

Foreword

Sound measurement of innovation is crucial for policy making. It helps policy makers to evaluate the efficiency of their policies and spending and to assess the contribution of innovation to achieving social and economic objectives, and it legitimises public intervention by enhancing public accountability. Yet, the measures of innovation currently available do not adequately take account of the full role of innovation in today's economy.

Measuring Innovation: A New Perspective selects indicators traditionally used to monitor innovation, and complements them with indicators from other domains that describe the broader context in which innovation occurs. It includes some experimental indicators that provide insight into new areas of policy interest. An important objective of the report is to highlight measurement gaps and propose action for advancing the measurement agenda. It draws mainly on OECD indicators or sources of comparable quality. Areas for which good-quality, internationally comparable indicators are not available or only very loose proxies exist are covered separately, using special “Gap pages” that point to measurement gaps that need to be filled.

The approach

The OECD Innovation Strategy takes a broad, horizontal approach. It recognises that to understand the nature of innovation and its impacts and to help monitor the functioning of innovation systems, it is necessary to move beyond aggregate numbers or indices, as these do not adequately reflect the diversity and linkages of innovation actors and processes. It is also necessary to go beyond science, technology and innovation indicators to draw on measures of education, of entrepreneurship, of economic, environmental and social outcomes and of the broader conditions for innovation, including framework conditions.

As a companion to *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*, this publication presents a set of indicators that reflect the broad policy areas examined in that study. The selection of indicators builds on the assumption that:

- The appropriateness of a given set of indicators depends on its use.
- Indicators are not a substitute for causal relations, which are examined through complex empirical analysis, as reviewed in *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*.
- Indicators should be identified on the basis of their policy relevance, analytical soundness, statistical quality and measurability (international, over time, prospects of improvement).

The aim of *Measuring Innovation* is threefold:

- To select “positioning indicators”. These traditional indicators, with broad coverage of countries over time, can help countries to compare themselves to other countries and monitor their progress towards a desired national or supranational policy goal.
- To go beyond “positioning indicators” to tell a more nuanced story. The goal is to:
 - Give a more refined version of the positioning indicator, e.g. instead of using scientific publications as a proxy for research output in international comparisons, one might use “top-cited” scientific publications to “quality adjust” the indicator.
 - Show how the *positioning indicator* is linked to a policy leverage, e.g. if PISA scores in science are used to proxy basic scientific skills, a way to increase the scores is to increase access to and use of computers by children.
 - Proxy a policy mix or instrument that can be used to progress towards an outcome or target, e.g. if a country sets a target in terms of business R&D intensity (R&D/GDP), a policy mix indicator can provide a picture of the extent of direct or indirect public support to business R&D. Some of these indicators may be more experimental in nature, have less country coverage or even be first-time indicators. Some might eventually become part of the regularly produced OECD indicators repertoire.
- To advance the innovation measurement agenda. The OECD has worked for 50 years on the development of science, technology and innovation indicators. Today, innovation raises measurement challenges that are either new or require urgent attention. Short boxes point to measurement challenges and gaps that need to be addressed by the broader community (policy makers, researchers and statisticians) to improve the evidence base for policy making, as well as to recent and ongoing initiatives that will provide better measures in the near future. Special pages are dedicated to gaps for which no good-quality indicator could be identified. Key actions to address these gaps are proposed in “Towards a Measurement Agenda for Innovation”.

The structure

Measuring Innovation is the outcome of a very ambitious project and is novel in many respects. It tries to satisfy multiple objectives and is targeted to a broad audience with varying levels of experience in the use of indicators. Its composite structure and look reflects the diversity of its aims. It is organised into three distinct parts.

Towards a Measurement Agenda for Innovation

This part builds on the OECD's half-century of indicator development and the challenge presented by the broad horizontal focus of the OECD Innovation Strategy. It summarises the main weaknesses of the current international measurement framework in this respect. It presents five key areas of action which, if endorsed, could be the basis for a forward-looking, longer-term, international measurement agenda. Its target audience is policy makers who care about evidence-based policy making, the broader research community working on innovation, and the statisticians who produce the data. This part of the publication builds on the following parts but is placed at the beginning to make the discussion of a longer-term strategy for innovation measurement more visible.

Innovation Today (Chapter 1)

Chapter 1 sets the stage in terms of the characteristics of innovation today by focusing on trends and aggregates. It is concerned with the following questions: What inputs (beyond R&D) does innovation entail? What complementary strategies are firms undertaking? How are actors linked in the innovation system and how "collaborative" is the innovation process? What indicators can be used to see how innovation contributes to global challenges such as climate change? It presents new indicators on investment in intangible assets and on trademarks, and innovation indicators drawn from innovation surveys. Traditional indicators based on patents and scientific publications are used to develop new indicators of science or innovation "hot spots" in certain technologies or locations. This part depends on indicators and short bullets to tell a story to policy makers about innovation today.

Beyond Positioning Indicators (Chapters 2, 3, 4, 5, 6)

This part is composed of thematic chapters that draw on traditional indicators and propose experimental ones to reflect the priorities for government action of the OECD Innovation Strategy. No attempt is made to choose a set of indicators for benchmarking purposes. On the contrary, the idea is to present traditional "positioning" indicators that have been, and can be, used to show where countries stand on a particular issue, and, on a facing page, to present more sophisticated or experimental indicators that go beyond simple "pointers". Ideally, these either complement the positioning indicators or point to potentially superior substitutes. The target audience of the thematic chapters is the policy analyst who has a certain level of sophistication in the use of indicators as well as all those who are engaged in producing indicators for policy making.

The five thematic chapters are: 1. Empowering People, 2. Unleashing Innovation in Firms, 3. Investing in Innovation, 4. Reaping the Returns from Innovation, and 5. Innovation for Global Challenges. These chapters also contain a few "Gap pages" that make a case for the development of new indicators in areas that lack high quality, internationally comparable indicators. The "Gap pages" discuss user needs, highlight the measurement challenges and propose a way forward. For example, owing to the lack of appropriate indicators, there is no chapter for the Governance of Innovation. Instead, a "Gap page" has been developed.

The thematic chapters are organised as double pages where the right- and left-hand pages are intended to complement each other. The left-hand page contains:

- A few lines (at the top) to show why it is relevant to monitor the "positioning" indicator in the context of an innovation strategy;
- One "positioning" indicator;
- A "Did you know?" frame that provides additional information from the source;
- A few paragraphs describing the use of the positioning indicator and the indicators on the right-hand page; and
- A small "Definitions" box used in the double page, for those who are not familiar with these particular indicators.

The elements of the right-hand page are:

- One or two figures that go beyond positioning indicators. While they provide a fresh perspective on a particular facet of innovation and frequently provide a better link to policies, these indicators suffer from less country coverage, and are frequently experimental in nature (first-time indicators) that have not benefited from the experience and refinement associated with the "positioning" (left-hand side) indicators; and
- A "Measurability" box that summarises the measurement challenges, gaps and recent initiatives.

All charts and underlying data can be downloaded via the *StatLink*  in the page (hyperlink to a web page).

Acknowledgments

Measuring Innovation is an experimental effort, which draws on contributions from many individuals inside and outside the OECD Secretariat. The development of experimental indicators based on microdata relied on researchers' willingness to devote a considerable amount of their free time to this project. Groups such as the OECD Working Party on Science and Technology Indicators (NESTI) have been on the front line contributing data, valuable comments and ideas for the measurement agenda.

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Without the help and dedication of all, this collaborative effort would not have been possible. We hope to continue to build on this experiment and on this wider community to implement the longer-term measurement agenda.