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Nanotechnologies — Vocabularies for science, technology and innovation indicators

*Nanotechnologies — Vocabulaires pour la science, la technologie et
les indicateurs d'innovation*



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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 229, *Nanotechnologies*.

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Introduction

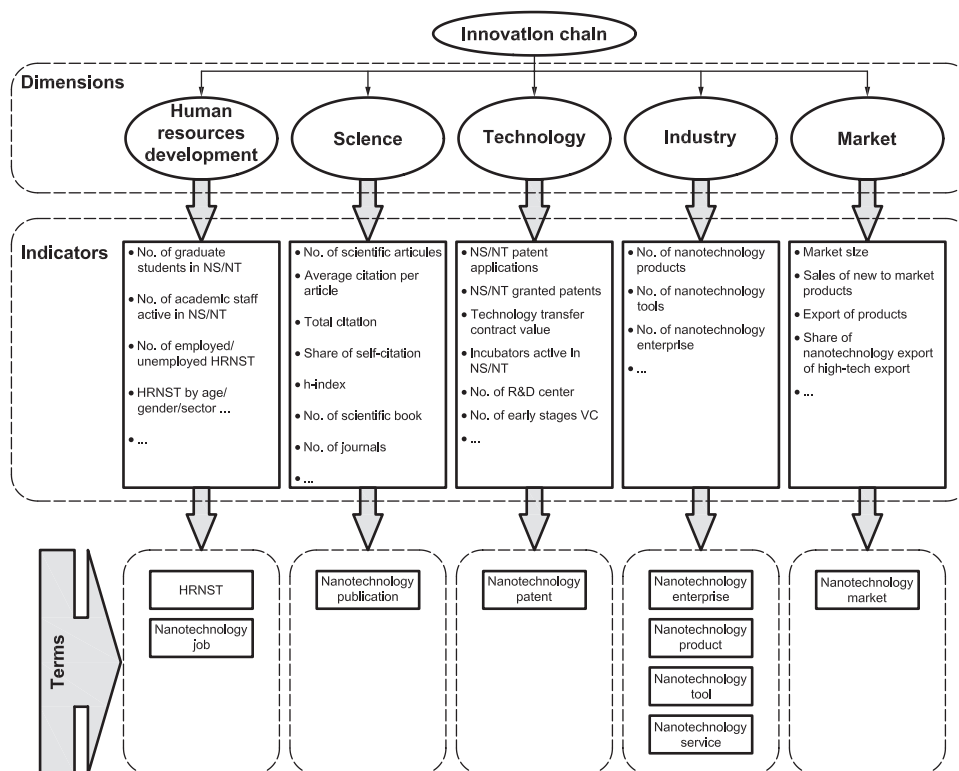
Emerging nanotechnologies are moving towards commercialization and will in future create extensive economic benefits in various industrial sectors. In this field, monitoring trends and the rate of changes in science, technology and industry at global, regional and domestic levels is an important consideration. Due to the high levels of investment by the private, public and industrial sectors and the substantial increase in nanotechnology-based publications, inventions and products, a unified approach is required to evaluate the impact of these investments, as well as the overall progress and impact of nanotechnology.

Understanding the socio-economic impacts of nanotechnology is important among communities. Investors, for example, require the assessment of scientific and technological advancements, while policy makers are interested in the assessment of results and impacts of their policies and programs.

The basic efforts of ISO/TC 229 for the standardization of nanotechnology-related terms were an important step towards the creation of a common language to inform people of nanotechnology development worldwide. Most of the terminology projects have focused on the development of scientific and technological vocabularies and terms. The creation of terms and core terms for science, technology and innovation indicators are of great interest, especially where existing indicators are inadequate for applications relating to nanotechnology. Such terms would help transparent and trustworthy comparison of international activities in this area. Unfortunately, due to the lack of such globally agreed vocabularies/definitions, the released economic, scientific and innovation statistics should be considered with caution.

[Figure 1](#) typically demonstrates the major dimensions of the nanotechnology innovation chain as human resources development, science, technology, industry and market. For each of these dimensions, there are several relevant indicators, which are utilized to varying degrees in some analytical reports related to nanotechnology.

Generic indicators that are descriptive of innovation dimensions are already well defined; however, the bounds of these indicators as they relate to nanotechnology need to be defined and harmonized to ensure consistent reporting.



Key

- NS nanoscience
- NT nanotechnology

NOTE Adopted from References [15] and [28].

Figure 1 — Demonstration of innovation chain dimensions, indicators and defined terms