



## OFFICE OF THE PRIME MINISTER'S CHIEF SCIENCE ADVISOR

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### SCIENCE TO INSPIRE HUMANITY

#### **Opening remarks in panel discussion at Congreso Futuro<sup>1</sup> A congress hosted by the Senate of the Government of Chile Santiago, Chile**

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There are few if any of the challenges that humanity faces where science, broadly defined, cannot assist. Scientific research, and the technology that it can lead to, can do so much to assist the human condition but to do so optimally requires several conditions to be met. Some of these are the responsibility of the science community and its institutions, some are the responsibility of governments and some are the responsibility of civil society.

First, science needs to be inclusive. This means not only being inclusive in the diversity of people involved in science but also in the way it is taught and performed. Disciplinary silos impede progress and the gulf between physical and life science, between natural sciences and social sciences and between science and the humanities must be addressed. There is much knowledge and effort wasted because of the continued barriers between disciplines, especially between natural and social sciences, in methodologies and by who does it. All the best climate science by climatologists will not have effective impact unless social scientists, economists, technologists are also involved in this fundamentally human-driven problem.

Second, science must be embedded in society at every stage. This means the science community must be open to discussion on what science is undertaken (before it is undertaking it), how it is done, and what practical implications might be drawn from it. Concepts like co-design and co-production and extended peer review need to be more than slogans. These concepts need to be implemented in ways that enhances scientific rigor while ensuring valid public values about the research agenda and the application of science and technology.

Third, it should be obvious that science must produce quality research of potential impact. However, increasingly we need to ask is this how the system has evolved. In 2016 over 3 million scientific 'papers' were published – how many of those papers will actually ever be read or make a difference except to the individual's curriculum vitae or the 'ranking' of the university? We must be wary of the bibliometric disease gone rampant.

Fourth, the limits of science must always be acknowledged, including the reality that science is not values-free. Science is defined by its processes, which seek to minimise to the extent possible any bias and preconceptions from the collection and analysis of data. But values exist in what scientists choose to study and how they choose to study it. Most importantly, values exist in the judgments, researchers

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<sup>1</sup> Others on the panel were Dr Lars Heikensten , Executive Director of the Nobel Foundation, Sweden and Dr Virginia Garretton, Executive Director of Millennium Science Initiatives, Ministry of Economy, Chile

and scientists make about the sufficiency and quality of data on which to reach a conclusion: there is always an inferential gap between what we know and what we conclude.

Fifth, scientific information must be presented with humility. Science does not have all the answers, especially on many of the issues with which humanity is today confronted. Nevertheless, science which is a set of processes, is the key element in defining what we know and do not know. These understandings must be contextualized and presented with humility, lest we fall into technocratic assumptions, forgetting our own humanity.

Sixth, the generation and use of science is a social process and society must use science wisely. This requires on the one hand, that society has a stake in what science is done, as previously mentioned, but importantly on the other hand, that those in a position to use science for decision-making, do not ignore it, falsify it or misuse it to suit their own agenda.

Seventh, policy-makers must use evidence responsibly and not ignore it and that means – in our era of complex policy problems - governments must have some form of science advisory system. Most science of relevance to the human condition is complex, incomplete and intersects with human values. The role of policy-makers and politicians is to make choices that, in a democracy, will always be made on the basis of values such as priority, affordability, electoral contracts, public values and political ideology. The reality is that for most policy-makers, better choices will be made when they are informed by evidence. These in turn require processes to ensure the gulf between the science and the policy communities is bridged.

Herein lies the biggest challenge: too many policy-makers and politicians do not see the need to reach out to the knowledge community. Only a few countries have well-developed formal science advisory ecosystems. The challenge is even greater when we consider the international arena. The lack of a formal process to vertically integrate science advice at a national level with the more diffuse multi-lateral policy agenda-setting processes is increasingly concerning. Progress on the SDGs will require coordinated actions at all levels of government. If science and policy are not connected both horizontally and vertically then the ambition to advance respond to our shared concerns through the SDGs will be impeded.

It is extraordinary that, in this context, the UN has abandoned rather than strengthened its own science advisory mechanism. The organisation that I chair, (the International Network for Government Science advice, [www.ingsa.org](http://www.ingsa.org)) INGSA, is seeking to see this deficit addressed because there is not yet a systematic processes to identify knowledge or policy gaps to address the SDGs either at a global, regional or generally national level.

If we are to assist humanity through science in a holistic and optimal way, these seven issues need to be discussed and addressed.