

Ethical and responsible model for the National Science, Technology and Innovation System in Colombia

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Introduction

Colombia's National Science, Technology, and Innovation System (NST&IS) faces important challenges in advancing towards a responsible and ethical measurement of research results. In 2023, a comprehensive model was designed for the modernization of System, based on the studies developed by Tejada-Gómez (2022) and Ayure-Urrego (2021). This model focuses on fundamental values for the scientific community, such as trust, integrity, and responsibility (Figure 1).

Dimensions of the Modernization Model

The Modernization Model proposed to address the following dimensions:

Recognition of the types of actors involved in R&D activities.

The model for Modernizing the National Science, Technology and Innovation System integrates the management of research, information, and knowledge from an inclusive approach, with a gender, ethnic, and territorial perspective.

Based on current science policy instruments and UNESCO and OECD recommendations, to progressively involve citizens and vulnerable or minority communities in the development of science.

Governance of the infrastructure for scientific information.

Colombia has an information platform for organizations, researchers, and research results that requires integrating current scientific information management resources, such as persistent identifiers, and moving towards an interoperable model.

R&D Indicators Think Tank

The characteristics of the country require a data and indicators model with territorial and inclusive details, likewise, the official sources that measure, calculate, and report data/indicators require collaborative and public governance instruments.

Research evaluation

The current models for evaluation require flexibility in the types of research results, knowledge products, and ways of acting in the development of science. The evaluation path must also promote changes in the regulatory instruments that define researchers' careers,

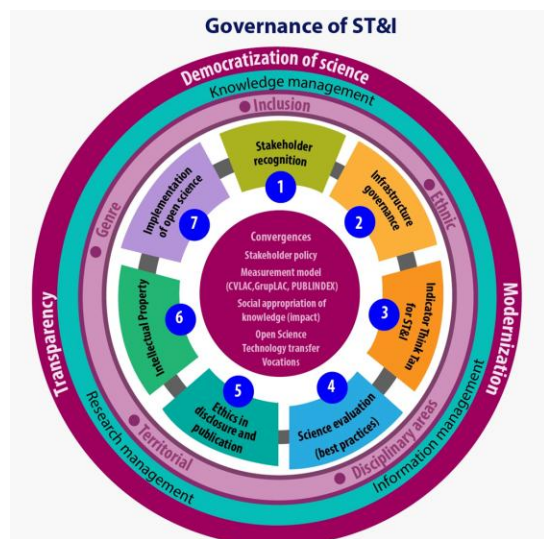


Figure 1. Modernization Model for the NST&IS of Colombia.

Developed by Tejada-Gómez and Ayure-Urrego (2023).

the forms of participation of R&D organizations, and open science.

Ethics of research dissemination and publication

One of the most sensitive aspects is the flexibility of the model for the recognition and measurement of scientific publications. Although Colombia has official policies for ethics and scientific integrity, it is necessary to advance in the transformation of the current mechanisms for the valuation of scientific publications. Likewise, it is necessary to advance globally in the aspects of public communication of science, which gives rise to the participation of more actors involved in R&D activities.

Intellectual Property Rights

Recognition of intellectual property rights and progress in the democratization of science are fundamental for scientific careers and trajectories, as well as the transfer of knowledge to promote innovation.

Progress and collaborative work

As a result of the collaborative work between national and international technical experts, progress was made in the following areas:

- Scientific information infrastructures
- Measurement model for national scientific publications
- Measurement model for research
- National system of indicators for the measurement of research
- Ethics for measurement and evaluation in the Publindex Model.

The progress in the dimensions of the modernization model for the Colombian SNCTeI showed the need to make efforts on the part of the organizations that carry out R&D activities, government decision makers, science policy makers, funders and other allies, to carry out integral processes of research and measurement of research results with multidimensional and inclusive views, based on ethics and responsibility about the characteristics and national and global context. In the coming years, decision makers, public policy makers, and main funders of scientific and technological research and

innovation processes should ensure the transition to:

- Ethical and multidimensional models for the collection, management, and use of national research data and indicators.
- Sustainable and public infrastructures to manage data and indicators of the Colombian SNCTeI.
- Inclusive evaluation systems align with COARA.

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