Metrics and evaluation for innovation in firms

Multiple measures can be used to evaluate innovation in firms, including measures of innovation inputs, innovation processes, and innovation outputs. Inputs for measurement include various statistical sources including firm innovation surveys. Appropriate measurement of innovation in firms is critical for innovation policy. Metrics and evaluation for innovation in firms should include different dimensions of innovation, adopt a broad approach to innovation determinants, go beyond targets and aggregates, address the role of government, capture knowledge interactions, and measure the social impacts of innovation.

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Why is metrics and evaluation for innovation in firms important?

Appropriate measurement is critical for policy to support innovation in firms (see Innovation in Firms [1]) (OECD 2010a, 2010b) since it may help policy makers in accomplishing the following:

- Assessing the contribution of business innovation to achieve social and economic objectives.
- Understanding the determinants of and obstacles to innovation to design policies with higher chances of success.
- Evaluating the effectiveness of different policy approaches, and consequently adapting current policies or designing new ones.
- Benchmarking innovation performance and conditions for innovation to those of other countries.

What measures can be used to proxy innovation in firms?

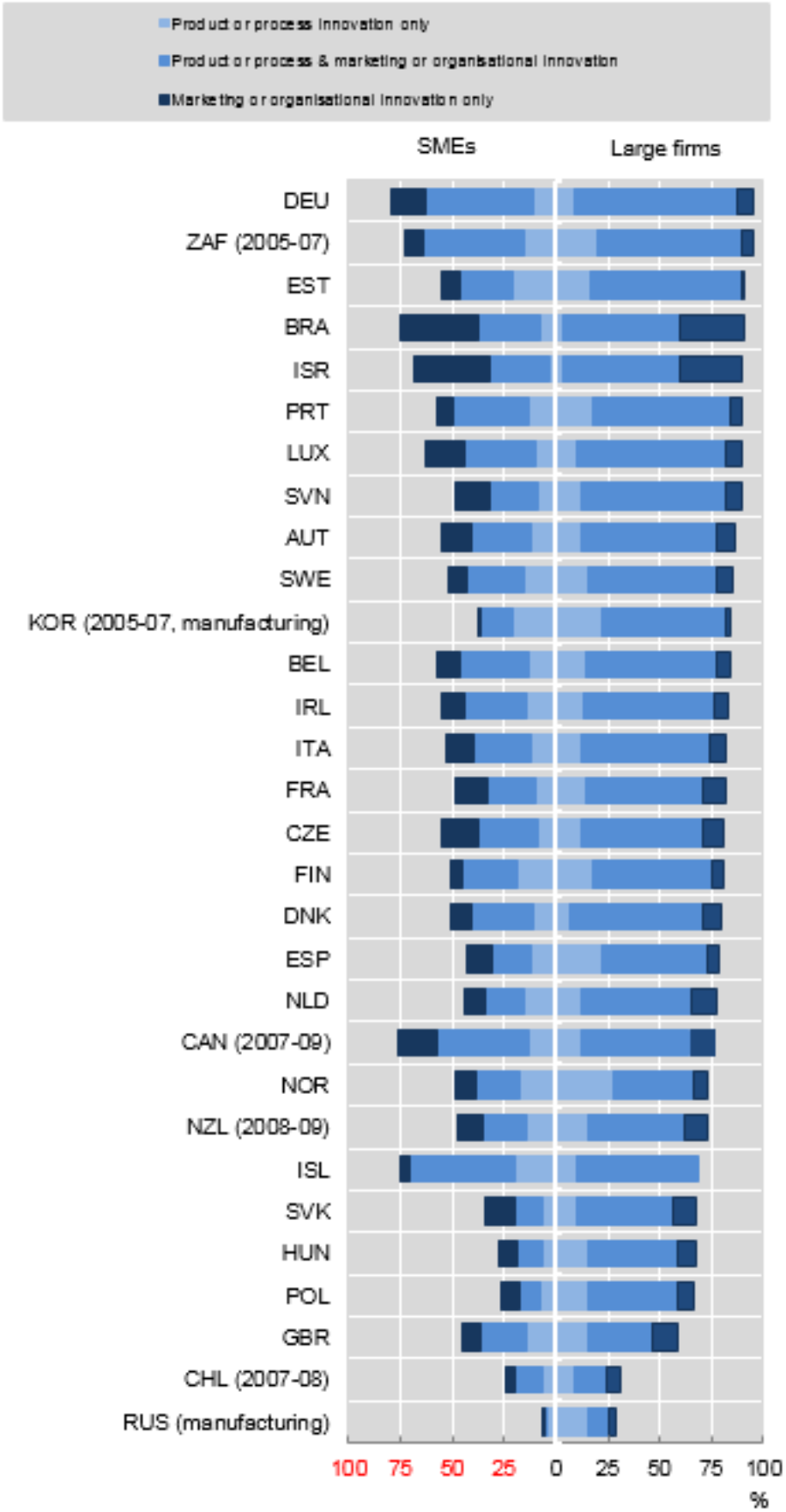
Multiple measures can be used to proxy innovation in firms and get complementary insight into firm innovation.

Measures may:

- Deal with various modes of innovation in firms (Figure 1)
- Focus on innovation input, such as business enterprise expenditure on research and development (BERD) (Figure 2)
- Reveal dimensions of the innovation process, such as collaboration for innovation (Figure 3)
- Focus on innovation output, such as patents (Figure 4)

Figure 1. Innovation strategies by firm size, 2006-08

As a percentage of all SMEs and large firms

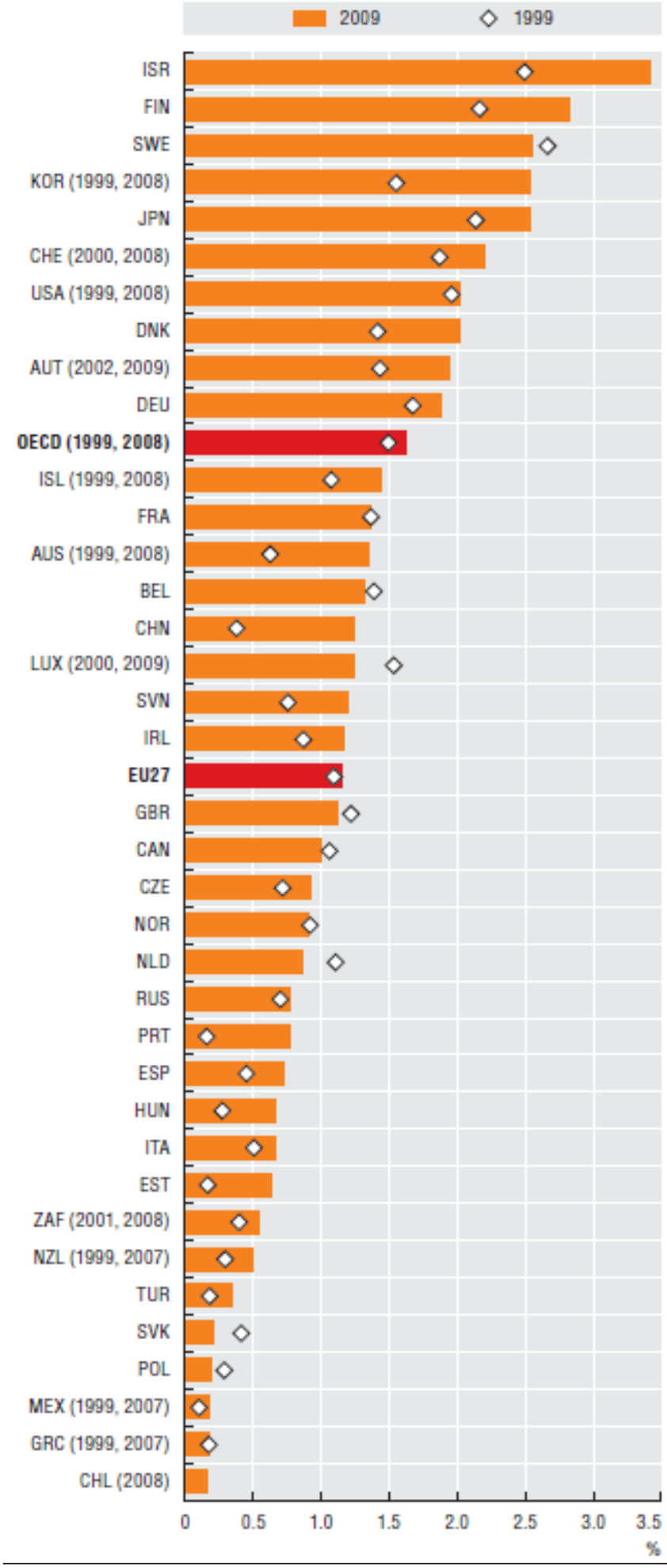


Source: OECD, based on Eurostat (CIS-2008) and national data sources, June 2011. See chapter notes

StatLink: http://dx.doi.org/10.1787/888932487058 [2]

Figure 2: Business enterprise expenditure on R&D, 1999 and 2009

As a percentage of GDP

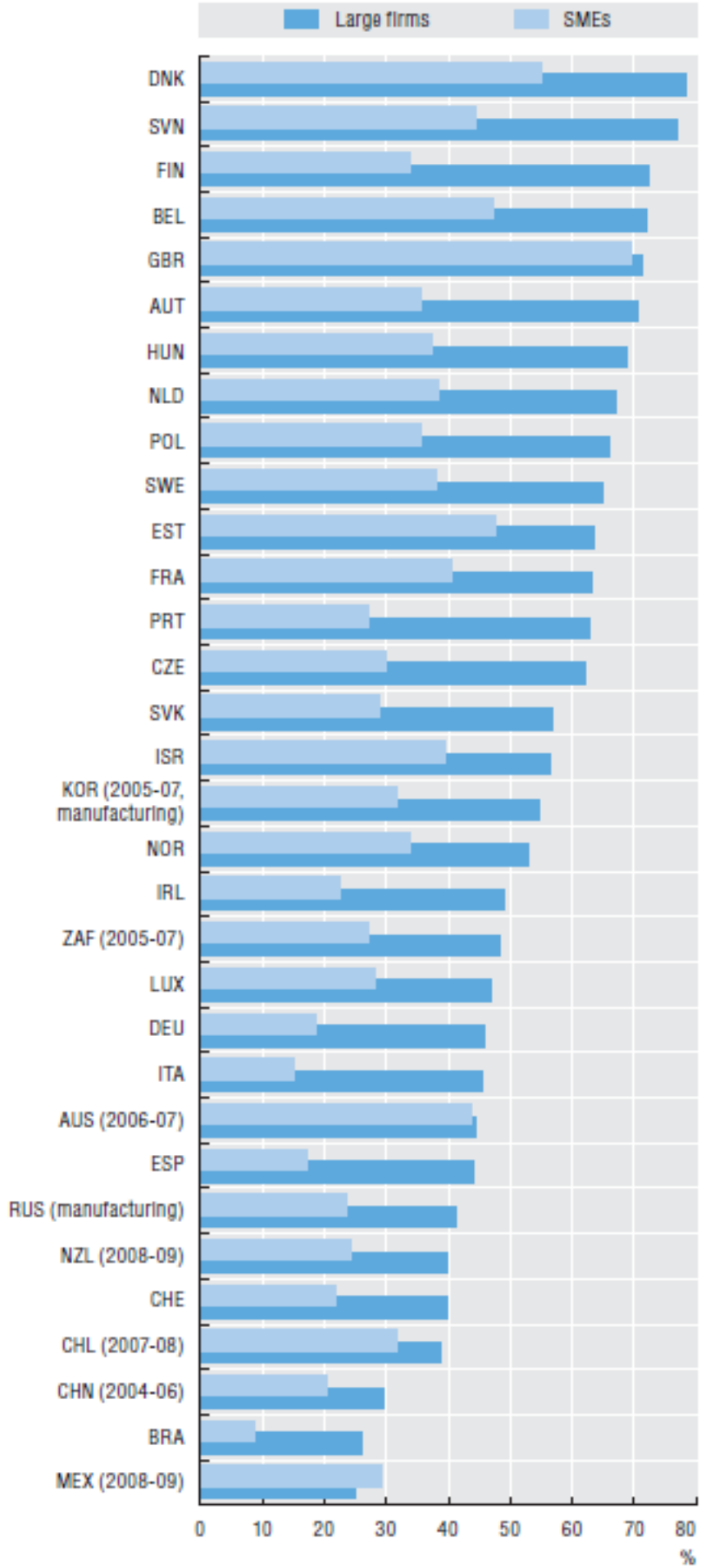

2009
1999
ISR
FIN
SWE
KOR (1999, 2008)
JPN
CHE (2000, 2008)
USA (1999, 2008)
DNK
AUT (2002, 2009)
DEU
OECD (1999, 2008)
ISL (1999, 2008)
FRA
AUS (1999, 2008)
BEL
CHN
LUX (2000, 2009)
SVN
IRL
EU27
GBR
CAN
CZE
NOR
NLD
RUS
PRT
ESP
HUN
ITA
EST
ZAF (2001, 2008)
NZL (1999, 2007)
TUR
SVK
POL
MEX (1999, 2007)
GRC (1999, 2007)
CHL (2008)
0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
%

Source: OECD, Main Science and Technology Indicators Database, June 2011. See chapter notes.

StatLink: http://dx.doi.org/10.1787/888932486070 [3]

Figure 3. Firms collaborating on innovation activities, by size, 2006-08

As a percentage of innovative firms

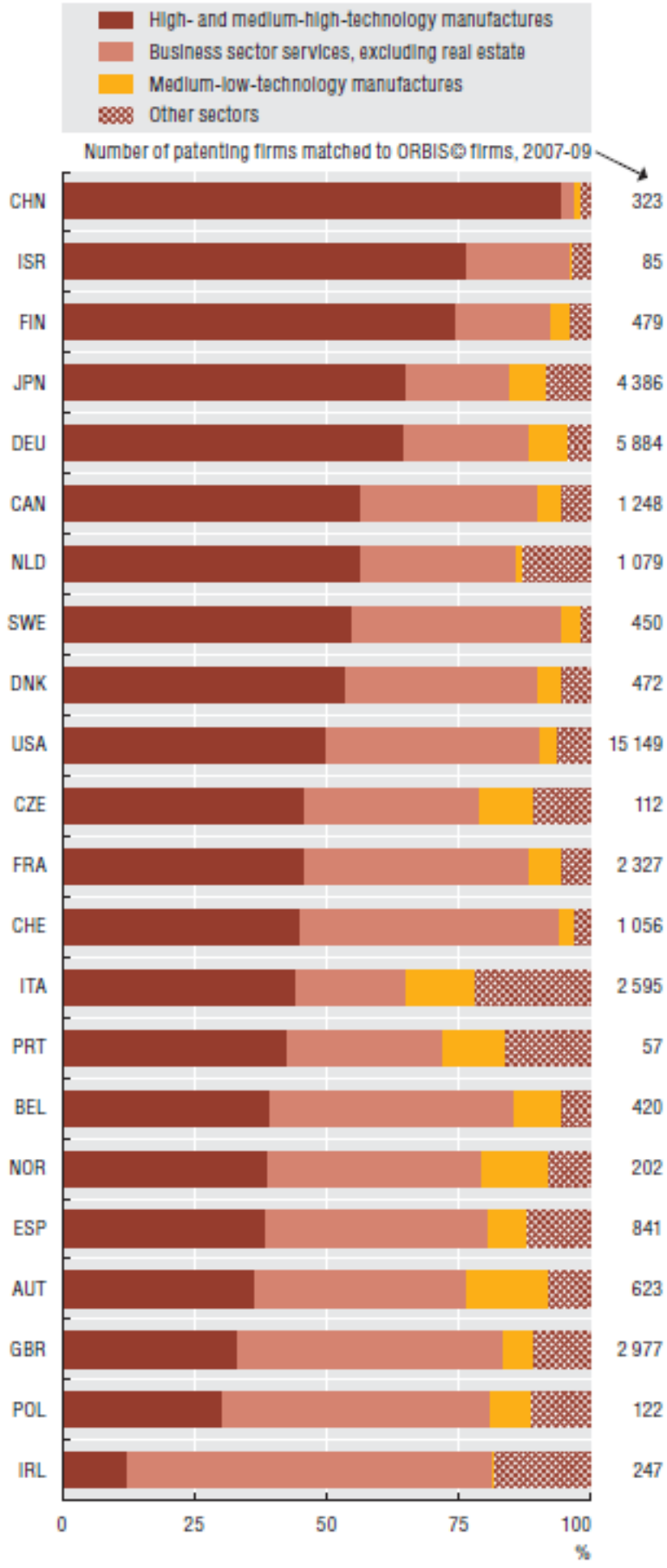


Source: OECD, based on Eurostat (CIS-2008) and national data sources,June 2011. See chapter notes.

StatLink: http://dx.doi.org/10.1787/888932486507 [4]

Figure 4. Patenting activity by sector, 2007-09

As a percentage of patents filed by firms, at the EPO and USPTO


High- and medium-high-technology manufactures
Business sector services, excluding real estate
Medium-low-technology manufactures
Other sectors
Number of patenting firms matched to ORBIS© firms, 2007-09
CHN 323
ISR 85
FIN 479
JPN 4 386
DEU 5 884
CAN 1 248
NLD 1 079
SWE 450
DNK 472
USA 15 149
CZE 112
FRA 2 327
CHE 1 056
ITA 2 595
PRT 57
BEL 420
NOR 202
ESP 841
AUT 623
GBR 2 977
POL 122
IRL 247
0
25
50
75
100
%

Source: OECD, calculations based on the Worldwide Patent Statistical Database, EPO, April 2011; and ORBIS© Database, Bureau van Dijk Electronic Publishing, December 2010; matched using algorithms in the Imalinker system developed for the OECD by IDENER, Seville, 2011. See chapter notes.

StatLink: http://dx.doi.org/10.1787/888932488084 [5]

What are the sources for measuring innovation in firms?

Inputs for measurement include various statistical sources, such as the following:

- Firm level microdata including innovation survey data
- Patents data (see Metrics and evaluation for IPR [6])
- Industry (STAN, IO) data [7]
- STAN database [8]

What types of metrics and evaluation for innovation in firms are needed for innovation policy?

Metrics and evaluation for innovation in firms should:

- Include different dimensions of innovation. Innovation may be characterized by several [illegible] innovation policy agendas.
- Adopt a broad approach to innovation determinants. Innovation is affected by a wide range of factors at multiple levels of analysis (e.g. those determined at the firm, industry, region and country levels).
- Go beyond targets and aggregates to an analysis level that will help understand why and how innovation happens in firms.
- Address the role of government, including central and local government and various agencies, in fostering innovation.
- Capture knowledge interactions since the production of new knowledge is often a collective process involving individuals and organizations within networks.
- Measure the social impacts of innovation, evaluating not only the contribution of innovation to economic performance, but also its impact on well-being and its contributions to achieving social goals

For more details, see Measurement for Innovation Policy (see Measurement for Innovation Policy [10]).

Contributor: OECD

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Related Link: Metrics and evaluation for innovative entrepreneurship
Metrics and evaluation for technology transfer and commercialisation

Links
[1] https://www.innovationpolicyplatform.org/content/innovation-firms?topic-filters=11380
[2] http://dx.doi.org/10.1787/888932487058
[3] http://dx.doi.org/10.1787/888932486070
[4] http://dx.doi.org/10.1787/888932486507
[5] http://dx.doi.org/10.1787/888932488084
[6] https://www.innovationpolicyplatform.org/content/metrics-and-evaluation-ipr?topic-filters=12222
[7] http://www.oecd.org/sti/measuringindustrialperformance.htm
[8] http://stats.oecd.org/Index.aspx?DatasetCode=STAN08BIS&lang=en
[9] http://stats.oecd.org/Index.aspx?DataSetCode=STAN_IO_TOTAL
[10] https://www.innovationpolicyplatform.org/content/measurement-policy?topic-filters=11379