with this background let me turn now to the question: what science and science policies are needed to map out and prepare for the road ahead?

In 2015, the International Council for Science (ICSU) provided a pointed analysis of the SDG's targets. ICSU pointed out that there were some quite substantive knowledge gaps to be filled before a number of the goals could be reached. Yet others require the more systematic application of current knowledge and issues of knowledge and technology transfer are real and complicated. In 2017 ICSU returned to this question and dissected out in some detail four of the goals: goal 2 – zero hunger; goal 3 - good health and wellbeing; goal 7 - affordable and clean energy; goal 14 - life below water. Their analysis identified a large number of knowledge gaps. We need a similar analysis across all 17 of the goals. Indeed last year's UN Global Sustainability Report opined that globally coordinated research roadmaps for most of the SDGs would help.

But there is no agreed, consultative and expert process for doing this. The complexity of the UN itself means there is no truly comprehensive view of its various advisory inputs. The

multiple agencies of the UN tend to work in silos and the full scope of sciences do not have a strong voice in many of the agencies that could be making great use of scientific advice. There is discussion through the Technology facilitation Mechanism of the SDGs and the UN bureaucracy of preparing SDGs roadmaps – bit these have highly variable meanings. And it needs to be clarified what needs to be done at a global level, what at a national level. What are the big issues needing global or regional attack, when is the issue about applying current knowledge, when is it about needing new knowledge. There is a need to get beyond capricious progress to address these knowledge gaps. Without an agreed roadmap, the vagaries of contestable research – which is increasingly managed and directed to areas of donor interest – may limit progress..

So the question could then become: how should science address these knowledge gaps? There is no generalized global research funding system and never likely to be one. Governments mainly spend their research dollars almost entirely within their own borders and on issues of domestic relevance. Only occasionally generally for some big science endeavours do they pool funds. Funding provided for development assistance is also often constrained to link to donor's objectives. And other funders such as foundations tend to have their own agendas and priorities.

While we will not have a global funding system should we be thinking about novel models for coordinated knowledge production. There are models of global research coordination without consolidated funding – the human genome project was one such example but a more pragmatic model is the Global Research Alliance on Agricultural Greenhouse Gases. This consortium emerged out of the Copenhagen climate change meeting in 2009 when NZ, supported by Canada and – at that time – the USA and several other countries, proposed a coordinated approach to agricultural emissions, given that 20% of GHG are associated with food production. In 2010 diplomats and scientists from some 30 countries developed the alliance model. The Alliance now >50 member countries including recently South Africa joined and a large number of agency partners. The members include all the major food-producing countries at all income levels. The secretariat consists essentially of two people and is based in Wellington. The secretariat supports a science-led effort in which scientists jointly identify the needs and then largely seek domestic funding to address these in a very coordinated fashion.

Irrespective of the knowledge gaps, we have a good idea of the general type of research and technologies that will be necessary. But is society willing to accept the technologies that could be most effective? We need to anticipate the issues of social license that will inevitably emerge and will be handled in different ways in different contexts and this requires new forms of partnership between the public and private sector for increasingly the private sector is the source of much new technology.

Let me focus briefly on four of these as areas for which the implications have not yet been fully imagined.

Firstly, there is data science. The 2017 STI forum in New York was very much focused on the role of data and indeed throughout the SDG papers, data is repeatedly mentioned. But there are many issues. For one thing, data collection is not free and in many cases it is not simple. Many countries do not have effective national statistical centres, data curation requires a major investment, and big data analysis cannot be done simply by data analysts alone. It also needs expertise to define the models and interpret the data. The application of AI provides a further complexity. There are many caveats about big data but the one that needs consideration in the context of the SDGs is the issue of social acceptability of data use – this is an area where I wrote an extensive report for the NZ government. Even where there is good data being collected, we must still consider who owns the data, who has access to the databases, and how it is interpreted. These issues are real in advanced economies, they will be equally large in LMICs. And globally, the issue of indigenous data sovereignty is another matter that mainstream data science has largely not begun to address. This is important because data science necessarily must set out a number of assumptions in developing its models. If these assumptions are not culturally informed, the outcomes could be wrong.

Secondly, digitalisation, AI, robotics and machine learning offer many opportunities but as I have discussed earlier, also threaten fundamental concepts of privacy, agency, autonomy, democracy and national identity and indeed the post-enlightenment organisation of society and definition of values and human satisfaction. There are inevitable shifts underway in these dimensions as the pace of technology outstrips the capacity of society to adjust and policy structures do not seem to be able to control the shifts underway. We see the start of this this in the rising power of the platform companies and the effects of social media. There is increasing concern about the putative ‘transparency’ of these technologies which does not really replace the ‘accountability’ of institutions? But equally these platforms could create control loops for societies by authoritarian rulers - I could extend my discussion of this issue at length but that is not for today

Thirdly the life science technologies from GM to GE to synthetic biology to whatever comes next offer enormous opportunities to deal with biosecurity, disease, food security, environmental management etc. But each of these technologies has real, perceived or unknown risks, creating for a complex discourse that can easily degrade into the entrenched views of one side or the other. Yet it seems inevitable that some of these technologies will have a role to play if we are to balance sustainability with the increased need for food production and against the background of climate and ecological change.

A common feature across all these technologies is their speed of development and very

variable perceptions of risk and precaution. Risk clearly has very different interpretations between scientist, citizen and politician. The scientist may try and see it in cold actuarial terms, the citizen sees it through the lens of cognitive biases and values, and the politician likely sees it in electoral terms.

Precaution is sometimes encapsulated in the precautionary principle but that term itself can be used in very many ways. Science can never prove absolute safety and in a sense can only reach provisional conclusions. Thus the precautionary principle can be misused and its original intent of being a form of adaptive management is critical if we are to harness technology appropriately. One role of effective science advisory ecosystems at national levels and enhanced science diplomacy is to ensure adequate dialogue both with the public and with governments on such issues.

And this lets me segue to a question – one that is getting much of my attention as chair of INGSA. How will science practically engage with the policy-making *process* to progress the SDGs? An examination of the targets suggests that many of them require policy and/or regulatory development and all have policy implications. But the reality is that the SDGs have had very little policy pull. Many countries have essentially done nothing but rebrand what they were already doing so they can report, almost cynically, to the UN through the voluntary reporting process.

The question is why do the SDGs not have greater policy pull; I think there are understandable reasons; first the way the SDGs were developed they were not framed around the primacy of the need for policy ownership; second the way governments are organized is not the way the SDGs are – there is not a ministry for SDG1, SDG 2, SDG3 etc. Thirdly in general democratic governments want to be seen to respond to the wishes of their citizens within their electoral cycle rather than responding to some vague direction from the global community. This creates a significant barrier – how to get effective change within policy processes to reflect the SDG goals.

But there is a further dimension – the SDG targets were largely developed the in isolation from other goals – yet they interact positively and negatively in many ways. And as every policy maker knows core to policy making is understanding the potential spill over issues – both positive and negative of any action. Add to that that the list of targets is not comprehensive from the perspective of domestic policy making and thus policy makers understandably see them as something to report against rather than driving their agenda.

INGSA and ICSU have been focused on this challenge and in June held a meeting which I chaired, with UN agencies including UNDP, UNESCO and DESA along with some academics and diplomats to explore the issue. The focus was on whether a sophisticated approach to interaction analysis between the SDG targets could bridge the gap between domestic policy push and the SDGs. The point being that a weighted interaction analysis

could help identify areas of priority and also help explore spill over effects. There was strong support and next month a working party partially supported by UNDP and ISC will meet at IIASA to start developing the tool it to a level it could be applied in pilot countries.

There is not one SDG that does not involve policy development and indeed goal 16 is essentially about building robust governance systems. Policy-making is fundamentally about making choices between options that involve different trade-offs affecting different stakeholders in different ways. More effective policies may be made and implemented if they are informed by scientifically derived evidence. This latter statement should not be contentious, and it should be true both globally and nationally, regardless of the policy context and even though the policy processes and considerations at global and national levels differ.

And indeed an increasing number and diversity of countries are establishing more formal science advisory mechanisms within their own domestic ecosystems. Comprehensive domestic advisory systems have some key components: those dealing with knowledge generation, with knowledge synthesis and with knowledge brokerage. Knowledge brokerage is the actual process of transferring policy needs to the science community and transferring an understanding of what we know and the limits on that understanding to the policy community to better inform their options; a decision that will always have a large values component.

My view is that all countries irrespective of their state of development need a multi-dimensional advisory ecosystem – in some case this could have a regional component. There is a need within the government for knowledge brokerage, often informal, throughout the policy process. There is a need for structured input of the scientific community – by means of more deliberative advice – for example via an academy. These internal and external sources have different functions and operational modes but between them and other components I do not have time to discuss, it allows for the full breadth of advisory needs.

But how do domestic advisory mechanisms link to decisions made at a global level? Largely they don't and that is a huge problem and here we need science diplomacy. For a country to make any investment that supports science diplomacy, the actions must be seen to either directly or indirectly advance the national interest but that national interest can be parsed according to the motivations and intervention logic. In this alternate framing, science diplomacy can be considered in three categories:

- Actions that are designed to directly advance a country's national needs,
- Actions that are designed to address cross-border interests,
- Actions that are primarily designed to meet global needs and challenges.

In situations of direct national interest, decision-making is structured through the executive branch of government and increasingly informed by domestic science advisory ecosystems. But international decision-making and scientific input is more obtuse. UN agencies and the UN itself are not autonomous but depend on decision making by the votes of member states. These votes are generally made via ministries of foreign affairs. However the scientific input to UN bodies generally comes from UN agency staff or advisory committees to those agencies and is largely disconnected from whatever advice the national representative may or may not have. If progress is to be made on many of these issues it is important that there is stronger linkage between domestic science advisory mechanism and international agencies on one hand and between domestic science advisory systems and ministries of foreign affairs on the other.

Progress will require that domestic science advisory and diplomatic systems agree that their national interests are indeed served by a global solution being reached. For example it is disappointing that the last United Nations Secretary General's Science Advisory Board made no effort to reach out to domestic science advisory systems. This deficit is not unique to the UN system – other parts of the international science policy system also are not inclusive – for example many of the influential policy discussions on Open Science have not been inclusive.

First domestic science advisory mechanisms and foreign ministries must be better linked. Recently there has been a growing effort to do so. In 2016, the United States, New Zealand, the United Kingdom and Japan joined to formalize a Foreign Ministers Science and Technology Advisers Network (FMSTAN) to elevate the inputs of science and technology to diplomacy. This network has now expanded to over 20 countries of diverse characteristics. Second, the UN system is largely built in silos, agencies have their own science inputs that are largely inchoate, and yet science and technology are obviously key to progress across the whole agenda. Logic says some scientific coordinating group close to the centre of the UN system is needed

Should a UN Scientific Advisory Board should be re-established but with its membership carefully drawn from distinguished scientists with a clear vision of the role of science, technology and innovation in supporting Agenda 2030 and deep experience at the science-policy interface. The board's mandate should be to: ensure better coordination across UN agencies and programmes in the development of scientific input into UN policy development and implementation framework; promote effective linkages between the UN system and international scientific bodies; contribute to coordinated science roadmap development for the SDGs; and encourage the development of domestic science

advisory systems and their coordination with UN agencies and advisory mechanisms.

The 2030 agenda has multiple dimensions; some require domestic action, some global action. All require sciences to support policy development and actions by civil society. There is a lack of structures to ensure the effective use of science. This requires attention to strengthening domestic advisory ecosystems and then linking them via the mechanisms of science diplomacy to global policy making.