OECD statistical guidelines for measuring innovation

- A common language to discuss and measure innovation
- Not legally binding document
- Consensus view on best practice

Two distinctive features:

- Concerned with the measurement of innovation within the business enterprise sector
- Provides guidelines for survey-based measurement of innovation

The origins of the Oslo Manual

1992
A manual in evolution

1992
Oslo 1st edition
Technological innovation; Manufacturing

1997
Oslo 2nd edition
Technological innovation; Manufacturing and most market services

2005
Oslo 3rd edition
Product, process, organisational, marketing innovations.

2018
Oslo 4th ed.

Published jointly by OECD and Eurostat since 1997
Third revision of the Oslo Manual: 2016-2018

- Extensive preparatory work before revision
  - Cognitive testing of concepts
  - Ad hoc studies on measurement of innovation and services, design, innovation policies
  - Distributed microdata work (Innovation in firms).
- Engagement of 40+ countries and international organisations
  - International steering group.
- Expert and stakeholder workshops
  - OECD and ESTAT committees
  - Workshops hosted by academics and national governments
Part I. Introduction to the measurement of innovation

1. Introduction to innovation statistics and the Oslo Manual
2. Concepts for measuring innovation

Part II. Framework and guidelines for measuring business innovation

3. Concepts and definitions for measuring business innovation
4. Measuring business innovation activities
5. Measuring business capabilities for innovation
6. Business innovation and knowledge flows
7. Measuring external factors influencing innovation in firms
8. Objectives and outcomes of business innovation

Part III. Methods for collecting, analysing and reporting statistics on business innovation

9. Methods for collecting data on business innovation
10. The object method for innovation measurement
11. Use of innovation data for statistical indicators and analysis

Glossary of terms
Conceptualising innovation

• Common use of term “innovation” refers to either
  – Notion of process of innovation (what is done by a subject)
  – Notion of outcome (what comes out) = an innovation
• Both are relevant and need to be measured.
  – “Outcome” view conceptualised in this manual as: “Innovation(s)”
  – “Process” view conceptualised as “Innovation activity(ies)”
• Innovation
  – More than ideas, implementation required
  – Not necessarily R&D-based
  – At least new to the subject
  – Success is aimed at, but neither guaranteed nor required

➤ The general concept of innovation:
Implementation of something new to meet a given objective.
“An innovation is

• a **new or improved product or process** (or combination thereof)

• that **differs significantly from the unit’s previous products or processes** and

• that has been **made available to potential users (product)** or **brought into use by the unit (process)**.”

The generic term ‘unit’ describes the actor responsible for innovations. It refers to any institutional unit in any sector, including households and their individual members.
Sectoral scope of practical guidance in this edition

OM₃=OM₄ scope

All business enterprises (public and private)

- Households
- Informal economy
- Rest of the world
- Government sector
- Non-profit institutions serving households

Linkages
OM2018 Chapter 2.
Concepts for measuring innovation

Why?

User needs for innovation statistics

Relevant Phenomena for measurement

Measurement strategies (sources, responsibilities, etc...)

Sectoral scope

Efforts to measure innovation beyond business

What?

Concept of innovation

How?

Business Focus of OM2018 guidelines

Future measurement agenda

General Definition of Innovation
Central part of OM 2018: Framework for measuring business innovation

Innovation active firms

- Business innovation activities (ch4)
- Business innovation (ch3)
- Business innovation objectives and outcomes (ch8)
- Innovation and knowledge flows (ch6)

All firms

- Business innovation capabilities (ch5)
- External factors influencing business inno (ch7)

Covered in OM 2005

New in OM 2018

Internal dimension

External dimension
A **business innovation** is a new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm.

**Innovation activities** include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.
• A **product innovation** is a new or improved good or service that differs significantly from the firm’s previous goods or services and that has been introduced on the market.

  -> Goods and services. This edition clarifies role of knowledge products that share features with both.

• A **business process innovation** is a new or improved business process for one or more business functions that differs significantly from the firm’s previous business processes and that has been brought into use by the firm.
Taxonomy of business processes

• Based on the full array of business functions
• All functions potentially subject to improvements that qualify as innovations

<table>
<thead>
<tr>
<th>Business functions devoted to</th>
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<tbody>
<tr>
<td>1. Production of goods and services</td>
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<tr>
<td>2. Distribution and logistics</td>
</tr>
<tr>
<td>3. Marketing and sales</td>
</tr>
<tr>
<td>4. Information and communication technology (ICT)</td>
</tr>
<tr>
<td>5. Administration and management</td>
</tr>
<tr>
<td>6. Product and business process development</td>
</tr>
</tbody>
</table>

• Differs only slightly from OM2005 but has more solid conceptual and practical basis
**Innovation activities** include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.

A range of knowledge-based activities highlighted for identification as potential loci of innovation activity:

• *Research and experimental development (R&D) activities*
• *Engineering, design and other creative work activities*
• *Marketing and brand equity activities*
• *Intellectual property (IP) related activities*
• *Employee training activities*
• *Software development and database activities*
• *Activities relating to the acquisition or lease of tangible assets*
• *Innovation management activities*

Identify also when activity carried out by another party.

Identify expenditures associated to those items – total (KBC estimates) and separating the amounts incurred in pursuit of innovation.
Innovation within the innovation system: Innovation and knowledge flows

The chapter about “open innovation” and “knowledge exchange”

- Outbound dimension of innovation complementing traditional inbound focus
- Sources of knowledge, collaboration partners
- Recommended focus on knowledge exchange channels with PRIs and HEs
Understanding internal and external factors shaping innovation in the firm and outcomes

- Management
- IP
- Human resources
- Technology in broad sense (technical, design, user engagement, digital)

- Markets
  - Position in value chain, supply, demand, platforms
- Public policy – including government support
- Society and environmental aspects

- Objectives – outcomes
- Impacts on market
- Quantitative measures
Collection and use of data on business innovation

Aimed at data producers: Lifecycle perspective on survey data collection and integration

Recommend convergence in country practices based on recent evidence

Complementary focus on most important innovation (or change) of the firm

Chapter intended for users of innovation data
- Types of innovation indicators
- Construction of indicators
- Analysis using innovation data

Business innovation survey methodology (ch9)

Object-based approaches to measurement (ch10)

Data use: indicators and analysis (ch11)
Cross cutting issues

• Digital-proofing

• Globalisation
  – Global markets
  – Cross boundary links within MNEs
  – Location of business process functions, aligned to business process innovation questions.

• Contribution to capacity building
  – Guidance on developing countries in previous annex mainstreamed into core document (esp. chapters on internal and external drivers)
  – Detailed methodology guidance for producers and users
Policy and broader relevance of the OM

Demonstrated but in need of strengthening

- Source of guidance for data collection
- Source of definitions and concepts used in policy documents at OECD, EU and country level
- Relevance to academics/researchers
- *Policy relevance of statistical data collected under OM guidelines*
- Relevance to business
  - Value to respondents?
  - Innovation management
- Broader statistical relevance
  - Better measuring the changing economy

To be demonstrated through implementation
OECD Innovation data resources

• The Oslo Manual website
  – http://oe.cd/oslomanual

• OECD Innovation Statistics and Indicators

• Community of practice on innovation data
  – Password protected, for practitioners: https://community.oecd.org/community/oslo-review
Other data resources using Oslo Manual guidelines

**Eurostat Community Innovation Survey (CIS) indicator database**


**Ibero-American/Inter-American Network of Science and Technology Indicators (RICYT)**


**UNESCO Institute for Statistics (UIS) Innovation Data**


The **NEPAD (New Partnership for Africa’s Development) for the African Union** is also active in promoting the use of comparable indicators in Africa. Online links to this manual will provide up-to-date links to international and national sources of statistical data and indicators on innovation.
Beyond the 2018 edition

The 2018 Oslo Manual as Platform for extending measurement of innovation following the 2016 Blue Sky Agenda
ADDITIONAL MATERIAL
ANNEX ON CHAPTER 9
• 1.2 Population and other basic characteristics for a survey
  – Reporting unit, main economic activity, unit size, frequency of data collection, observation and reference periods
  – Recommendation that the observation period should not exceed the frequency of data collection
• 1.3 Question & questionnaire design
  – Question design: translation, comprehension and response categories
  – Questionnaire design: filters, question order, combining innovation with other business surveys
  – Questionnaire testing: cognitive testing and pilot surveys
  – Recommendation to conduct cognitive testing
• 1.4 Sampling
  – Survey frame, census versus sample, stratified sampling
  – Longitudinal panel data and cross-sectional surveys
  – Recommendations on sampling fractions, cells defined by industry and size classes
• 1.5 Data collection methods
  – Postal, online, telephone, face-to-face, combined survey methods
• 1.6 Survey protocol
  – Support for respondents, mandatory and voluntary surveys, non-response follow-up, conducting non-response surveys
  – Recommendations for when to conduct a non-response survey: response rates < 70%
Sections

• 1.7 Post-survey data processing
  – Error checks, imputation of missing data, calculating weights

• 1.8 Publication and dissemination of results
  – Metadata and quality reports, data access
  – Recommend improving data access if NSOs lack resources for in-house analyses
ANNEX ON CHAPTER 11
Why this new chapter?

• Need to consider both the production and use of business innovation data
  – Relevance and use as quality criteria
  – Variety of users and potential users
  – Address paradox and challenge of innovation indicators without OM-based innovation data

• Capitalise and further promote good use of data as indicators and analysis based on all types of innovation data (macro and microdata)
Data and indicators on business innovation

- Data, statistical data, stat data about innovation
- Statistical indicators-> Innovation indicators
- Desirable properties of innovation indicators—a reminder of quality requirements
- Basic principles
  - International comparisons
- Sources for international resources
Methodologies for business innovation indicators

• Aggregation and simplification
  – From microdata to macro. Relevant uses.
  – Reducing complexity – composite indicators and classification schemes

• Indicator development and presentation for international comparisons
  • Innovation headline indicators, dashboards, scoreboards, composite indexes.
  • Advantages and limitations.

• Firm-level data
  – Micro-level scoreboards. Some health warnings.
A blueprint for producing indicators on business innovation

1. User needs
2. Choice of indicators
3. Choice of data sources
4. Interpretation
### Table 11.3. Thematic areas for business innovation indicators

<table>
<thead>
<tr>
<th>Thematic area</th>
<th>Main data sources</th>
<th>Relevant OM4 chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence of innovations and their characteristics (e.g. type, novelty)</td>
<td>Innovation surveys, administrative or commercial data (e.g. product databases)</td>
<td>3</td>
</tr>
<tr>
<td>Innovation activity and investment (types of activity and resources for each activity)</td>
<td>Innovation surveys, administrative data, IP data (patents, trademarks, etc.)</td>
<td>4</td>
</tr>
<tr>
<td>Innovation capabilities within firms(^1)</td>
<td>Innovation surveys, administrative data</td>
<td>5</td>
</tr>
<tr>
<td>Innovation linkages and knowledge flows</td>
<td>Innovation surveys, administrative data, bilateral international statistics (trade, etc.), data on technology alliances</td>
<td>6</td>
</tr>
<tr>
<td>External influences on innovation (including public policies) and framework conditions for business innovation (including knowledge infrastructure)(^1)</td>
<td>Innovation surveys, administrative data, expert assessments, public opinion polls, etc.</td>
<td>6,7</td>
</tr>
<tr>
<td>Outputs of innovation activities</td>
<td>Innovation surveys, administrative data</td>
<td>6,8</td>
</tr>
<tr>
<td>Economic and social outcomes of business innovation</td>
<td>Innovation surveys, administrative data</td>
<td>8</td>
</tr>
</tbody>
</table>

\(^1\) New thematic area for this edition of the manual (OM4).
Other indicator issues

• Official vs non official sources
• The role of survey data
• Direct and indirect measurement
• Change vs position indicators
• Simple -> Complex indicators
• Limits of indicators
Using data on innovation to analyse innovation performance, policies and impacts

- Descriptive multivariate analysis – examples
- Inference of causal effects in innovation analysis

*Figure 11.1. Logic model used in evaluation literature applied to innovation*

Source: Adapted from McLaughlin and Jordan (1999), “Logic models: A tool for telling your program’s performance story”.
Why measuring innovation impact is difficult

- Direct and indirect methods.
- The CDM framework

• Specific implications for data collection and analysis
• Procedures
• Coordinated analysis of innovation microdata across countries