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PREDICT 2016 DATASET METHODOLOGICAL NOTES

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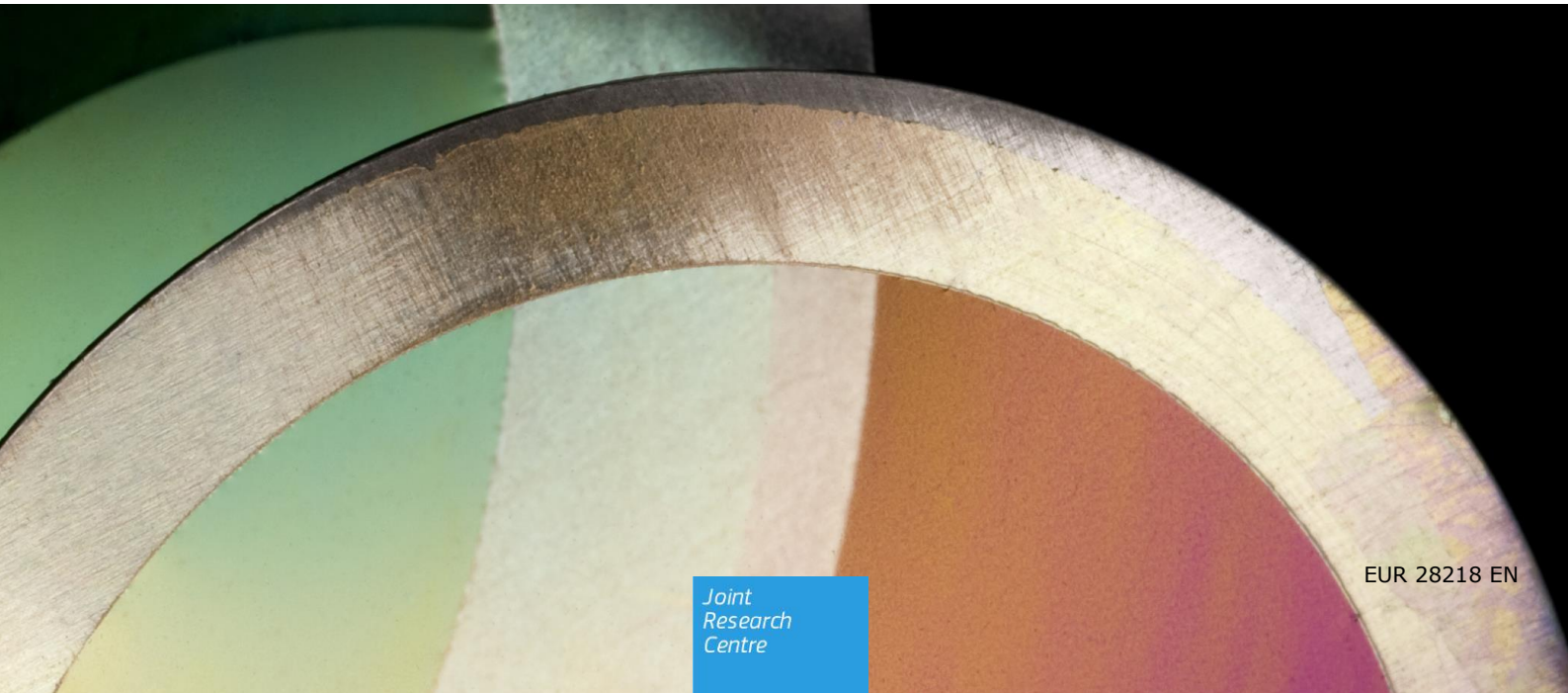

EUR 28218 EN

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Foreword

PREDICT: Prospective Insights on R&D in ICT

PREDICT produces statistics and analyses on ICT industries and their R&D in Europe since 2006. The project covers major world competitors including 40 advanced and emerging countries – the EU28 plus Norway, Russia and Switzerland in Europe; Canada, the United States and Brazil in the Americas; China, India, Japan, Korea and Taiwan in Asia; and Australia – as well as a growing array of indicators related to the ICT content of economic activities.

Rationale

ICTs determine competitive power in the knowledge economy. The ICT sector alone originates almost one fourth of total Business expenditure in R&D (BERD) for the aggregate of the 40 economies under scrutiny in the project. It also has a huge enabling role for innovation in other technological domains, let aside the impact of ICT uptake in the organisation of businesses. This is reflected at the EU policy level, where the Digital Agenda for Europe in 2010 was identified as one of the seven pillars of the Europe 2020 Strategy for growth in the Union and the achievement of a Digital Single Market (DSM) is one of the 10 political priorities set by the Commission since 2015.

Statistics and indicators

PREDICT provides indicators in a wide variety of topics, including value added, employment, labour productivity and BERD, distinguishing fine grain economic activities in ICT and media and content industries (up to 22 individual activities, 14 of which at the class level, i.e. at 4 digits in the ISIC classification) and at a higher level of aggregation for all the other industries in the economy. It also produces data on Government financing of R&D in ICTs, and total R&D expenditure at the country level. Now-casting of more relevant data in these domains is also being performed.

Team

PREDICT is a collaboration between the JRC and the European Commission Communications Networks, Content and Technology (CNECT) Directorate General. Since 2013 data collection and analysis has been carried out jointly by JRC and the Valencian Institute of Economic Research (Instituto Valenciano de Investigaciones Económicas - Ivie).

Acknowledgements

The present Methodological notes have been prepared by the Instituto Valenciano de Investigaciones Económicas (*Valencian Institute of Economic Research*, Ivie) which has collected and processed the data following international standards, in particular the *Guide to measuring the Information Society* (Organisation for Economic Co-operation and Development, OECD 2011).

Abstract

The present report is compiled of the methodological choices that have ruled the production of the 2016 PREDICT dataset.

PREDICT produces statistics and analysis on ICT industries and their R&D in Europe since 2006, and covers the EU's main world competitors, includes data on 40 advanced and emerging countries – i.e. the EU28 plus Norway, Russia and Switzerland in Europe; Canada, the United States and Brazil in the Americas; China, India, Japan, Korea and Taiwan in Asia; and Australia. It also describes a range of indicators.

PART 1: Description of the Database

The Instituto Valenciano de Investigaciones Económicas (*Valencian Institute of Economic Research*, Ivie) has collected and processed data for the European Union (EU), its Members States and some of the major developed, industrialised and emerging economies in the world (Switzerland, Norway, Australia, Brazil, Canada, China, India, Japan, Korea, Russia, Taiwan and United States), following international standards, in particular the *Guide to measuring the Information Society* (Organisation for Economic Co-operation and Development, OECD 2011).

Prospective Insights on R&D in ICT (PREDICT) 2016 database consists of comparable NACE Rev. 2[1] data on the ICT sector —and its sub-sectors—[2], RS sector (Retail sale via mail order houses or via Internet) and other important economic activities for purpose of comparison with ICT sectors. The variables included in this database are Research and Development (R&D) variables: Business R&D Expenditure (BERD), Gross R&D Expenditure (GERD), R&D personnel (PERD) and R&D researchers (RERD). It also includes macroeconomic variables: Gross Value Added (GVA), Gross Domestic Product (GDP), employment, labour productivity and Public Funding of ICT R&D for the period 2006-2014.

The data are organized according to four different classifications for each country and variable:

a) The first dataset consists of the ICT sector and sub-sectors and has been built following a "comprehensive" definition of the ICT sector based on the NACE Rev. 2 classification, which corresponds to the 2007 OECD definition (table 1). This definition consists of five ICT manufacturing sectors: 261 (distinguishing between 2611 and 2612) to 264 and 268, two ICT trade sectors: 4651 and 4652, and five ICT services sectors: 582 (disentangled between 5821 and 5829), 61 (611, 612, 613 and 619), 62 (6201, 6202, 6203 and 6209), 631 (6311 and 6312) and 951 (9511 and 9512).

b) As it is not possible to obtain for all the countries the necessary disaggregated information to estimate all the ICT subsectors included in the comprehensive definition, the second dataset presents what has been called "operational" definition of ICT sector (table 2) that allows international comparisons with more countries over a longer period of time. This definition takes into account the standard distinction between manufacturing and services, but does not include the following sectors: Manufacture of magnetic and optical media (268) and ICT trade industries (465). In addition, ICT services industries are only available for two sub-sectors: Telecommunication (61) and the aggregate Computer and related activities (5820, 62, 631, 951).

c) Additionally, the RS sector (Retail sale via mail order houses or via Internet) is included as a separate section.

d) Finally, the third dataset includes data for other selected industries (table 3) for the purpose of comparison with the ICT sectors and between the EU and the rest of the countries.

The PREDICT 2016 Project database is an extension of the previous database elaborated in the Context of PREDICT Project, inheriting the methodology and procedures developed in the latter project (correspondence tables between NACE Rev. 2 and other national activities classifications –Appendix 1– for example). PREDICT 2016 Project novelties are

[1] Available at http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-015/EN/KS-RA-07-015-EN.PDF

[2] According to latest OECD definition (2007): http://www.oecd.org/science/scienceandtechnologypolicy/38217340.pdf

threefold. Firstly, as described previously, the ICT sector classification is higher, increasing the sectors detailed at 4-digits. Secondly, it includes the RS sector and the disaggregation of ICT GBAORD by NABS chapters. Finally, the data is produced according to the European System of National Accounts (ESA) 2010, recently implemented by Eurostat and the National Statistical Offices.

Section 2 of this document summarizes the main data sources and procedures used in the elaboration of PREDICT 2016 database.

Table 1. ICT sector disaggregation. Comprehensive definition
(based on NACE Rev. 2)

NACE Rev. 2.	Description
261-264, 268, 465, 582, 61, 62, 631, 951	**A. ICT Total [A=B+C]**
261-264, 268	***B. ICT manufacturing industries [B=1 to 5]***
261	[1] Manufacture of electronic components and boards
2611	[1.1] Manufacture of electronic components
2612	[1.2] Manufacture of loaded electronic boards
262	[2] Manufacture of computers and peripheral equipment
263	[3] Manufacture of communication equipment
264	[4] Manufacture of consumer electronics
268	[5] Manufacture of magnetic and optical media
465, 582, 61, 62, 631, 951	***C. ICT total services [C=C1+C2]***
465	*C.1. ICT trade industries [C1=6+7]*
4651	[6] Wholesale of computers, computer peripheral equipment and software
4652	[7] Wholesale of electronic and telecommunications equipment and parts
582, 61, 62, 631, 951	*C.2. ICT services industries [C2=8 to 12]*
582	[8] Software publishing
5821	[8.1] Publishing of computer games
5829	[8.2] Other software publishing
61	[9] Telecommunications
611	[9.1] Wired telecommunications activities
612	[9.2] Wireless telecommunications activities
613	[9.3] Satellite telecommunications activities
619	[9.4] Other telecommunications activities
62	[10] Computer programming, consultancy and related activities
6201	[10.1] Computer programming activities
6202-6203	[10.2] Computer consultancy and computer facilities management activities
6202	[10.2.1] Computer consultancy activities
6203	[10.2.2] Computer facilities management activities
6209	[10.3] Other information technology and computer service activities
631	[11] Data processing, hosting and related activities; web portals
6311	[11.1] Data processing, hosting and related activities
6312	[11.2] Web portals
951	[12] Repair of computers and communication equipment
9511	[12.1] Repair of computers and peripheral equipment
9512	[12.2] Repair of communication equipment

Source: Own elaboration.

Table 2. ICT sector disaggregation. Operational definition
(based on NACE Rev. 2)

NACE Rev. 2	Description
261-264, 61, 582, 62, 631, 951	**A'. ICT Total (operational) [A'=B'+C']**
261-264	**B'. ICT manufacturing industries (operational) [B'=1 to 4]**
261	[1] Manufacture of electronic components and
262	[2] Manufacture of computers and peripheral equipment
263	[3] Manufacture of communication equipment
264	[4] Manufacture of consumer electronics
582, 61, 62, 631, 951	**C'. ICT services industries [C'=9+13]**
61	[9] Telecommunications
582, 62, 631, 951	[13] Computer and related activities [13=8+10+11+12]

Source: Own elaboration.

Table 3. Additional sectors
(based on NACE Rev. 2)

NACE Rev. 2	Description
10-33	Manufacturing
20-21	Manufacture of chemicals and chemical products; Manufacture of pharmaceuticals, medicinal chemical and botanical products
20	Manufacture of chemicals and chemical products
21	Manufacture of pharmaceuticals, medicinal chemical and botanical products
27-28	Manufacture of machinery and equipment
29-30	Manufacture of transport equipment
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
303	Manufacture of air and spacecraft and related machinery
45-47	Wholesale and retail trade, repair of motor vehicles and motorcycles
49-99	Services, except trade
49-53	Transportation and storage
58-63	Information and communication
64-66	Financial and insurance activities
68-82	Professional, scientific, technical, administration and support service activities
69-75	Professional, scientific and technical activities
85	Education
86-88	Human health and social work activities

Source: Own elaboration.

Part 2: Data Collection

1. RESEARCH AND DEVELOPMENT VARIABLES

1.1 BUSINESS R&D EXPENDITURE AND GROSS R&D EXPENDITURE

1.1.1 European Union and its Member States

Sources
Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdindr2&lang=en

Downloaded: 16-11-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdind&lang=en

Downloaded: 18-09-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 1.1))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 16-11-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)

STructuralANalysis Database (STAN) from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 18-09-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD2011_REV3

Downloaded: 18-09-2015
(STAN R&D expenditures by industry (ISIC Rev.3.1))

Statistics on Research and Development (SRD) from National Statistical Institutes

- http://pub.stat.ee/px-web.2001/I_Databas/Economy/28SCIENCE._TECHNOLOGY._INNOVATION/28SCIENCE._TECHNOLOGY._INNOVATION.asp

Downloaded: 16-09-2015
(R&D in business enterprise sector in Estonia)

- http://www.statbank.dk/statbank5a/default.asp?w=1280

Downloaded: 16-11-2015
(Research and development Statistics in Denmark)

- http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Education-and-research/Research/Research-and-development-in-the-business-enterprise-sector/

Downloaded: 16-11-2015
(Research and development in Sweden)

- http://statdat.statistics.sk/

Downloaded: 16-11-2015
(Expenditures on research and development in Slovakia)

- http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft14%2Fp057&file=inebase&L=0

Downloaded: 16-11-2015
(Estadística de I+D. Sector Empresas. Resultados en I+D por rama de actividad)

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 2-10-2015
(Annual enterprise statistics for special aggregates of activities)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

Labour Force Survey (LFS) from Eurostat

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2015
(Employment by economic activity and level of education attained (NACE Rev. 2))

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2015
(Employment by economic activity and level of education attained (NACE Rev. 1.1))

Purchasing power parities (PPP) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015
(Purchasing power parities (PPP))

Remarks

The elaboration of the 2008-2013 BERD (and GERD) NACE Rev. 2 ICT and RS sectors database (in nominal euros and euros PPS) for the EU countries has been based on the information provided by Eurostat and OECD.

The main sources of Business Expenditure R&D data are Statistics on Research and Development (Eurostat) and STAN R&D expenditures (OECD). BERD data has been distributed among ICT (and non-ICT) sectors, according to the latest OECD definition (table 1) using data provided by country and industry from Eurostat and OECD.

The majority of the gaps in BERD sectors have been filled following these steps:

a. Using R&D data provided by National Statistical Institutes for Estonia, Denmark, Sweden, Slovakia and Spain.
b. Using data provided by industry (NACE 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1. This methodology is described in Mas, Robledo and Pérez (2012)[3].
c. When a country has data for some years in Statistics on R&D, we keep either the trend of expenditure or the subsector weight over the years.
d. Using the percentage structure of turnover: weight of the sector 465 (Wholesale of information and communication equipment) in sector G (Wholesale and retail trade; repair of motor vehicles and motorcycles; for Finland, Germany, Greece, Ireland, Luxembourg, Netherlands and Sweden); distribution of the sector 26 (Manufacture of computer, electronic and optical products) to 3-digits (for Finland, Greece, Latvia,

[3] ICT Sector Definition Transition from NACE Rev. 1.1 to NACE Rev. 2: A Methodological Note. JRC Technical Reports (2012). http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5919. See in Appendix 1 the correspondence tables for ICT sectors between from NACE Rev. 1.1 and NACE Rev. 2

Luxembourg and Sweden); weight of the sector 631 (Data processing, hosting and related activities; web portals) in sector 63 (Information service activities; for Belgium, Finland, Greece, Ireland, Lithuania, Luxembourg, Netherlands, Romania and Sweden).

e. Using the United States' R&D/Employment ratio: the relation between this ratio of each NACE subsectors 611, 612, 613 and 619 with regard to sector 61 (Telecommunications) is applied to obtain the R&D/Employment ratio of European countries on these subsectors. The statistics of employment from the SBS (Eurostat) and this estimated R&D/Employment ratio are used to calculate the R&D data on subsectors for European countries. The percentage structure of this data is applied to the 61 sector data for each European country.

f. Using the United States' BERD/Employment ratio: the relation between this ratio of sector 4791 (Retail sale via mail order houses or via Internet) with regard to sector G (45-47, Wholesale and retail trade, repair of motor vehicles and motorcycles) is applied to obtain the BERD/Employment ratio of European countries on sector 4791. The statistics of employment (see sources on employment section) and this estimated BERD/Employment ratio are used to calculate the BERD data on sector 4791 for European countries.

g. Using the average weight of R&D expenditure in countries with sector 951 data (Repair of computers and communication equipment) in sector S-U (Other service activities; sample 17 countries; weight: 12% in 2010, 9,5% in 2011 and 10% in 2012).

Greece and Luxembourg lack official data, therefore, we recommend taking the results with caution. The missing data has been estimated using some alternative methods like NACE Rev. 1.1 data and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1 or the percentage structure of turnover.

Data by industry for European Union is obtained as the sum of the member countries since official data is not available.

We obtain BERD dataset in PPS by using purchasing power parities from Eurostat. GERD data expressed in PPS are provided by Eurostat for each country, and EU data is calculated as the sum of the Member countries.

1.1.2 Norway

Sources
Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdindr2&lang=en

Downloaded: 16-11-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 2))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdind&lang=en

Downloaded: 18-09-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 1.1))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 16-11-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)

STructuralANalysis Database (STAN) from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 18-09-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

Purchasing power parities (PPP) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015
(Purchasing power parities (PPP))

Remarks
The elaboration of the 2008-2013 BERD (and GERD) NACE Rev. 2 ICT and RS sector database (in nominal euros and euros PPS) for Norway has been based on the information provided by Eurostat.

The main source of Business Expenditure R&D data is Statistics on Research and Development (Eurostat). BERD data has been distributed among ICT, RS and additional sectors using data provided by industry from Eurostat. The majority of BERD sector gaps have been filled using data provided by industry (NACE Rev. 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1. When data exists for some years in Statistics on R&D, we keep either the trend of expenditure or the subsector weight over the years to complete gaps.

We obtain BERD dataset in PPS using purchasing power parities coming from Eurostat. GERD data expressed in PPS are provided by Eurostat.

1.1.3 Switzerland

Sources
Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdindr2&lang=en

Downloaded: 16-11-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 2))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdind&lang=en

Downloaded: 18-09-2015
(R&D expenditure at national and regional level. Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 1.1))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 16-11-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)

STructuralANalysis Database (STAN) from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 18-09-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD2011_REV3

Downloaded: 18-09-2015
(STAN R&D expenditures by industry (ISIC Rev.3.1))

Purchasing power parities (PPP) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015
(Purchasing power parities (PPP))

Remarks
The elaboration of the 2006-2013 BERD (and GERD) NACE Rev. 2 ICT and RS sectors database (in nominal euros and euros PPS) for Switzerland has been based on the information provided by Eurostat and OECD.

The main sources of Business Expenditure R&D data are Statistics on Research and Development (Eurostat) and STAN R&D expenditures (OECD). BERD data has been

distributed among the selected sectors using data provided by country and industry from Eurostat and OECD.

Statistics on R&D in Switzerland (*Rechercheetdéveloppement (R-D) dans les entreprises*) are conducted every four years. Only two years are available: 2008 and 2012. The majority of the gaps in BERD sectors have been filled using data provided by industry (NACE Rev. 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1.

We obtain BERD dataset in PPS using purchasing power parities coming from Eurostat. GERD data expressed in PPS are provided by Eurostat.

1.1.4 Australia

Sources
Research and Experimental Development, Businesses from Australian Bureau of Statistics (ABS)

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/BAE5FB25D2121F6DCA2568A9001393EF?opendocument

Downloaded: 15-10-2015
(Gross Expenditure on R&D and Business expenditure on R&D)

Research and Experimental Development, Higher Education Organisations, Australia

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8111.02012?OpenDocument

Downloaded: 15-10-2015
(Higher education expenditure on R&D)

Research and Experimental Development, Government and Private Non-Profit Organisations, Australia

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8109.02012-13?OpenDocument

Downloaded: 15-10-2015
(Government expenditure on R&D and Private non-profit expenditure on R&D)

STructural ANalysis Database (STAN) from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 4) and Gross Expenditure on R&D)

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The elaboration of the BERD database for Australia has been based on the information provided by OECD, as it has already published NACE Rev. 2 data (ISIC Rev. 4).

For industries not disaggregated in the OECD database, the information provided by Australian Bureau of Statistics (ABS) in the publication "Research and Experimental Development, Businesses" has been used, with the correspondence tables between ANSZIC 2006 and NACE Rev. 2[4].

There is no available information on 2012 BERD and GERD for Australia, as the frequency of the "Survey of Research and Experimental Development (R&D), Businesses" has changed from annual to biennial, and 2012 is the first year without data. This is the reason why, in the case of 2012, the ABS statistics on Government and private non-profit and higher education R&D expenditure have been used as a basis to estimate BERD and GERD evolution, combined with the information of 2013. This national information has been completed with the OECD databases on R&D variables. In order to obtain the required sectoral disaggregation, structures and average growth rates from previous and next years have been used.

ICT sector NACE 261 (Manufacture of electronic components and boards) includes ICT sector NACE 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media) in Australia, as there is not enough information to separate these sectors. ICT subsector 612 (Wireless telecommunications activities) includes ICT subsector NACE 613 (Satellite telecommunications activities), as these two industries are defined as a single industry in ANSZIC. In addition, NACE 4791 (Retail sale via mail order houses or via Internet) incudes Other retail sale not in stores, stalls or markets (NACE class 4799), as there is not enough information to separate these activities.

ICT sector database does not include information at 4-digits NACE level in the case of Australia. We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.5 Brazil

Sources
PINTEC, Survey of Technological Innovation from Instituto Brasileiro de Geografia e Estatística (IBGE)

- http://www.ibge.gov.br/home/estatistica/economia/industria/pintec/2011/default.shtm

Downloaded: 31-01-2014

Science, Technology and Innovation Data from UNESCO Institute for Statistics (UIS)

- http://www.uis.unesco.org/DataCentre/Pages/BrowseScience.aspx

Downloaded: 10-03-2015

Annual Survey of Industry from IBGE

- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 14-01-2015
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

[4] See: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1292.0.55.0052008?OpenDocument. Also, the Ivie has elaborated correspondence tables for ICT sectors between NACE Rev. 2 and ANZIC 2006 (see Appendix 1).

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of the BERD database for Brazil has been based on the information provided by IBGE in the Survey of Technological Innovation (PINTEC). We have used PINTEC data by industry and correspondences between CNAE 2 and NACE Rev. 2 to distribute R&D expenditure among ICT, RS and selected non-ICT sectors[5]. However, PINTEC survey is only available for 2008 and 2011, as it is only conducted every three years.

Gross value of industrial production from Industrial Survey (IBGE) has been also used, in order to distribute the R&D expenditures between ICT Sector NACE 263 (Manufacture of communication equipment), 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media). It has also been used to estimate NACE 303 (Manufacture of air and spacecraft and related machinery).

ICT sector NACE 62 (Computer programming, consultancy and related activities) includes ICT sector NACE 582 (Software publishing). In addition, for Brazil there is no information for the ICT trade sector (NACE 465) and for one ICT services sector: 951 (Repair of computers and communication equipment). Also, there is no available information on BERD at 4-digits NACE.

Moreover, Brazil's dataset does not contain information for RS sector (NACE 4791) and macro-sectors NACE 45 (Wholesale and retail trade and repair of motor vehicles and motorcycles), 85 (Education) and the aggregations 49-99 (Services, except trade), 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and 86-88 (Human health and social work activities).

Data for GERD come from UNESCO-UIS database.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.6 Canada

Sources

Science and Technology Indicators from Statistics Canada

- http://www5.statcan.gc.ca/subject-sujet/subtheme-soustheme.action?pid=193&id=3212&lang=eng&more=0

Downloaded: 22-10-2015
NA from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a33?RT=TABLE&themeID=311&spMode=tables&lang=eng

[5] The correspondence between CNAE 2 and ISIC Rev. 4 is available at: http://www.ibge.gov.br/home/estatistica/economia/classificacoes/cnae2.0/defaulttab.shtm. Ivie has also elaborated a correspondence table for ICT and RS sectors between NACE Rev. 2 and CNAE 2 (see Appendix 1).

Downloaded: 02-10-2015
Labour Force Survey from Statistics Canada
- http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=2820008

Downloaded: 02-10-2015

Annual Survey of Service Industries: Software Development and Computer Services, from Statistics Canada
- http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3540005&pattern=3540005&searchTypeByValue=1&p2=35

Downloaded: 23-07-2013

Annual Wholesale Trade Survey, from Statistics Canada
- http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=0810014

Downloaded: 02-10-2015

Annual Retail Non-Store Survey
- http://www5.statcan.gc.ca/subject-sujet/subtheme-soustheme.action?pid=60000&id=60001&lang=eng&more=0

Downloaded: 02-10-2015

STructural ANalysis Database (STAN) from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 4))

Research and Development Statistics from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 3.1 and ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Gross expenditure on R&D)

Exchange rates and PPP from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The elaboration of the database for Canada has been based on the information provided by OECD as it has already published ISIC Rev. 4 data. The R&D expenditures have been distributed among ICT, RS and the other selected sectors, using the correspondence tables between ISIC Rev. 4 and NACE Rev. 2.

In some years it has been necessary to use additional information to estimate specific sectors. In these cases, information provided by Statistics Canada in its key socioeconomic database CANSIM, Science and Technology Indicators has been used. R&D

expenditures have been distributed among sectors using the correspondence tables between NAICS and ISIC Rev. 4[6].

In the case of some sectors, additional sources and variables need to be used:

- Total Operating Revenue from Annual Retail Non-Store Survey (Statistics Canada) has been used to estimate sector NACE 4791 (Retail sale via mail order houses or via Internet).
- Gross Domestic Product from National Accounts (Statistics Canada) has been used, especially in the initial years of the database, to estimate ICT sectors NACE 61 (Telecommunications) and NACE 631 (Data processing, hosting and related activities; web portals), and the NACE sections M-N (Professional, scientific, technical, administration and support service activities), M (Professional and scientific activities) and P (Education).
- Operating Revenue from Annual Survey of Service Industries: Software Development and Computer Services (Statistics Canada) has been used to estimate ICT sector NACE 582 (Software publishing).
- BERD/employment ratios have been used to estimate the disaggregation of NACE sector 61, applying the ratios' structures of the US, as in the case of the European countries (see section 1.1.1).

Canada dataset does not contain information for one ICT services sector (951, Repair of computers and communication equipment). Also, ICT sectors at 4-digits are not available, as no information is published at that level of detail.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.7 China

Sources

China Statistical Yearbook on Science and Technology from National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/

Downloaded: 26-10-2015

The Second R&D Resources Inventory Survey Compilation 2009 from National Bureau of Statistics of China

- Information provided by Gao Changlin, Li Xiuquan and Xuan Zhaohui, from Chinese Academy of Science and Technology for Development (CASTED)

China National Expenditures on Science and Technology Statistics from National Bureau of Statistics of China

- http://www.stats.gov.cn/english/

Downloaded: 26-09-2013

Statistics on Education, Science and Technology in High-tech Industry by Industrial Sector from China Statistical Yearbook, compiled by National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 26-10-2015

[6] The correspondence between NAICS and ISIC Rev. 4 is available at: http://www.statcan.gc.ca/concepts/concordances-classifications-eng.htm. Ivie has also elaborated a correspondence table for ICT and RS sectors between NACE Rev. 2 and NAICS (see Appendix 1).

STructural ANalysis Database (STAN) from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY

Downloaded: 27-09-2013
(STAN R&D expenditures by industry (ISIC Rev. 3.1.))

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Gross expenditure on R&D)
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of BERD and GERD database for China has been based on the information provided by OECD as it has already published ISIC Rev. 4 data. The R&D expenditures have been distributed among ICT, RS and the other selected sectors, using the correspondence tables between ISIC Rev. 4 and NACE Rev. 2.

In some years it has been necessary to use additional information to estimate specific sectors. In these cases, information provided by the National Bureau of Statistics of China in The Second R&D Resources Inventory Survey Compilation, China Statistical Yearbook, China Statistical Yearbook on Science and Technology and National Expenditures on Science and Technology Statistics has been used. However, the correspondence between NACE Rev. 2 and China classification of activities is approximate, as it is based on the correspondences between Chinese industry classification and ISIC Rev. 3 (NACE Rev. 1.1)[7]. In addition, China lacks official data for the initial years and they have been estimated by interpolation or by applying the growth rates of a higher aggregated sector. Information of Korea's BERD structure has also been used to split some services industries (NACE sectors 58, Publishing activities, and 63, Information service activities). Therefore, we recommend taking the results with caution. When necessary, R&D expenditure has also been distributed among sectors, using structures from next/previous years.

China dataset does not contain information for ICT trade sector, Retail sale via mail order houses or via Internet sector (NACE 4791) and NACE sectors 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), 58-63 (Information and communication) (in this case for the initial years), 85 (Education) and 951 (Repair of computers and communication equipment). Also, the disaggregation at 3-4-digits of ICT sectors 261, 582, 61, 62, 631 and 951 is not available, as there is no information with such industry detail.

[7] The correspondence between Chinese SIC and ISIC Rev. 3 is available at: http://www.stats.gov.cn/tjbz/t20040210_402369833.htm

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.8 India

Sources
Research and Development Statistics from National Science and Technology Management Information System (NSTMIS), Department of Science and Technology, Government of India

- http://www.nstmis-dst.org/Publication.aspx

Downloaded: 20-10-2015

World Input-Output Database ISIC Rev. 3 (WIOD)

- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 22-01-2014
(National Input-Output Tables, Released November 2013)

- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 10-07-2014
(Socio Economic Accounts, Released July 2014)

Annual Survey of Industries from MOSPI

- http://mospi.nic.in/mospi_new/site/inner.aspx?status=3&menu_id=56

Downloaded: 18-11-2014

Science, Technology and Innovation Data from UNESCO Institute for Statistics (UIS)

- http://www.uis.unesco.org/DataCentre/Pages/BrowseScience.aspx

Downloaded: 15-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The elaboration of BERD and GERD database for India has been estimated using the information provided by the National Science and Technology Management Information System (NSTMIS) in the Research and Development Statistics and the R&D UIS database.

India dataset has been obtained using approximate correspondences between the classification of activities used in the Research and Development Statistics of India and NACE Rev. 1.1. Therefore, results for India must be taken with caution.

In order to distribute R&D expenditure between some manufacturing subsectors we have used the output structure from the Annual Survey of Industries (ASI). Information from WIOD has also been used to estimate other non-manufacturing sectors with non-available information.

To estimate ICT services, the assumption is made that total ICT services sector has the same BERD intensity as the sum of NACE sector 61 (Telecommunications) and 62

(Computer programming, consultancy and related activities). As ICT services GVA is available, an estimation for ICT services BERD can be obtained. BERD intensities of total ICT services have been also used to estimate some ICT services subsectors. In order to estimate some additional macro-sectors, the structure from the most similar country in the sample according to BERD by industry (United Kingdom) has been used.

In addition, the sectoral distribution of 2011 and 2012 has been estimated by using information on previous years' structures.

India dataset does not contain information for the ICT trade industries (NACE Rev. 2 465) and NACE sector 4791 (Retail sale via mail order houses or via Internet). Also, the disaggregation of some ICT subsectors at 3 or 4-digits is not available for this country.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.9 Japan

Sources
Annual Survey of Research and Development from Japan's Ministry of Internal Affairs and Communication (MIC)

- http://www.stat.go.jp/english/data/kagaku/index.htm

Downloaded: 23-10-2015

STructural ANalysis Database (STAN) from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Total intramural R&D expenditure (GERD) by sectors of performance and source of funds)

Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_berdindr2&lang=en

Downloaded: 19-10-2015
(Business enterprise R&D expenditure (BERD) by economic activity (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 19-10-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The elaboration of BERD and GERD database for Japan has been based on the information provided by OECD as it has already published ISIC Rev. 4 data.

In some years it has been necessary to use additional information to estimate specific ICT subsectors, such as 261 (Manufacture of electronic components and boards), 264 (Manufacture of consumer electronics), 268 (Manufacture of magnetic and optical media) and 631 (Data processing, hosting and related activities; web portals). In order to estimate these ICT sectors, data from Japan's Annual Survey of Research and Development has been used, as this survey presents a higher disaggregation in years 2010 and 2012. The structure from these years has been used to disaggregate the industry classification of other years.

Japan dataset does not contain information for sectors NACE 4791 (Retail sale via mail order houses or via Internet), 85 (Education), 86-88 (Human health and social work activities) and one ICT industry: 951 (Repair of computers and communication equipment). In addition, ICT sector 62 (Computer programming, consultancy and related activities) includes ICT sector 582 (Software publishing) and it is not possible to estimate the disaggregation of some ICT sectors in 3-4-digits NACE, as there is not enough available information to do that.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.10 Korea

Sources
Survey of Business activities from Statistics Korea
- http://kosis.kr/eng/statisticsList/statisticsList_01List.jsp?vwcd=MT_ETITLE&parentId=K

Downloaded: 17-02-2014

Wholesale and Retail trade Survey from Statistics Korea
- http://kostat.go.kr/portal/english/surveyOutlines/5/2/index.static

Downloaded: 09-10-2015

Economically Active Population Survey from Statistics Korea
- http://kosis.kr/eng/database/database_001000.jsp?listid=B&subtitle=Employment/Labor/Wage

Downloaded: 08-10-2015

STructural ANalysis Database (STAN) from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))

Research and Development Statistics from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(Business R&D expenditure by industry (ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Gross expenditure on R&D)

Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 19-10-2015

(Total intramural R&D expenditure (GERD) by sectors of performance)
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of the BERD and GERD database for Korea has been based on the information provided by OECD as it has already published ISIC Rev. 4 data (NACE Rev. 2).

In order to obtain an estimation of RS sector (NACE 4791, Retail sale via mail order houses or via Internet), US BERD/employment ratios have been used to adjust data coming from OECD database. However, the results must be taken with caution.

Korea dataset does not contain information for the ICT trade sector (NACE 465) and the NACE Rev. 2 section Q (Human health and social work activities) for the years 2006 to 2008. In addition, the disaggregation at 3-4 digits of the ICT sectors 261, 582, 61, 62 and 951 is not available.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.11 Russia

Sources

Russian Science and Technology at a Glance from Russian Centre for Science Research and Statistics (CSRS)

- http://www.csrs.ru/english/statis/default.htm

Downloaded: 10-07-2013
R&D data from Rosstat (Russian Federal State Statistics Service)

- Information provided by Galina Lyubova (Department of Foreign Statistics and International Cooperation from Rosstat)

National Accounts NACE Rev. 1.1 from Federal State Statistic Service of Russian Federation (Rosstat)

- http://www.gks.ru/free_doc/new_site/vvp/tab10a.xls

Downloaded: 15-01-2015
Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 29-10-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)
Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdtot&lang=en

Downloaded: 19-10-2015
(Total intramural R&D expenditure (GERD) by sectors of performance)
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)
PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of the BERD and GERD database for Russia has been based on the information by industry provided by the annual publication *Russian Science and Technology at a Glance* (CSRS) and by Rosstat.

The R&D expenditures have been distributed among ICT and non-ICT selected sectors, using approximate correspondences between ISIC Rev. 4 and ISIC Rev. 3.1 (see Appendix 1), which have a direct correspondence with the classification of industries of Russian R&D statistics. In addition, some assumptions need to be done to estimate business R&D expenditure by industry, as the available information by industry refers to total R&D expenditure (GERD). For this reason, national data have been re-adjusted to OECD and Eurostat total business R&D figures.

Russia dataset does not contain information for sectors NACE 20 (Manufacture of chemicals and chemical products), 21 (Manufacture of pharmaceuticals, medicinal chemical and botanical products), 303 (Manufacture of air and spacecraft and related machinery), 45 (Wholesale and retail trade and repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and ICT sectors 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 268 (Manufacture of magnetic and optical media), 4652 (Wholesale of electronic and telecommunications equipment and parts), 582 (Software publishing) and its disaggregation, 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 62 (Computer programming, consultancy and related activities) and its disaggregation, 631 (Data processing, hosting and related activities; web portals) and its disaggregation at 4-digits and 951 (Repair of computers and communication equipment) and its disaggregation at 4-digits NACE. However, an estimation for total ICT services is available.

Sector NACE 4791 (Retail sale via mail order houses or via Internet) is also not available.

Data for GERD come from Eurostat.

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.12 Taiwan

Sources
National Science and Technology Survey from Taiwan's Ministry of Science and Technology

- https://ap0512.most.gov.tw/WAS2/English/AsTechnologyEStatisticsList.aspx

Downloaded: 24-10-2015
Census Statistics from National Statistics of Taiwan

- http://eng.stat.gov.tw/lp.asp?ctNode=1624&CtUnit=774&BaseDSD=7&mp=5

Downloaded: 07-10-2015

Labour Force Statistics (Manpower Survey): Employed persons, by mid-category of industries and class of workers, 2004-2013

- Information provided by Teresa Chang (Directorate General of Budget, Accounting and Statistics (DGBAS) of Executive Yuan, Taiwan)

STructural ANalysis Database (STAN) from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))
Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Gross expenditure on R&D)
Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)
PPP from International Monetary Fund (IMF)

- http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/download.aspx

Downloaded: 27-10-2015
(Exchange rates and PPPs: national currency per US dollar)

Remarks

The elaboration of BERD and GERD database for Taiwan has been based on the information by industry provided by OECD as it has already published ISIC Rev. 4 data. The R&D expenditures have been distributed among ICT, RS and non-ICT selected sectors, using the correspondence table between ISIC Rev. 4 and NACE Rev. 2 (see Appendix 1).

In the case of RS sector (NACE 4791, Retail sale via mail order houses or via Internet), US BERD/employment ratios have been used to adjust Taiwan data, as in the case of the European countries (see section 1.1.1 for more details).

Taiwan dataset does not contain information for sectors NACE 303 (Manufacture of air and spacecraft and related machinery) and NACE section P (Education) in the initial year of the period (2008). It also does not contain data for ICT subsectors 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 4651 (Wholesale of computers, computer peripheral equipment and software), 4652 (Wholesale of electronic and telecommunications equipment and parts), 5821 (Publishing of computer games), 5829 (Other software publishing), 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 6201 (Computer programming activities), 6202 (Computer consultancy activities), 6203 (Computer facilities management activities), 6209 (Other information technology and computer service activities), 6311 (Data processing, hosting and related activities), 6312 (Web portals), 9511 (Repair of computers and peripheral equipment) and 9512 (Repair of communication equipment).

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.1.13 United States

Sources
Business R&D and Innovation Survey (BRDIS) from National Science Foundation and United States Census Bureau
- http://www.nsf.gov/statistics/srvyindustry/#tabs-2

Downloaded: 19-10-2015
- Information provided by Raymond M. Wolfe (Economist & Senior Analyst of National Science Foundation 's National Center for Science and Engineering Statistics (NCSES))

Science and Engineering Indicators from National Science Foundation and United States Census Bureau
- http://www.nsf.gov/statistics/seind14/index.cfm/appendix/tables.htm

Downloaded: 05-03-2014

Survey of Industrial Research and Development (SIRD) from National Science Foundation
- http://www.nsf.gov/statistics/industry/

Downloaded: 10-09-2013

STructural ANalysis Database (STAN) from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV4

Downloaded: 15-10-2015
(STAN R&D expenditures by industry (ISIC Rev. 4))
Research and Development Statistics from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=BERD_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D expenditures by industry (ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=GERD_FUNDS

Downloaded: 15-10-2015
(Gross expenditure on R&D)

Exchange rates and PPP from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en

Downloaded: 21-10-2015
(Exchange rates)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_aux_cra&lang=en

Downloaded: 27-10-2015
(Purchasing power parities)

PPP from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The elaboration of the BERD database for the United States has been based mainly on the information provided by OECD in the STAN database. As this source does not include information for US in 2013, data for this year come directly from Business R&D and Innovation Survey (BRDIS) (National Science Foundation and United States Census Bureau).

In order to complete the distribution by industry for the years 2008 to 2012, information coming from Business R&D and Innovation Survey (BRDIS) and from the publication Science and Engineering Indicators (National Science Foundation and United States Census Bureau) has also been used, especially for the ICT sectors/subsectors and RS

sector. The R&D expenditures have been distributed among ICT, RS and selected macro-sectors, using the correspondence tables between NAICS and NACE Rev. 2[8].

As 2008 and 2011 BRDIS data have greater industrial disaggregation, these years' structure has been used to distribute R&D expenditures in other years, especially among certain ICT sectors.

For the years 2006 and 2007, R&D expenditures have been also distributed among ICT (and non ICT) sectors using BERD from United States Science and Engineering Indicators (National Science Foundation and United States Census Bureau) and from Survey of Industrial Research and Development (National Science Foundation).

United States dataset does not contain information for ICT trade industries (NACE 465, 4651 and 4652) and one ICT services sector: 951 (Repair of computers and communication equipment). It also does not offer the disaggregation at 4-digits of ICT sectors 261, 582, 62 and 631, as there is no available information with such detail.

Sector 85 (Education) are also not available (except for 2008).

We obtain BERD in euros and PPS using exchange rates and purchasing power parities coming from OECD and Eurostat.

1.2 R&D PERSONNEL

1.2.1 European Union and its Member States

Sources

Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015

(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015

(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Labour Force Survey (LFS) from Eurostat

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2015

(Employment by economic activity and level of education attained (NACE Rev. 2))

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2015

(Employment by economic activity and level of education attained (NACE Rev. 1.1))

Statistics on Research and Development (SRD) from National Statistical Institutes

- http://pub.stat.ee/px-web.2001/I_Databas/Economy/28SCIENCE._TECHNOLOGY._INNOVATION/28SCIENCE._TECHNOLOGY._INNOVATION.asp

Downloaded: 16-11-2015

(R&D in business enterprise sector in Estonia)

- http://www.statbank.dk/statbank5a/default.asp?w=1280

[8] The correspondences between different versions of US NAICS and ISIC Rev. 4 are available at http://www.census.gov/eos/www/naics/concordances/concordances.html. Ivie has also elaborated a correspondence table for ICT and RS sectors (see Appendix 1)

Downloaded: 16-11-2015
(Research and development Statistics in Denmark)

- http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Education-and-research/Research/Research-and-development-in-the-business-enterprise-sector/

Downloaded: 16-11-2015
(Research and development in Sweden)

- http://statdat.statistics.sk/

Downloaded: 16-11-2015
(Expenditures on research and development in Slovakia)

- http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft14%2Fp057&file=inebase&L=0

Downloaded: 16-11-2015
(Estadística de I+D. Sector Empresas. Resultados en I+D por rama de actividad)

Remarks

The elaboration of the 2008-2013 R&D Personnel NACE Rev. 2 ICT and RS sector database (in full-time equivalent) for the EU countries has been based on the information provided by Eurostat.

The main source of R&D Personnel data is Statistics on Research and Development (Eurostat). This data has been distributed among ICT sectors, according to the latest OECD definition (table 1), RS and other selected sectors using data provided by country and industry from Eurostat.

The majority of the gaps in the sectors have been completed following these steps:

a. Using R&D data provided by National Statistical Institutes for Estonia, Denmark, Sweden, Slovakia and Spain.
b. Using data provided by industry (NACE Rev. 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1 (Mas, Robledo and Pérez 2012)[9].
c. When a country has data for some years in Statistics on R&D, we keep either the trend of expenditure or the subsector weight over the years.
d. Using the percentage structure of Highly Qualified Employment (Labour Force Statistics from Eurostat): weight of the sector 465 (Wholesale of information and communication equipment) in sector G (Wholesale and retail trade; repair of motor vehicles and motorcycles; for Finland, Germany, Greece, Ireland, Luxembourg, Netherlands and Sweden); distribution of the sector 26 (Manufacture of computer, electronic and optical products) to 3-digits (for Finland, Greece, Latvia, Luxembourg and Sweden); weight of the sector 631 (Data processing, hosting and related activities; web portals) in sector 63 (Information service activities; for Belgium, Finland, France, Greece, Ireland, Luxembourg, Romania and Sweden).
e. Using the percentage structure of Highly Qualified Employment (Labour Force Statistics from Eurostat): the weight of the subsectors 611, 612, 613 and 619 in sector 61 (Telecommunications) is applied to R&D data on sector 61 for each European countries.
f. Using the United States' RERD/BERD ratio: the relation between this ratio for sector 4791 (Retail sale via mail order houses or via Internet) with regard to sector G (45-47, Wholesale and retail trade, repair of motor vehicles and motorcycles) is applied to obtain the RERD/BERD ratio of European countries on sector 4791. The BERD data of European countries and this estimated RERD/BERD ratio are used to calculate RERD data on sector 4791.

[9] ICT Sector Definition Transition from NACE Rev. 1.1 to NACE Rev. 2: A Methodological Note. JRC Technical Reports (2012). http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5919. See in Appendix 1 the correspondence tables for ICT sectors between from NACE Rev. 1.1 and NACE Rev. 2

To estimate PERD data, the PERD/RERD ratio for each one European countries on sector G* [G (45-47, Wholesale and retail trade, repair of motor vehicles and motorcycles) – 465 (Wholesale of information and communication equipment)] is used. The PERD data is obtained by applying this ratio to RERD data.

g. Using the average weight of R&D personnel and researchers in countries with data of the ratio of sector 951/sector S-U (Repair of computers and communication equipment/Other service activities; sample 17 countries; weight: 14% in 2009, 17% in 2010, 14% in 2011 and 16% in 2012).

Greece and Luxembourg lack official data, therefore, we recommend taking the results with caution. The missing data has been estimated using some alternative methods like NACE Rev. 1.1 data and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1 or percentage structure of Highly Qualified employment.

Data by industry for European Union is obtained as the sum of the member countries since official data is not available.

1.2.2 Norway

Sources
Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks
The elaboration of the 2008-2013 R&D Personnel NACE Rev. 2 database (in full-time equivalent) for Norway has been based on the information provided by Eurostat.

The main source of R&D Personnel data is Statistics on Research and Development (Eurostat). This data has been distributed among the selected sectors (ICT, RS and additional sectors), using data provided by country and industry from Eurostat.

The majority of the gaps in the sectors have been filled using data provided by industry (NACE 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1. When data exists for some years in Statistics on R&D, we keep either the trend of expenditure or the subsector weight over the years to complete gaps.

1.2.3 Switzerland

Sources
Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks
The elaboration of the 2008-2013 R&D Personnel NACE Rev. 2 database (in full-time equivalent) for Switzerland has been based on the information provided by Eurostat.

The main source of R&D Personnel data is Statistics on Research and Development (Eurostat). This data has been distributed among ICT (and non-ICT) sectors, according to the latest OECD definition (table 1) using data provided by country and industry from Eurostat. The same has been done to obtain RS sector.

Statistics on R&D in Switzerland (*Rechercheetdéveloppement (R-D) dans les entreprises*) is conducted every four years. Only two years are available: 2008 and 2012. The majority of the gaps in PERD sectors have been filled using data provided by industry (NACE 1.1.) from Eurostat and the correspondence table between NACE Rev. 2 and NACE Rev. 1.1.

1.2.4 Australia

Sources
Research and Experimental Development, Businesses from Australian Bureau of Statistics (ABS)
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/BAE5FB25D2121F6DCA2568A9001393EF?opendocument

Downloaded: 15-10-2015
(R&D personnel)
Research and Experimental Development, Higher Education Organisations, Australia
- http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/8111.0?OpenDocument

Downloaded: 15-10-2015
(Higher education R&D personnel)

Research and Experimental Development, Government and Private Non-Profit Organisations, Australia
- http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/8109.0?OpenDocument

Downloaded: 15-10-2015
(Government R&D personnel and Private non-profit R&D personnel)

Research and Development Statistics from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 3.1))

Remarks
The elaboration of the database for Australia has been based on the information provided by OECD, as it has already published NACE Rev. 2 data (ISIC Rev. 4). For industries not disaggregated in the OECD database, the information provided by Australian Bureau of

Statistics has been used, distributing R&D personnel among sectors using the correspondence tables between ANSZIC 2006 and NACE Rev. 2[10].

When necessary, methods such as interpolation have been used in the case of some industries to complete the database.

There is no available data for 2012 in the case of Australia, as the frequency of the "Survey of Research and Experimental Development (R&D), Businesses" has changed from annual to biennial, and 2012 is the first year without information. This is the reason why, in the case of 2012, the ABS statistics on Government and private non-profit and higher education R&D expenditure have been used in combination with 2013 official R&D personnel figures to estimate business R&D personnel evolution. This information has been completed with the one offered by OECD databases on R&D variables. In order to obtain the required sectoral disaggregation, structures and average growth rates from previous years have been used.

ICT sector NACE 261 (Manufacture of electronic components and boards) includes ICT sector NACE 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media) in Australia, as there is not enough information to separate these sectors. ICT subsector 612 (Wireless telecommunications activities) includes ICT subsector NACE 613 (Satellite telecommunications activities), as these two industries are defined as a single industry in ANSZIC. In addition, NACE 4791 (Retail sale via mail order houses or via Internet) incudes Other retail sale not in stores, stalls or markets (NACE class 4799), as there is not enough information to separate these activities.

ICT sector database does not include information at 4-digits NACE level in the case of Australia.

1.2.5 Brazil

Sources
PINTEC, Survey of Technological Innovation from Instituto Brasileiro de Geografia e Estatística (IBGE)

- http://www.ibge.gov.br/home/estatistica/economia/industria/pintec/2011/default.shtm

Downloaded: 31-01-2014
Annual Survey of Industry from IBGE

- http://www.ibge.gov.br/english/estatistica/economia/industria/pia/empresas/2013/defaultempresa.shtm

Downloaded: 14-01-2015

Remarks
The elaboration of the R&D personnel database for Brazil has been based on the information provided by IBGE, in the Survey of Technological Innovation (PINTEC 2008 and 2011). We have used PINTEC data by industry and correspondences between CNAE 2 and NACE Rev. 2 to distribute R&D personnel among sectors[11]. However, PINTEC survey is only available for 2008 and 2011, as it is only conducted every three years.

The distribution of Wages from Industrial Survey (IBGE) has been also used to assign the R&D personnel between ICT Sector NACE 263 (Manufacture of communication equipment), 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media). It has also been used to estimate NACE 303 (Manufacture of air and spacecraft and related machinery).

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[10] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1292.0.55.0052008?OpenDocument. Also, the Ivie has elaborated correspondence tables for ICT and RS sectors between NACE Rev. 2 and ANZIC 2006 (see Appendix 1).

[11] See Appendix 1 and the correspondence between CNAE 2 and ISIC Rev. 4 at: http://www.ibge.gov.br/home/estatistica/economia/classificacoes/cnae2.0/defaulttab.shtm.

ICT sector NACE 62 (computer programming, consultancy and related activities) includes ICT sector NACE 582 (Software publishing). In addition, for Brazil there is no information for the ICT trade sector (NACE 465) and one ICT services sector: Repair of computers and communication equipment (NACE 951). Neither for ICT subsectors (3-4-digits level). Moreover, Brazil's dataset does not contain information for RS sector (NACE 4791) and macro-sectors 85 (Education), 49-99 (Services, except trade), 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and 86-88 (Human health and social work activities).

1.2.6 Canada

Sources

Science and Technology Indicators from Statistics Canada

- http://www5.statcan.gc.ca/subject-sujet/subtheme-soustheme.action?pid=193&id=3212&lang=eng&more=0

Downloaded: 22-10-2015

Annual Survey of Service Industries: Software Development and Computer Services, from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3540005&pattern=3540005&searchTypeByValue=1&p2=35

Downloaded: 23-07-2013

Survey of Employment, Payrolls and Hours from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810047&paSer=&pattern=&stByVal=1&p1=1&p2=35&tabMode=dataTable&csid=

Downloaded: 13-11-2014

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 3.1))

Remarks

The elaboration of the database for Canada has been based on the information provided by Statistics Canada in its key socioeconomic database CANSIM, Science and Technology Indicators, and by OECD, as it has already published NACE Rev. 2 (ISIC Rev. 4) data in 2015.

The R&D personnel have been distributed among sectors using the correspondence tables between ISIC Rev. 4/NAICS and NACE Rev. 2, as in the case of BERD. In order to estimate the figures for some sectors, additional sources and variables need to be used. For instance, total Employment from Survey of Employment, Payrolls and Hours (Statistics Canada) has been used to estimate RS sector (NACE 4791) and the NACE sections M (Professional and Scientific activities) and P (Education).

PERD ratios over BERD/PERD from US have also been used to split ICT sector 61 (Telecommunications) into its subsectors at 3 digits (NACE 611, 612, 613 and 619).

Canada dataset does not contain information for one ICT services sector (951, Repair of computers and communication equipment) and for ICT subsectors at 4-digits, as there is no statistical source with this level of detail.

1.2.7 China

Sources
China Statistical Yearbook on Science and Technology from National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/

Downloaded: 26-10-2015

The Second R&D Resources Inventory Survey Compilation 2009 from National Bureau of Statistics of China

- Information provided by Gao Changlin, Li Xiuquan and Xuan Zhaohui, from Chinese Academy of Science and Technology for Development (CASTED)

Statistics on Education, Science and Technology in High-tech Industry by Industrial Sector from China Statistical Yearbook, compiled by National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 26-10-2015

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 3.1))

Remarks
The elaboration of the R&D personnel database for China has been based on the information provided by the OECD, as in 2015 it has published for the first time NACE Rev. 2 data for China. This information has been complemented when necessary with data provided by the National Bureau of Statistics of China in The Second R&D Resources Inventory Survey Compilation and the China Statistical Yearbook on Science and Technology. However, the correspondence between NACE Rev. 2 and China classification of activities is approximate, as it is based on the correspondences between Chinese industry classification and ISIC Rev. 3 (NACE Rev. 1.1)[12]. In addition, China lacks official data for some years and they have been estimated by interpolation or by applying the growth rates of a higher aggregated sector.

When necessary, structures from next/previous years have been used. In the case of some industries, BERD/PERD ratios of a higher aggregated sector and/or PERD/Total employment ratio have been used to estimate R&D personnel figures. Therefore, we recommend taking the results with caution, especially the more disaggregated data.

China R&D personnel dataset does not contain information for ICT trade sector, ICT sector 951 (Repair of computers and communication equipment) and for ICT subsectors (2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 4651 (Wholesale of computers, computer peripheral equipment and software), 4652 (Wholesale of electronic and telecommunications equipment and parts), 5821 (Publishing of computer games), 5829 (Other software publishing), 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 6201 (Computer programming activities), 6202 (Computer consultancy activities), 6203 (Computer facilities management activities), 6209 (Other information technology and computer service activities), 6311 (Data processing, hosting and related activities), 6312

[12] The correspondence between Chinese SIC and ISIC Rev. 3 is available at: http://www.stats.gov.cn/tjbz/t20040210_402369833.htm

(Web portals), 9511 (Repair of computers and peripheral equipment) and 9512 (Repair of communication equipment)). Data for RS sector (NACE 4791) and NACE sectors 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles) and 85 (Education) are not available, as well as sector 58-63 for the first year of the database.

1.2.8 India

Sources
Research and Development Statistics from National Science and Technology Management Information System (NSTMIS), Department of Science and Technology, Government of India

- http://www.nstmis-dst.org/Publication.aspx

Downloaded: 20-10-2015

Science, Technology and Innovation Data from UNESCO Institute for Statistics (UIS)

- http://www.uis.unesco.org/DataCentre/Pages/BrowseScience.aspx

Downloaded: 15-10-2015

Annual Survey of Industries from MOSPI

- http://mospi.nic.in/mospi_new/site/inner.aspx?status=3&menu_id=56

Downloaded: 18-11-2014

Remarks
Official data for R&D personnel by industry are not available. Only the total amount of R&D personnel is available in national sources, but data from 2006 to 2009 are estimations made by interpolating official BERD/R&D Personnel ratios referred to 2005 and 2010. 2011 and 2012 data are also estimated using BERD/R&D Personnel ratio from 2010. Data for 2013 are not yet available.

To estimate R&D personnel by industry, additional assumptions are required. PERD/BERD ratios by industry from the most similar country in the sample according to BERD structure (United Kingdom) have been selected. These ratios have been adjusted so that they replicate India's total PERD/BERD ratio, which is readily available. However, we recommend taking the results with caution.

In the case of some macro-sectors, India's BERD structure has been applied to estimate PERD figures for these industries.

India R&D personnel dataset does not contain information for ICT trade sector, RS sector and the disaggregated ICT subsectors at 3-4 digits.

1.2.9 Japan

Sources
Annual Survey of Research and Development from Japan's Ministry of Internal Affairs and Communication (MIC)

- http://www.stat.go.jp/english/data/kagaku/index.htm

Downloaded: 23-10-2015

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D personnel (ISIC Rev. 3.1))

Remarks
The elaboration of the R&D personnel database for Japan has been based on the information provided by OECD, as this year it has published PERD figures for Japan following NACE Rev. 2. This information has been combined with data coming from the Annual Survey of Research and Development from Japan's Ministry of Internal Affairs and Communication (MIC), especially when a high sectoral disaggregation is required, as this national source offers a higher level of industry detail. In order to do that, the correspondence tables between JSIC and NACE Rev. 2 elaborated by Ivie for ICT and RS industries (see Appendix 1) have been used. For non-ICT industries, the official correspondence table between JSIC and NACE Rev. 2 has been used[13].

Although the Annual Survey of Research and Development from Japan offers a great industry disaggregation for the years 2010 and 2012, that allows to complete the information for almost all the sectors requested, it doesn´t have the same detail for the other years. For these, when necessary, the 2010 and 2012 structure has been applied to estimate some problematic industries.

Japan dataset does not contain information for RS sector (NACE 4791), one ICT services sector: 951 (Repair of computers and communication equipment), and the macro-sectors 85 (Education) and 86-88 (Human health and social work activities) and. In addition, ICT sector 62 (Computer programming, consultancy and related activities) includes ICT sector 582 (Software publishing). The disaggregation at 3-4-digits NACE of ICT sectors is not available.

1.2.10 Korea

Sources
Survey of Business activities from Statistics Korea
- http://kosis.kr/eng/statisticsList/statisticsList_01List.jsp?vwcd=MT_ETITLE&parentId=K

Downloaded: 17-02-2014

Research and Development Statistics from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 4))
- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 3.1))

Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 19-10-2015
(R&D personnel at national and regional level. Total R&D personnel in business sector by economic activity and sex (NACE Rev. 2))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 19-10-2015
(R&D personnel at national and regional level. Total R&D personnel in business sector by economic activity and sex (NACE Rev. 1.1))

[13] The correspondences between JIP codes, JSIC, ISIC Rev. 3 and ISIC Rev. 4 are available at:
http://www.rieti.go.jp/en/database/d05_data/03-6.pdf
http://www.euklems.net/data/nace2/JPN_sources_12i.pdf
http://www.stat.go.jp/english/index/seido/sangyo/index07.htm

Remarks
The elaboration of the PERD database for Korea has been based on the information provided by the Research and Development Statistics from OECD. In 2015 OECD has published data on R&D personnel following NACE Rev. 2 for the first time. Therefore, this information has been taken as the main basis for the construction of Korea dataset.

In order to estimate RS sector, PERD ratios over BERD/RERD from US have also been used, as there is no available information on this sector for Korea.

Korea dataset does not contain information for the ICT trade sector (NACE 465) and ICT subsectors at 3-4-digits level of NACE Rev. 2.

1.2.11 Russia

Sources
Russian Science and Technology at a Glance from Russian Centre for Science Research and Statistics (CSRS)

- http://www.csrs.ru/english/statis/default.htm
- http://www.st-gaterus.eu/en/672.php

Downloaded: 10-07-2013

R&D data from Rosstat (Russian Federal State Statistics Service)

- Information provided by Galina Lyubova (Department of Foreign Statistics and International Cooperation from Rosstat)

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 29-10-2015
(R&D personnel)

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_OCCUP

Downloaded: 29-10-2015
(R&D personnel by sector of employment and occupation. R&D personnel in Business sector)

Remarks
The elaboration of the ICT sector database for Russia has been based on the information by industry provided by the publication *Russian Science and Technology at a Glance* (CSRS) and by Rosstat.

The R&D personnel have been distributed among ICT, RS and the additional selected sectors, using approximate correspondences between ISIC Rev. 4 and the classification of industries of Russian R&D statistics, which have a direct correspondence with ISIC Rev. 3.1 (see Appendix 1). In addition, some assumptions need to be done to estimate business R&D personnel by industry, as the available information by industry refers to total R&D personnel. For this reason, national data have been re-adjusted to OECD total business R&D figures.

Russia dataset does not contain information for sectors NACE 20 (Manufacture of chemicals and chemical products), 21 (Manufacture of pharmaceuticals, medicinal chemical and botanical products), 303 (Manufacture of air and spacecraft and related machinery), 45 (Wholesale and retail trade and repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and ICT sectors 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 268 (Manufacture of magnetic and optical media), 4652 (Wholesale of electronic and telecommunications equipment and parts), 582 (Software publishing) and its disaggregation, 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613

(Satellite telecommunications activities), 619 (Other telecommunications activities), 62 (Computer programming, consultancy and related activities) and its disaggregation, 631 (Data processing, hosting and related activities; web portals) and its disaggregation at 4-digits and 951 (Repair of computers and communication equipment) and its disaggregation at 4-digits NACE. However, an estimation for total ICT services is available. Sector NACE 4791 (Retail sale via mail order houses or via Internet) is also not available, as information on PERD by industry is very scarce in the case of Russia.

1.2.12 Taiwan

Sources
National Science and Technology Survey from Taiwan's Ministry of Science and Technology

- https://ap0512.most.gov.tw/WAS2/English/AsTechnologyEStatisticsList.aspx

Downloaded: 24-10-2015

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D personnel (ISIC Rev. 3.1))

Remarks
The elaboration of the database for Taiwan has been based on the information by industry provided by OECD and Taiwan's National Science Council in the National Science and Technology Survey. These two sources have been complementary to elaborate Taiwan R&D Personnel dataset.

Although the available data for Taiwan are very complete, in order to estimate RS sector, additional assumptions need to be done. In this case PERD ratios over BERD and RERD from the US have been applied to Taiwan's data to obtain an estimation of the RS sector. Therefore, we recommend taking the results with caution.

Taiwan dataset does not contain information for sectors 303 (Manufacture of air and spacecraft and related machinery) and NACE section P (Education) in the initial year of the period (2008). Neither does it contain data for ICT subsectors 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 4651 (Wholesale of computers, computer peripheral equipment and software), 4652 (Wholesale of electronic and telecommunications equipment and parts), 5821 (Publishing of computer games), 5829 (Other software publishing), 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 6201 (Computer programming activities), 6202 (Computer consultancy activities), 6203 (Computer facilities management activities), 6209 (Other information technology and computer service activities), 6311 (Data processing, hosting and related activities), 6312 (Web portals), 9511 (Repair of computers and peripheral equipment) and 9512 (Repair of communication equipment).

1.2.13 United States

In the case of United States, there are no available data for this variable, as the main national sources for R&D variables (SIRD and BRDIS) do not offer information on R&D personnel. US R&D Surveys include only information on "R&D scientists and engineers", which definition is more similar to R&D researchers.

1.3 R&D RESEARCHERS

1.3.1 European Union and its Member States

Sources
Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Labour Force Survey (LFS) from Eurostat

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2014
(Employment by economic activity and level of education attained (NACE Rev. 2))

- Specific request to 3-digits by highest level of education attained

Downloaded: 15-09-2014
(Employment by economic activity and level of education attained (NACE Rev. 1.1))

Statistics on Research and Development (SRD) from National Statistical Institutes

- http://pub.stat.ee/px-web.2001/I_Databas/Economy/28SCIENCE._TECHNOLOGY._INNOVATION/28SCIENCE._TECHNOLOGY._INNOVATION.asp

Downloaded: 16-11-2015
(R&D in business enterprise sector in Estonia)

- http://www.statbank.dk/statbank5a/default.asp?w=1280

Downloaded: 16-11-2015
(Research and development Statistics in Denmark)

- http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Education-and-research/Research/Research-and-development-in-the-business-enterprise-sector/

Downloaded: 16-11-2015
(Research and development in Sweden)

- http://statdat.statistics.sk/

Downloaded: 16-11-2015
(Expenditures on research and development in Slovakia)

- http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft14%2Fp057&file=inebase&L=0

Downloaded: 16-11-2015
(Estadística de I+D. Sector Empresas. Resultados en I+D por rama de actividad)

Remarks
The methodology is the same as for R&D Personnel (view remarks in section 1.2.1).

1.3.2 Norway

Sources
Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks
The methodology is the same as for R&D Personnel (view remarks in section 1.2.2).

1.3.3 Switzerland

Sources
Statistics on Research and Development (SRD) from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 16-11-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 2))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 18-09-2015
(R&D personnel at national and regional level. Total R&D personnel and researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks
The methodology is the same as for R&D Personnel (view remarks in section 1.2.3).

1.3.4 Australia

Sources
Research and Experimental Development, Businesses from Australian Bureau of Statistics (ABS)
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/BAE5FB25D2121F6DCA2568A9001393EF?opendocument

Downloaded: 15-10-2015
(R&D researchers)

Research and Experimental Development, Higher Education Organisations, Australia
- http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/8111.0?OpenDocument

Downloaded: 15-10-2015
(Higher education R&D researchers)

Research and Experimental Development, Government and Private Non-Profit Organisations, Australia

- http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/8109.0?OpenDocument

Downloaded: 15-10-2015
(Government R&D researchers and Private non-profit R&D researchers)

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 3.1))

Remarks

The elaboration of the database for Australia has been based on the information provided by OECD, as in 2015 it has already published NACE Rev. 2 data (ISIC Rev. 4). For industries not disaggregated in the OECD database, the information provided by Australian Bureau of Statistics (ABS) in the publication Research and Experimental Development, Businesses has been used, applying the correspondence tables between ANSZIC 2006 and NACE Rev. 2[14]. Methods such as interpolation have also been used in the case of some industries to complete the database.

However, the industry disaggregation in the case of Researchers is not enough to cover all the individual industries in the database, so additional assumptions must be done. In these cases, R&D personnel's structure has been applied to Researchers in order to achieve the industry disaggregation that is needed (see Remarks from R&D Personnel section for more details).

In addition, there is no available data for 2012 on business researchers, as the frequency of the "Survey of Research and Experimental Development (R&D), Businesses" has changed from annual to biennial, and this year is the first one without survey. This is the reason why, in the case of 2012, data from 2013 and the ABS statistics on Government and private non-profit and higher education R&D human resources of 2012 have been used as a basis to estimate business R&D researchers' figures. In order to obtain the required sectoral disaggregation, structures and average growth rates from previous/next years have been used.

ICT sector NACE 261 (Manufacture of electronic components and boards) includes ICT sector NACE 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media) for Australia, as there is not enough information to separate these sectors. ICT subsector 612 (Wireless telecommunications activities) includes ICT subsector NACE 613 (Satellite telecommunications activities), as these two industries are defined as a single industry in ANSZIC. In addition, NACE 4791 (Retail sale via mail order houses or via Internet) incudes Other retail sale not in stores, stalls or markets (NACE class 4799), as there is not enough information to separate these activities.

ICT sector database does not include information at 4-digits NACE level in the case of Australia.

[14] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1292.0.55.0052008?OpenDocument. Also, the Ivie has elaborated correspondence tables for ICT sectors between NACE Rev. 2 and ANZIC 2006 (see Appendix 1).

1.3.5 Brazil

Sources
PINTEC, Survey of Technological Innovation from Instituto Brasileiro de Geografia e Estatística (IBGE)

- http://www.ibge.gov.br/home/estatistica/economia/industria/pintec/2011/default.shtm

Downloaded: 31-01-2014
Annual Survey of Industry from IBGE

- http://www.ibge.gov.br/english/estatistica/economia/industria/pia/empresas/2013/defaultempresa.shtm

Downloaded: 14-01-2015

Remarks
The elaboration of the R&D researchers' database for Brazil has been based on the information provided by IBGE, in the Survey of Technological Innovation (PINTEC). However, data on researchers are only available in PINTEC 2011 (this variable was not included in the previous editions of this survey).

We have used PINTEC data by industry and correspondences between CNAE 2 and NACE Rev. 2 to distribute researchers among ICT, RS and the additional sectors [15]. The distribution of Wages from Industrial Survey (IBGE) has been also used to assign the R&D researchers between ICT Sector NACE 263 (Manufacture of communication equipment), 264 (Manufacture of consumer electronics) and 268 (Manufacture of magnetic and optical media). It has also been used to estimate NACE 303 (Manufacture of air and spacecraft and related machinery).

In the case of Brazil, ICT sector NACE 62 (computer programming, consultancy and related activities) includes ICT sector NACE 582 (Software publishing). In addition, there is no information for the ICT trade sector (NACE 465) and one ICT services sector: Repair of computers and communication equipment (NACE 951). Neither for ICT subsectors (3-4-digits level). Moreover, Brazil's dataset does not contain information for macro-sectors, 85 (Education) and the aggregations 49-99 (Services, except trade), 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and 86-88 (Human health and social work activities).

1.3.6 Canada

Sources
Science and Technology Indicators from Statistics Canada

- http://www5.statcan.gc.ca/subject-sujet/subtheme-soustheme.action?pid=193&id=3212&lang=eng&more=0

Downloaded: 22-10-2015

Annual Survey of Service Industries: Software Development and Computer Services, from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3540005&pattern=3540005&searchTypeByValue=1&p2=35

Downloaded: 23-07-2013

[15] See Appendix 1 and the correspondence between CNAE 2 and ISIC Rev. 4 at: http://www.ibge.gov.br/home/estatistica/economia/classificacoes/cnae2.0/defaulttab.shtm.

Survey of Employment, Payrolls and Hours from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810047&paSer=&pattern=&stByVal=1&p1=1&p2=35&tabMode=dataTable&csid=

Downloaded: 13-11-2014

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 3.1))

Remarks
The elaboration of the database for Canada has been based mainly on the information provided by OECD since it has already published information on researchers following NACE Rev. 2 for Canada. This information has been complemented by the one provided by Statistics Canada in its key socioeconomic database CANSIM, Science and Technology Indicators.

Using this complementary source, researchers have been distributed among problematic sectors using the available correspondence tables between NAICS and NACE Rev. 2[16] and the correspondence for ICT/RS sectors elaborated by Ivie (see Appendix 1).

Methods such as interpolation have been used in the case of some industries to complete the database. However, the available industry disaggregation in the case of Researchers is not enough to cover all the individual industries in the database. To estimate these problematic sectors, total R&D personnel's structure has been applied to Researchers in some cases in order to achieve the industry disaggregation that is needed (see Remarks from R&D Personnel section).

Canada dataset does not contain information for one ICT services sector (951, Repair of computers and communication equipment) and for ICT subsectors at 4-digits, as there is no statistical source with this level of detail.

1.3.7 China

Sources
China Statistical Yearbook on Science and Technology from National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/

Downloaded: 26-10-2015

The Second R&D Resources Inventory Survey Compilation 2009 from National Bureau of Statistics of China

- Information provided by Gao Changlin, Li Xiuquan and Xuan Zhaohui, from Chinese Academy of Science and Technology for Development (CASTED)

Statistics on Education, Science and Technology in High-tech Industry by Industrial Sector from China Statistical Yearbook, compiled by National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 26-10-2015
Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015

[16] See http://www.statcan.gc.ca/concepts/concordances-classifications-eng.htm

(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D researchers (ISIC Rev. 3.1))

Remarks
The elaboration of the researchers' database for China has been based on the information provided by the OECD, as in 2015 it has published for the first time NACE Rev. 2 data for China. This information has been complemented when necessary with the data provided by the National Bureau of Statistics of China in The Second R&D Resources Inventory Survey Compilation, China Statistical Yearbook on Science and Technology and China Statistical Yearbook (Education, Science and Technology section). However, the correspondence between NACE Rev. 2 and China classification of activities is approximate, as it is based on the correspondences between Chinese industry classification and ISIC Rev. 3 (NACE Rev. 1.1), as in the case of total R&D personnel. In addition, China lacks official data for the initial year and it has been estimated by interpolation or by applying the shares on R&D personnel of a higher aggregated sector, therefore, we recommend taking the results with caution. RERD/PERD ratios have also been used to estimate data for some ICT sectors.

Generally, data by industries from National Bureau of Statistics of China (China Statistical Yearbook and China Statistical Yearbook on Science and Technology) have been used to disaggregate Researchers' total figures coming from OECD. When necessary, structures from next/previous years or total R&D personnel's structures have been used.

China dataset does not contain information for ICT trade sector and ICT sectors 268 (Manufacture of magnetic and optical media) and 951 (Repair of computers and communication equipment). Also, data for RS sector (NACE 4791) and NACE sectors 303 (Manufacture of air and spacecraft and related machinery), 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), and 85 (Education) are not available, as well as the NACE aggregate 58-63 for 2008.

In the case of the ICT manufacturing and services subsectors, the dataset does not offer information for the following: 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 4651 (Wholesale of computers, computer peripheral equipment and software), 4652 (Wholesale of electronic and telecommunications equipment and parts), 5821 (Publishing of computer games), 5829 (Other software publishing), 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 6201 (Computer programming activities), 6202 (Computer consultancy activities), 6203 (Computer facilities management activities), 6209 (Other information technology and computer service activities), 6311 (Data processing, hosting and related activities), 6312 (Web portals), 9511 (Repair of computers and peripheral equipment) and 9512 (Repair of communication equipment).

1.3.8 India

Sources
Research and Development Statistics from National Science and Technology Management Information System (NSTMIS), Department of Science and Technology, Government of India

- http://www.nstmis-dst.org/Publication.aspx

Downloaded: 20-10-2015
Annual Survey of Industries from MOSPI

- http://mospi.nic.in/mospi_new/site/inner.aspx?status=3&menu_id=56

Downloaded: 18-11-2014

Remarks
Official data for R&D researchers by industry are not available. Only the total amount of researchers is available in the national source, but data from 2006 to 2009 are estimations made by interpolating Researchers/R&D Personnel ratios referred to 2005 and 2010. The data for 2011 and 2012 have also been estimated using Researchers/R&D Personnel ratio from 2010. Data for 2013 are not yet available.

To estimate ICT R&D researchers additional assumptions are required. RERD/PERD ratios by industry from the most similar country in the sample according to BERD structure (United Kingdom) have been selected. These ratios have been adjusted so that they replicate India's total RERD/PERD ratio, which is readily available. However, we recommend taking the results with caution.

In the case of some macro-sectors, India's BERD or PERD structure has been applied to estimate RERD figures for these industries.

India R&D researchers' dataset does not contain information for ICT trade sector (NACE 465), RS sector (NACE 4791) and NACE sector 303 (Manufacture of air and spacecraft and related machinery) for the year 2008 (Wholesale and retail trade and repair of motor vehicles and motorcycles). Neither the disaggregation of ICT sectors 261, 582, 61, 62, 631 and 95 is available, as in the case of India there is no statistical R&D source that offers such industry detail.

1.3.9 Japan

Sources
Annual Survey of Research and Development from Japan's Ministry of Internal Affairs and Communication (MIC)

- http://www.stat.go.jp/english/data/kagaku/index.htm

Downloaded: 23-10-2015

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 15-10-2015
(R&D researchers (ISIC Rev. 3.1))

Remarks
The elaboration of the Researchers' data for Japan has been based on the information provided by OECD, as this year it has published researchers' figures for Japan following NACE Rev. 2. This information has been combined with data coming from the Annual Survey of Research and Development (Japan's Ministry of Internal Affairs and Communication, MIC), especially when a high sectoral disaggregation is required, as this national source offers a higher level of industry detail. Using this information, researchers have been distributed among ICT, RS and the other selected sectors using the correspondence tables between JSIC and NACE Rev. 2[17] when the OECD database has a gap. In some cases, Research and Development Statistics from OECD by industry following ISIC Rev. 3 have been also used to estimate the incomplete series, especially in the case of the initial years of the database.

Japan dataset does not contain information for sectors NACE 85 (Education) and 86-88 (Human health and social work activities), the RS sector (NACE 4791, Retail sale via mail

[17] The correspondences between JIP codes, JSIC, ISIC Rev. 3 and ISIC Rev. 4 are available at:
http://www.rieti.go.jp/en/database/d05_data/03-6.pdf
http://www.euklems.net/data/nace2/JPN_sources_12i.pdf
http://www.stat.go.jp/english/index/seido/sangyo/index07.htm
Ivie has also elaborated a correspondence table for ICT and RS sectors (see Appendix 1).

order houses or via Internet) and one ICT services sector: 951 (Repair of computers and communication equipment). In addition, ICT sector 62 (Computer programming, consultancy and related activities) includes ICT sector 582 (Software publishing) and the disaggregation of ICT subsectors at 3-4-digits is not available, as there is no information at that level of detail.

1.3.10 Korea

Sources

Survey of Business activities from Statistics Korea

- http://kosis.kr/eng/statisticsList/statisticsList_01List.jsp?vwcd=MT_ETITLE&parentId=K

Downloaded: 17-02-2014

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015
(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D researchers (ISIC Rev. 3.1))

Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 19-10-2015
(R&D personnel at national and regional level. Researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 19-10-2015
(R&D personnel at national and regional level. Researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks

The elaboration of the Researchers' database for Korea has been based on the information provided by Research and Development Statistics from OECD. In 2015 OECD has published data on R&D researchers following ISIC Rev. 4 (NACE Rev. 2) for the first time. Therefore, this information has been taken as the main basis for the construction of Korea dataset, although some missing data have been estimated using OECD and Eurostat databases with the classification ISIC Rev. 3.1/NACE Rev. 1.1.

In the case of the RS sector, the estimation relies on the calculation of Researchers/BERD ratios in the US and its adjustment to the R&D researchers' figures and structure of Korea.

Korea dataset does not contain information for the ICT trade sector (NACE 465) and the RS sector (NACE 4791) in the first year of the dataset. Also, the disaggregation at 3-4-digits NACE of ICT sectors 261, 582, 61, 62, 631 and 951 is not available.

1.3.11 Russia

Sources
Russian Science and Technology at a Glance from Russian Centre for Science Research and Statistics (CSRS)

- http://www.csrs.ru/english/statis/default.htm
- http://www.st-gaterus.eu/en/672.php

Downloaded: 10-07-2013

R&D data from Rosstat (Russian Federal State Statistics Service)

- Information provided by Galina Lyubova (Department of Foreign Statistics and International Cooperation from Rosstat)

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 29-10-2015
(R&D researchers)

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_OCCUP

Downloaded: 29-10-2015
(R&D personnel by sector of employment and occupation. Researchers in Business sector)

Remarks
The elaboration of the researchers' database for Russia has been based on the information by industry provided by the publication *Russian Science and Technology at a Glance* (CSRS) and by Rosstat.

Researchers have been distributed among ICT and non-ICT selected sectors, using approximate correspondences between ISIC Rev. 4 and ISIC Rev. 3.1 (see Appendix 1), which have a direct correspondence with the classification of industries of Russian R&D statistics. In addition, some assumptions need to be done to estimate business R&D by industry, as the available information by industry refers to total researchers, including researchers that do not work in the business sector. For this reason, national data have been re-adjusted to OECD total business R&D figures.

Russian dataset does not contain information for sectors NACE 4791 (RS sector, Retail sale via mail order houses or via Internet), NACE 20 (Manufacture of chemicals and chemical products), 21 (Manufacture of pharmaceuticals, medicinal chemical and botanical products), 303 (Manufacture of air and spacecraft and related machinery), 45-47 (Wholesale and retail trade, repair of motor vehicles and motorcycles), 49-53 (Transportation and storage), 58-63 (Information and communication), 64-66 (Financial and insurance activities), 69-82 (Professional, scientific, technical, administration and support service activities), 69-75 (Professional, scientific and technical activities) and ICT sectors 268 (Manufacture of magnetic and optical media), 4652 (Wholesale of electronic and telecommunications equipment and parts), 582 (Software publishing), 62 (Computer programming, consultancy and related activities), 631 (Data processing, hosting and related activities; web portals) and 951 (Repair of computers and communication equipment), although an estimation of ICT services is available. Also, the disaggregation at 4-digits of ICT sector NACE 261 (Manufacture of electronic components and boards) and at 3 digits of ICT sector NACE 61 (Telecommunications) is not available.

1.3.12 Taiwan

Sources
National Science and Technology Survey from Taiwan's Ministry of Science and Technology

- https://ap0512.most.gov.tw/WAS2/English/AsTechnologyEStatisticsList.aspx

Downloaded: 24-10-2015

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY_ISIC4

Downloaded: 24-10-2015
(R&D researchers (ISIC Rev. 4))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 24-10-2015
(R&D researchers (ISIC Rev. 3.1))

Remarks
The elaboration of the researchers' database for Taiwan has been based on the information by industry provided by OECD and by Taiwan's Ministry of Science and Technology in the National Science and Technology Survey. These two sources have been complementary to elaborate Taiwan R&D researchers' dataset.

Although Taiwan available data are very complete, in order to estimate RS sector, additional assumptions need to be done. In this case BERD/Researchers ratios from the US have been re-adjusted and applied to Taiwan's data to obtain an estimation of the RS sector. Therefore, we recommend taking the results with caution.

Taiwan dataset does not contain information for sectors 303 (Manufacture of air and spacecraft and related machinery) and NACE section P (Education) in the initial year of the period (2008). Neither does it contain data for ICT subsectors 2611 (Manufacture of electronic components), 2612 (Manufacture of loaded electronic boards), 4651 (Wholesale of computers, computer peripheral equipment and software), 4652 (Wholesale of electronic and telecommunications equipment and parts), 5821 (Publishing of computer games), 5829 (Other software publishing), 611 (Wired telecommunications activities), 612 (Wireless telecommunications activities), 613 (Satellite telecommunications activities), 619 (Other telecommunications activities), 6201 (Computer programming activities), 6202 (Computer consultancy activities), 6203 (Computer facilities management activities), 6209 (Other information technology and computer service activities), 6311 (Data processing, hosting and related activities), 6312 (Web portals), 9511 (Repair of computers and peripheral equipment) and 9512 (Repair of communication equipment).

1.3.13 United States

Sources
Business R&D and Innovation Survey (BRDIS) from National Science Foundation and United States Census Bureau

- http://www.nsf.gov/statistics/srvyindustry/#tabs-2

Downloaded: 19-10-2015

- Information provided by Raymond M. Wolfe (Economist & Senior Analyst of National Science Foundation 's National Center for Science and Engineering Statistics (NCSES))

Science and Engineering Indicators from National Science Foundation and United States Census Bureau

- http://www.nsf.gov/statistics/seind14/index.cfm/appendix/tables.htm

Downloaded: 05-03-2014

Survey of Industrial Research and Development (SIRD) from National Science Foundation

- http://www.nsf.gov/statistics/industry/

Downloaded: 10-09-2013

Research and Development Statistics from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_INDUSTRY

Downloaded: 12-02-2015
(R&D researchers (ISIC Rev. 3.1))

- http://stats.oecd.org/Index.aspx?DataSetCode=PERS_OCCUP

Downloaded: 20-10-2015
(R&D personnel by sector of employment and occupation. Researchers in Business sector)

Statistics on Research and Development (SRD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempoccr2&lang=en

Downloaded: 19-10-2015
(R&D personnel at national and regional level. Researchers in business sector by economic activity and sex (NACE Rev. 2))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_p_bempocc&lang=en

Downloaded: 19-10-2013
(R&D personnel at national and regional level. Researchers in business sector by economic activity and sex (NACE Rev. 1.1))

Remarks

The elaboration of the researchers' database for the United States has been based on the information provided by OECD in its Research and Development Statistics and by Eurostat. However, these two sources do not offer information by industry following NACE Rev. 2. Thus, in order to complete the database by industry, the information coming from Business R&D and Innovation Survey (BRDIS) (National Science Foundation and United States Census Bureau), conducted since 2008 and its predecessor, Survey of Industrial Research and Development (National Science Foundation) has been used. When necessary, different methods such as interpolation have been used in the case of some industries to complete the database. In order to split some sector into its subsectors other assumptions need to be done, as the use of previous/next years' structure, the use of BERD/Researchers ratio of a higher sectoral aggregated, etc.

However, although statistics from BRDIS and SIRD are generally comparable and the definitions used in both are very similar, this is not the case of R&D employment figures. For them, a discontinuity (a drop in the amount of R&D researchers) appears between the two surveys, although there is not a definite evidence of the potential reason. According to the National Science Foundation, the discontinuity has much more to do with the way companies responded to the SIRD (survey conducted up to 2007), than with changes in the way the data are collected in the new and current survey (BRDIS). Given the drop in the number of FTE scientists and engineers between the last (2007) cycle of SIRD and the first (2008) cycle of BRDIS, it is suspected that SIRD respondents, although instructed to do otherwise, reported headcounts for this item. NSF and Census are working with this issue and do not have a definite answer yet.

In 2015 both, OECD and Eurostat, have changed their policy with respect to the previous years, now publishing in their R&D databases for the first time the researchers figures coming from SIRD and BRDIS without any adjustment to correct this break in the series. Hence, it was decided to follow its criteria also in the elaboration of PREDICT 2016 database. Consequently, US researchers' dataset is complete in PREDICT 2016 database, but it must be taken into account that there is a series break in 2008.

Sectors NACE 85 (Education) is not available in the US dataset. Also, ICT trade sector (NACE 4651-4652), Repair of computers and communication equipment (NACE 951) and

the disaggregation into its 3-4-digits subsectors of the ICT industries Manufacture of electronic components and boards (NACE 261), Software publishing (NACE 582), Computer programming, consultancy and related activities (NACE 62) and Data processing, hosting and related activities; web portals (NACE 631) are not available.

1.4 PUBLIC FUNDING OF ICT R&D

1.4.1 European Union and its Member States

Methodology

Since data on Public Funding of ICT R&D in the European Union and its Member States is not readily available from Eurostat or OECD databases, it is estimated by applying a methodology developed by IPTS and documented in Stančík (2012)[18] and Stančík and Rohman (2014)[19].

The analysis of public R&D expenditures on ICT is based on GBAORD data (Government Budget Appropriations or Outlays on R&D). GBAORD data is reported for 14 different NABS-2007 chapters and is available for every EU Member State in Eurostat databases. A dedicated ICT NABS chapter, however, does not exist in this database and ICT-related R&D is likely to be included in several NABS chapters. Due to the very broad definition of NABS chapters, a straightforward extraction of ICT from GBAORD is not possible either.

For this reason, there is a need to create a proxy variable enabling to estimate ICT shares within different GBAORD NABS chapters. The values of this proxy would have to differ across countries, time and NABS chapters. Assuming that the share of ICT R&D expenditures in GBAORD is similar to the share of ICT R&D labour costs (from total R&D labour costs), a possible solution comes from the Labour Force Survey (LFS). A direct link between GBAORD and LFS can be created using LFS information on workers' sectors of activity categorized by NACE codes. The link uses the correspondence between NABS chapters and NACE codes developed by Stančík and Rohman (2014) and is reproduced in table A8.

Once the link between NABS and NACE is created, total R&D employment and ICT R&D employment for each NABS chapter can be determined. For this, the International Labour Organization (ILO) is followed and ICT occupations are determined based on ISCO-88 and ISCO-09 occupational classifications (tables A10 and A11). Furthermore, R&D employees are defined as workers with a tertiary education. R&D employment is measured in hours worked, which allows the inclusion of a partial employment or a partial involvement in ICT-related activities that will prevent the method from overestimating ICT R&D employment shares. Additionally, since wage information is also used, as they play an important part of R&D expenditures and they can differ substantially across occupations, applying an indicator of wages should better reflect expenditures. This information comes from the Structure of Earnings Survey (SES), which allows obtaining average hourly wages for different occupations, education groups or countries. The EU is calculated by aggregating hours worked multiplied by salaries for the Member States.

ICT R&D labour shares can be calculated separately for each NABS category *i*, country *j* and year *t* using the following formula:

$$ICT\_R\&D\_emp\_share_{ijt} = \frac{\sum_{k:ISCO-88 \in tertiary\ edu} hours\_worked_{kijt} * wages_{kijt}}{\sum_{k:tertiary\ edu} hours\_worked_{kijt} * wages_{kijt}}, \qquad (1)$$

[18] Stančík, J. (2012). A Methodology for Estimating Public ICT R&D Expenditures in the EU. JRC Technical Reports, JRC92883, EUR26981, doi: 10.2791/224075, available at: http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5119.

[19] Stančík, J., & Rohman, I. K., 2014. ICT R&D Public Funding in the European Union. EUR-Scientific and Technical Research Report, JRC92883, available at: http://publications.jrc.ec.europa.eu/repository/handle/JRC92883.

where index *k* denotes individual employee-groups, variable *hours_worked* represents the total number of hours worked by all employees within each group and variable *wages* represents average hourly wages within these groups. The sum in numerator represents the total costs for R&D employees working in a country *j*, year *t*, NABS category *i* and in occupations that are considered to be ICT occupations. The sum in the denominator represents the total costs for R&D employees in a country *j*, year *t*, NABS category *i*, irrespective of their occupation.

The aim of calculating these ICT R&D labour shares is to estimate the weight of ICT within each particular NABS chapter. It is unlikely that these shares will change rapidly from year to year. For some countries, however, LFS data estimates show some data gaps across the years (disappearances/appearances of ICT occupations). In order to make the results not dependent on this volatility and, in reality, highly improbable behaviour, ICT R&D labour share trends are used in further calculations rather than actual shares. These ICT R&D labour share trend values are calculated separately for each country and NABS chapter. Here, labour shares from equation are regressed on time (years). Consequent linear prediction provides the trend values.

Finally, the resulting ICT GBAORD for country j – where EU is considered as another country-, in year *t* is in NABS *i* estimated by the following formula:

$$ICT\_GBAORD_{ijt} = GBAORD_{ijt} * ICT\_R\&D\_emp\_share\_trends_{ijt} \ , \qquad (2)$$

where $ICT\_R\&D\_emp\_share\_trends_{ijt}$ are the ICT R&D labour shares estimated separately for each country and NABS chapter by regressing them on time (years). Total ICT GBAORD is obtained by aggregating all the NABS.

This procedure is made for the period 2004 to 2012 to include the last updated information published by Eurostat in 2015 (30.09.2015). This data is maintained as a benchmark to be comparable with previous PREDICT databases. In order to update subsequent years in the database a two-step procedure has been followed. First, the methodology has been applied for the whole 2004-2014 period. Second, the growth rates of ICT GBAORD by NABS chapters between 2012-2014 obtained in this latter estimation have been applied to the benchmark to obtain figures for 2013 and 2014.

Sources

Government budget appropriations or outlays on R&D (GBAORD) from Eurostat
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gba_nabsfin07&lang=en
Downloaded: 30-09-2015 (data last updated by Eurostat: 30-09-2015).

Science and technology – Research and development data - Total GBAORD by NABS 2007 socio-economic objectives

Tailor-made extractions from the Labour Force Survey (LFS) microdata from Eurostat

- Received: 21-08-2015

Hours worked by NACE sub-sector and ICT versus non-ICT occupations by country, for higher educated employees

Tailor-made extractions from the Structure of Earnings Survey (SES) microdata from Eurostat

- Received: 27-08-2015
- Mean hourly wages by NACE sub-sector and ICT versus non-ICT occupations by country, for higher educated employees; and mean hourly wages for ICT versus non-ICT occupations by country for higher educated employees

1.4.2 United States

Public Funding of ICT R&D by NABS chapters in the United States is estimated by applying the methodology developed by IPTS and documented in Stančík and Rohman (2014) and maintaining the period 2004-2012 as a benchmark in order to update it with subsequent years by means of annual growth rates of the estimated results obtained for the period 2012-2014.

Regarding the estimation of US ICT GBAORD, it has to be slightly modified as compared to the EU in terms of the industry and occupation classifications used in the US. Namely, the US Census Industrial Classification (CIC) is used. ICT occupations are identified on the Mid-Pacific Information and Communication Technologies Center (MPICT) definition following the Standard Occupation Classification (SOC). All US employment data (hours worked, mean hourly wages) comes from the Current Population Survey. The CIC-NABS correspondence table is defined in table A9 and the ICT occupations following the SOC classification are defined in tables A12 and A13.

Sources
Government budget appropriations or outlays on R&D (GBAORD) from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gba_nabsfin07&lang=en

Downloaded: 30-09-2015 (data last updated by Eurostat: 30-09-2015).

Science and technology – Research and development data - Total GBAORD by NABS 2007 socio-economic objectives

Current Population Survey (CPS) from the Bureau of Labor Statistics (BLS) and the US Census Bureau

- http://dataferrett.census.gov/

Downloaded: 01-10-2015

Mean hourly wages and hours worked by CIC industrial classification and SOC occupational classification, for higher educated workers

1.4.3 Japan

In order to estimate Public Funding of ICT R&D in Japan, the methodology developed in Stančík and Rohman (2014) is taken as reference, but the availability of data does not allow to calculate ICT GBAORD with the level of disaggregation required by the methodology. Therefore, the methodology followed is not as homogeneous with the one followed for the EU countries and the US and it does not allow to estimate ICT GBAORD by NABS chapters.

Japanese data comes from the Basic Survey on Wage Structure. The survey aims at obtaining a clear picture of the wage structure of employees in major industries i.e., wage distribution by type of employment, type of work, occupation, sex, age, school career, length of service and occupational career, etc. The survey is conducted every year and investigates the salary referred to June. The average salary for June (instead of the average of hourly wages) is totalized, and working hours are totalled collectively. However, data on earnings by occupation and school career is not available, as well as data on earnings by industries and occupation.

Available data to calculate the ICT R&D employment shares relies on average monthly wages and number of employees by occupation (with a 129 occupation disaggregation) and average monthly wages by school career (tertiary education: graduates of higher professional schools or junior colleges and graduates of universities). The ICT occupations chosen from the 129 occupation classification are: system engineer, programmer and computer operator.

The ICT R&D employment shares are applied to Eurostat's data of GBAORD for Japan.

$$ICT\_R\&D\_emp\_share_t = \frac{\sum_{k:ICT\ occupations} employees_t * monthly\_wages_t}{\sum_{k:tertiary\ edu} employees_t * monthly\_wages_t}$$

Sources
Government budget appropriations or outlays on R&D (GBAORD) from Eurostat
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gba_nabsfin07&lang=en
Downloaded: 30-09-2015 (data last updated by Eurostat: 30-09-2015).

Science and technology – Research and development data - Total GBAORD by NABS 2007 socio-economic objectives

Basic Survey on Wage Structure from the Ministry of Health, Labour and Welfare (Japan)

- http://www.mhlw.go.jp/english/database/db-l/ordinary.html

Downloaded: 05-10-2015

Data by school career

- http://www.e-stat.go.jp/SG1/estat/GL08020101.do?_toGL08020101_&tstatCode=00000101 1429&requestSender=dsearch

Downloaded: 05-10-2015
Data by detailed occupation

2. MACROECONOMIC VARIABLES

2.1 GROSS VALUE ADDED AND GROSS DOMESTIC PRODUCT

2.1.1 European Union and its Member States

Sources
National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en

Downloaded: 27-10-2015
(GDP and main components (output, expenditure and income))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10&lang=en

Downloaded: 27-10-2015
(Gross value added and income by A*10 industry breakdowns)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64&lang=en

Downloaded: 27-10-2015
(National Accounts aggregates by industry (up to NACE A*64)

National Accounts (NA) NACE Rev 1.1 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - aggregates at current prices)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - aggregates at current prices)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace38_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - aggregates at current prices)

ESA 95 Input-Output tables. Member States
- http://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/data/workbooks

Downloaded: 06-11-2015

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 2-10-2015
(Annual enterprise statistics for special aggregates of activities)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

Structural Business Statistics (SBS) NACE Rev 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dade&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DA-DE and total manufacturing)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dfdn&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DF-DN and total manufacturing)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_3b_tr&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on trade)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on services (H-K)

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

EU KLEMS Growth and Productivity Accounts ISIC Rev. 3

- http://www.euklems.net/index.html

Downloaded: 11-11-2014
(March 2008 Release)
(November 2009 Release, updated March 2011)

PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015
(Purchasing power parities (PPP))

Remarks

The main source of the GVA (and GDP) NACE Rev. 2 dataset in nominal euros for the EU countries is NA from Eurostat, compiled according to the new European System of National and Regional Accounts (ESA 2010). The ESA 2010 is based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world. Nevertheless, it incorporates certain differences, particularly in its presentation, which is more in line with its specific use within the Union.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of GVA, the sectorial breakdown in both Eurostat and National Statistical Office (NSO) are limited to 2-digit or division level (A*10, A*21, A*38, A*64 classifications).

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. In the case of ICT sectors, direct NA GVA information is only provided by Eurostat for the sector NACE 61 (telecommunications) for all the European countries, except Croatia. Therefore, many additional sources of data are needed. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources

will be used according to a hierarchy that prioritise Eurostat, other official statistical offices and the OECD over other data.

The NA GVA data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via Internet, the selected economic activities (additional sectors) and the rest of industries using GVA, production or turnover data (when the first is not available) from Eurostat, NSO of individual countries, input-output tables, SBS statistics, EU KLEMS database and correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012)[20].

The majority of GVA sector gaps have been filled with weights of the same sector and the same year in production, turnover or with GVA of another year. Croatia, Greece, Luxembourg and Malta lack official information for some industries, therefore, we recommend taking the results with caution. The missing data not covered with sources mentioned above has been estimated using European averages ICT shares, and turnover (production)/GVA ratio.

We obtain GVA dataset in PPS using purchasing power parities coming from Eurostat.

2.1.2 Norway

Sources
National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en

Downloaded: 27-10-2015
(GDP and main components (output, expenditure and income))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10&lang=en

Downloaded: 27-10-2015
(Gross value added and income by A*10 industry breakdowns)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64&lang=en

Downloaded: 27-10-2015
(National Accounts aggregates by industry (up to NACE A*64)

National Accounts (NA) NACE Rev 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - aggregates at current prices)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - aggregates at current prices)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace38_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - aggregates at current prices)

PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015

[20] ICT Sector Definition Transition from NACE Rev. 1.1 to NACE Rev. 2: A Methodological Note. JRC Technical Reports (2012). http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5919. See in Appendix 1 the correspondence table between NACE Rev. 1.1 and NACE Rev. 2

(Purchasing power parities (PPP))

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 2-10-2015
(Annual enterprise statistics for special aggregates of activities)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

Structural Business Statistics (SBS) NACE Rev 1.1 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dade&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DA-DE and total manufacturing)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dfdn&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DF-DN and total manufacturing)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_3b_tr&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on trade)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on services (H-K)

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

Remarks
The main source of the GVA (and GDP) NACE Rev. 2 dataset in nominal euros for Norway is NA from Eurostat and Statistics Norway, compiled according to ESA 2010, based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of GVA, the sectorial breakdown in both Eurostat and national statistical office (NSO) are limited to 2-digit or division level (A*10, A*21, A*38, A*64 classifications).

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. In the case of ICT sectors, direct NA GVA information is only provided by Eurostat for the sector NACE 61 (telecommunications). Therefore, many additional sources of data are needed to estimate each variable. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources will be used according to a hierarchy that prioritise Eurostat, NSO and the OECD over other data.

The NA GVA data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via Internet, the selected economic activities (additional sectors) and the rest of industries using GVA, production or turnover data (when the first is not available) from the Eurostat and Statistics Norway NA, SBS statistics and correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012). The majority of GVA sector gaps have been filled with weights of the same sector and the same year in production or with GVA of another year.

We obtain GVA dataset in PPS using purchasing power parities coming from Eurostat.

2.1.3 Switzerland

Sources
National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en

Downloaded: 27-10-2015
(GDP and main components (output, expenditure and income))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10&lang=en

Downloaded: 27-10-2015
(Gross value added and income by A*10 industry breakdowns)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64&lang=en

Downloaded: 27-10-2015
(National Accounts aggregates by industry (up to NACE A*64)

National Accounts (NA) NACE Rev 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - aggregates at current prices)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - aggregates at current prices)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace38_c&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - aggregates at current prices)

PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en

Downloaded: 27-10-2015
(Purchasing power parities (PPP))

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 2-10-2015
(Annual enterprise statistics for special aggregates of activities)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

Remarks
The main source of the GVA (and GDP) NACE Rev. 2 dataset in nominal euros for Switzerland is NA from Eurostat and Bundesamt für Statistik (BFS), compiled according to ESA 2010, based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of GVA, the sectorial breakdown in both Eurostat and NSO are limited to 2-digit or division level (A*10, A*21, A*38, A*64 classifications).

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. In the case of ICT sectors, direct NA GVA information is only provided for the sector NACE 61 (telecommunications). Therefore, many additional sources of data are needed to estimate 4-digits dataset. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources will be used according to a hierarchy that prioritise Eurostat, BFS and the OECD over other data.

The NA GVA data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via Internet, the selected economic activities (additional sectors) and the rest of industries using GVA, production or turnover data (when the first is not available) from the NA, SBS statistics and correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012). The majority of GVA sector gaps have been filled with weights of the same sector and the same year in production, turnover or with GVA of another year.

We obtain GVA dataset in PPS using purchasing power parities coming from Eurostat.

2.1.4 Australia

Sources
NA from Australian Bureau of Statistics (ABS)
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/110953FFA28D4E52CA2572110002FF03?opendocument

Downloaded: 05-10-2015

Australian Industry from ABS

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/48791677FF5B2814CA256A1D0001FECD?opendocument

Downloaded: 05-10-2014

Experimental Estimates for the Manufacturing Industry from ABS

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8159.02009-10?OpenDocument

Downloaded: 05-10-2015
Information and Communication Technology from ABS

- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8126.02006-07?OpenDocument

Downloaded: 05-10-2015

Information Media and Telecommunications Services

- http://www.abs.gov.au/ausstats/abs@.nsf/mf/8681.0

Downloaded: 20-10-2015
Retail and Wholesale Industries

- http://www.abs.gov.au/ausstats/abs@.nsf/mf/8622.0

Downloaded: 20-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The main source of the GVA (and GDP) NACE Rev. 2 dataset (in national currency) for Australia is ABS. As from December 2009, national accounts estimates are compiled according to the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009). NA from OECD only provided "high-level aggregation A*10", that aggregates the ISIC Rev. 4/NACE Rev. 2 sections into 10 or 11 categories.

This GVA data has been distributed among ICT sector, RS sector and the rest of industries using GVA data from Australian Industry Statistics, Experimental Estimates for the Manufacturing Industry, Information and Communication Technology Statistics, Information Media and Telecommunications Services Statistics, Retail and Wholesale Industries Statistics, provided by ABS and correspondence tables between ANZSIC 2006 and NACE Rev. 2[21].

In Australia GVA dataset, Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33); Group 261 (manufacture of electronic components and boards) includes Manufacture of consumer electronics (group 264) and Manufacture of magnetic and optical media (group 268); Services, except

[21] The correspondence between ANZIC 2006 and ISIC Rev. 4 is available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1292.0.55.0052008?OpenDocument. Ivie has also elaborated correspondence tables (see Appendix 1).

trade (divisions 49-99) include part of Repair and installation of machinery and equipment (division 33); Repair of computers and communication equipment (group 951) include part of Repair and installation of machinery and equipment (division 33) and Retail sale via mail order houses or via Internet (RS sector, class 4791), includes Other retail sale not in stores, stalls or markets (class 4799).

We obtain NACE Rev. 2 GVA datasets in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.5 Brazil

Sources

Annual National Accounts from Instituto Brasileiro de Geografia e Estatística (IBGE)

- http://www.ibge.gov.br/home/estatistica/economia/contasnacionais/2011/default.shtmDownloaded: 05-10-2015

Quarterly National Accounts from Instituto Brasileiro de Geografia e Estatística (IBGE)

- http://www.ibge.gov.br/english/estatistica/indicadores/pib/defaultcnt.shtm

Downloaded: 05-10-2015

Annual Survey of Industry from IBGE

- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 05-10-2015

Annual Survey of Trade from IBGE

- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 05-10-2015

Annual Survey of Services from IBGE

- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 05-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015

(PPPs: national currency per US dollar)

Remarks

The elaboration of the NACE Rev. 2 GVA (and GDP) database for Brazil has been based on the NA (annual and quarterly) information published by IBGE in national currency. As from March 2015, national accounts estimates are compiled according to the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009).

The National Accounts GVA (CNAE 2.0) data has been distributed among ICT and non-ICT sectors using GVA and sales data from Surveys (Industrial, Trade and Services)

provided by IBGE (in CNAE 1.0 and CNAE 2.0) and correspondence tables between CNAE 1.0, CNAE 2.0, ISIC Rev. 3.1 (NACE Rev. 1.1) and ISIC Rev. 4 (NACE Rev. 2)[22].

Brazil GVA dataset does not include Retail sale via mail order houses or via Internet sector. We obtain NACE Rev. 2 GVA in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.6 Canada

Sources
NA from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3840038&tabMode=dataTable&srchLan=-1&p1=-1&p2=9
- http://www5.statcan.gc.ca/cansim/a33?RT=TABLE&themeID=2745&spMode=tables&lang=eng

Downloaded: 11-11-2015

Annual Survey of Manufactures and Logging from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3010006

Downloaded: 02-10-2015

Annual Wholesale Trade Survey from Statistics Canada

- http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0810014&paSer=&pattern=&stByVal=1&p1=1&p2=38&tabMode=dataTable&csid=

Downloaded: 02-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The main source of the GVA data (in national currency) for Canada is National Accounts from Statistics Canada (CANSIM database), since OECD has not published any NACE Rev. 2 data yet. As from 2012, NA are compiled according to the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009).

The National Accounts GVA data has been distributed among ICT and non-ICT sectors using value added data from Annual Survey of Manufacturing and Logging, Annual Wholesale Trade Survey provided by Statistics Canada and correspondence tables between NAICS and NACE Rev. 2[23].

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[22] The correspondences between CNAE 1.0, CNAE 2.0, ISIC Rev. 3.1 and ISIC Rev. 4 are available at: http://www.ibge.gov.br/home/estatistica/economia/classificacoes/cnae2.0/defaulttab.shtm. Ivie has also elaborated a correspondence table for ICT sectors (see Appendix 1).

[23] The correspondence between different versions of Canadian NAICS and ISIC Rev. 4 is available at: http://www.statcan.gc.ca/concepts/concordances-classifications-eng.htm. Ivie has also elaborated a correspondence table for ICT sectors (see Appendix 1).

In Canada GVA dataset, Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33), Manufacture of magnetic and optical media (group 268) includes Reproduction of recorded media (class 1820), Services, except trade (divisions 49-99) includes part of Repair and installation of machinery and equipment (division 33), Repair of computers and communication equipment (group 951) include part of Repair and installation of machinery and equipment (division 33) and part of Repair of personal and household goods (group 952).

We obtain NACE Rev. 2 GVA dataset in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.7 China

Sources
World Input-Output Database ISIC Rev. 3 (WIOD)
- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 15-10-2015
(National Input-Output Tables, Released November 2013)
- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 15-10-2015
(Socio Economic Accounts, Released July 2014)

NA from National Bureau of Statistics of China
- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Main industrial economic indicators from National Bureau of Statistics of China
- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Statistics on Production and Management in High-tech Industry by Industrial Sector from Ministry of Science and Technology of China
- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Exchange rates and PPP from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The main source of the GVA data (in national currency) for China is National Bureau of Statistics of China and WIOD ISIC Rev. 3 Database. These National Accounts estimates are still compiled according to the 1993 SNA ('System of National Accounts 1993',

Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 1993).

This information has been distributed among ICT sector, RS sector and the rest of industries using production data from Main industrial economic indicators provided by National Bureau of Statistics of China, production data from Statistics on Production and Management in High-tech Industry by Industrial Sector from Ministry of Science and Technology of China, and correspondence tables between National Economic Industrial Classification (GB/T 4754-2002), ISIC Rev. 3 and ISIC Rev. 4 (NACE Rev. 2)[24].

China GVA dataset does not include ICT trade sector, Manufacture of chemicals and chemical products (division 20) includes Manufacture of magnetic and optical media (group 268), Wholesale and retail trade, repair of motor vehicles and motorcycles (divisions 45-47) include Repair of personal and household goods (group 952), Services, except trade (divisions 49-99) include Remediation activities and other waste management services (division 39) and Development of building projects (group 411) and exclude Repair of personal and household goods (group 952), Transportation and storage (divisions 49-53) include Travel agency and tour operator activities (group 791), Professional, scientific, technical, administration and support service activities (divisions 69-82) excludes Travel agency and tour operator activities (group 791) and Veterinary activities (division 75), Divisions 69-75 excludes Veterinary activities (division 75), Divisions 86-88 includes Veterinary activities (division 75).

We obtain NACE Rev. 2 GVA dataset in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.8 India

Sources
NA from Ministry of Statistics Programme Implementation (MOSPI).

- http://mospi.nic.in/Mospi_New/upload/item10-St50-51-current_5aug13.xls
- http://mospi.nic.in/mospi_new/upload/NAS2015/NAS15.html

Downloaded: 16-10-2015

World Input-Output Database ISIC Rev. 3 (WIOD)

- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 16-10-2015
(National Input-Output Tables, Released November 2013)

- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 16-10-2015
(Socio Economic Accounts, Released July 2014)

Annual Survey of Industries from MOSPI

- http://mospi.nic.in/mospi_new/site/inner.aspx?status=3&menu_id=56

Downloaded: 16-10-2015

Value added and employment generation in the ICT sector in India from MOSPI

- http://mospi.nic.in/mospi_new/upload/val_add_ICT_21june11.pdf

Downloaded: 16-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

[24] The correspondence between Chinese SIC and ISIC Rev. 3 is available at: http://www.stats.gov.cn/tjbz/t20040210_402369833.htm

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The main source of the GVA data (in national currency) for India is NA from MOSPI. As from January 2015, NA estimates are compiled according to the latest recommendations of SNA 2008 ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009).

This information been distributed among ICT sectors and the rest of selected industries using value added data from WIOD Database, Annual Survey of Industry, Value added & employment generation in the ICT sector in India provided by MOSPI. This last source gives the 2008 National Industry Classification (NIC) codes for ICT sectors following the 2007 definition of OECD, which coincide exactly with NACE Rev. 2 ones[25]. India GVA dataset does not include ICT trade and RS sectors.

We obtain NACE Rev. 2 GVA dataset for India in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.9 Japan

Sources
Japan Industrial Productivity (JIP) from Research Institute of Economy, Trade and Industry (RIETI) and Hitotsubashi University

- http://www.rieti.go.jp/en/database/JIP2015/index.html

Downloaded: 8-12-2015

NA from Economic and Social Research Institute (ESRI), Cabinet Office

- http://www.esri.cao.go.jp/en/sna/data/kakuhou/files/2013/27annual_report_e.html

Downloaded: 14-10-2015

Annual manufacturing census from Economic and Industrial Policy Bureau, Ministry of Economy, Trade and Industry (METI)

- http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html

Downloaded: 14-10-2015

Survey of selected services industries from METI

- http://www.meti.go.jp/english/statistics/tyo/tokusabizi/index.html

Downloaded: 14-10-2015
Structural Business Statistics ISIC Rev. 4 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC_ISIC4

Downloaded: 24-09-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

[25] The structure of NIC 2008 is identical to the structure of ISIC Rev. 4 up to 4-digit level (class). NIC 2008 is available at: http://mospi.nic.in/Mospi_New/site/inner.aspx?status=2&menu_id=129.

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en
  Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The main source of the GVA (in national currency) for Japan is JIP Database provided by RIETI and Hitotsubashi University. The data contained in the JIP Database are still consistent with the 1993 SNA ('System of National Accounts 1993', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 1993). The JIP Database form part of the World Input-Output Database (WIOD) project. This dataset uses its own industry classification, distinguishing 108 industries, covering the whole of the Japanese economy.

The JIP GVA data has been distributed among ICT and non-ICT sectors using GVA data from annual manufacturing census provided by METI, sales data from Survey on Selected Service Industries provided by METI, turnover data from Structural Business Statistics (OECD) and correspondence tables between JIP codes, Japan Standard Industrial Classification (JSIC), ISIC Rev. 3 (NACE Rev. 1) and ISIC Rev. 4 (NACE Rev. 2)[26].

Japan GVA dataset does not include RS sector, ICT sector NACE 951 (Repair of computers and communication equipment), and NACE 62 (Computer programming, consultancy and related activities) includes ICT sector NACE 5820 (Software publishing).

We obtain NACE Rev. 2 GVA dataset for Japan in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.1.10 Korea

Sources

NA from Bank of Korea

- http://ecos.bok.or.kr/flex/EasySearch_e.jsp

Downloaded: 09-10-2015

STructural ANalysis Database (STAN) ISIC Rev. 4 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STANI4

Downloaded: 09-10-2015
Structural Business Statistics ISIC Rev. 4 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC_ISIC4

Downloaded: 24-09-2015

Mining and Manufacturing Survey from Statistics Korea

- http://kostat.go.kr/portal/english/surveyOutlines/6/2/index.static

Downloaded: 09-10-2015

[26] The correspondences between JIP codes, JSIC, ISIC Rev. 3 and ISIC Rev. 4 are available at:
http://www.rieti.go.jp/en/database/d05_data/03-6.pdf
http://www.euklems.net/data/nace2/JPN_sources_12i.pdf
http://www.stat.go.jp/english/index/seido/sangyo/index07.htm
Ivie has also elaborated correspondence tables (see Appendix 1)

Service Industry Survey from Statistics Korea

- http://kostat.go.kr/portal/english/surveyOutlines/5/5/index.static

Downloaded: 09-10-2015

Survey of Business activities from Statistics Korea

- http://kostat.go.kr/portal/english/surveyOutlines/6/5/index.static

Downloaded: 09-10-2015

Wholesale and Retail trade Survey from Statistics Korea

- http://kostat.go.kr/portal/english/surveyOutlines/5/2/index.static

Downloaded: 09-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks
The main source of the GVA ICT sector data (in national currency) for Korea is NA from Bank of Korea. The NA data published by Bank of Korea from Spring 2014 onwards is in accordance with the SNA 2010 recommendations ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009).

Additional information was needed to obtain GVA dataset: value added data and annual sales from surveys (Mining and Manufacturing, Business activities, Wholesale and Retail trade and Service Industry), provided by Statistics Korea and value added and production data from STAN Database and Structural Business Statistics (OECD), correspondence tables between KSIC and NACE Rev. 2[27].

Transportation and storage (divisions 19-53) excludes postal and courier activities (division 53), because this sector is included in NACE 61 sector (Telecommunications).

We obtain NACE Rev. 2 GVA dataset in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat

2.1.11 Russia

National Accounts NACE Rev. 1.1 from Federal State Statistic Service of Russian Federation (Rosstat)

- http://www.gks.ru/free_doc/new_site/vvp/tab10a.xls

Downloaded: 13-10-2015

[27] The correspondences between KSIC and ISIC Rev. 4 are available at: http://www.kostat.go.kr/kssc/attach/data/data161.xls http://kostat.go.kr/kssc/main/MainAction.do?method=sub&catgrp=ekssc&catid1=ekssc01 http://kostat.go.kr/portal/english/help/1/index.board?bmode=read&aSeq=249244&pageNo=33&rowNum=10&amSeq=&sTarget=&sTxt=. Ivie has also elaborated correspondence tables (see Appendix 1)

Structural Business Statistics ISIC Rev. 3 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC

Downloaded: 23-09-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The main source of the GVA ICT sector data (in national currency) for Russia is National Accounts from Federal State Statistic Service of Russian Federation (Rosstat). These NA estimates are still compiled according to the 1993 SNA ('System of National Accounts 1993', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 1993).

GVA NA data has been distributed among ICT and non-ICT (RS sector, selected economic activities and rest of industries) using turnover data from Structural Business Statistics ISIC Rev. 3 (OECD) and the correspondence table between NACE Rev. 1.1 and NACE Rev. 2 (see Appendix 1).

Russia GVA dataset does not include ICT trade sector, Manufacture of chemicals and chemical products (division 20) includes Manufacture of magnetic and optical media (group 268), Manufacture of electronic components and boards (group 261) includes Manufacture of communication equipment (group 263), Computer programming, consultancy and related activities (division 62) includes Software Publishing (group 582), Services, except trade (divisions 49-99) includes Development of building projects (group 411), Transportation and storage (divisions 49-53) includes Travel agency and tour operator activities (group 791), and Professional, scientific, technical, administration and support service activities (divisions 69-82) exclude Travel agency and tour operator activities (group 791).

We obtain NACE Rev. 2 GVA dataset in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat

2.1.12 Taiwan

Sources

NA from National Statistics of Taiwan

- http://ebas1.ebas.gov.tw/pxweb/Dialog/statfile1L.asp

Downloaded: 07-10-2015

Input-Output tables from National Statistics of Taiwan

- http://eng.stat.gov.tw/lp.asp?ctNode=1650&CtUnit=799&BaseDSD=7&MP=5

Downloaded: 07-10-2015

Census Statistics from National Statistics of Taiwan

- http://eng.stat.gov.tw/lp.asp?ctNode=1624&CtUnit=774&BaseDSD=7&mp=5

Downloaded: 07-10-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of the NACE Rev. 2 GVA (and GDP) database for Taiwan has been based on NA information by industry provided by National Statistics of Taiwan (Directorate of Budget, Accounting and Statistics (DGBAS) of Executive Yuan). The NA data published by DGBAS from November 2014 onwards are based on the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009).

The National Accounts GVA data has been distributed among ICT (and non-ICT) sectors using GVA data from Input-Output tables, production data from Census Statistics provided by National Statistics of Taiwan and correspondence tables between Standard Industrial Classification (SIC) of Taiwan and ISIC Rev. 4 (NACE Rev. 2).

Taiwan GVA dataset does not include ICT trade sector, Services, except trade (divisions 49-99) include Development of building projects (group 411), Repair of computers and communication equipment (group 951) includes Repair of consumer electronics (class 9521). In addition, NACE 4791 (Retail sale via mail order houses or via Internet) incudes Other retail sale not in stores, stalls or markets (NACE class 4799), as there is not enough information to separate these activities

We obtain NACE Rev. 2 GVA data in euros and PPS using exchange rates and purchasing power parities respectively coming from IMF and Eurostat.

2.1.13 United States

Sources

NA from Bureau of Economic Analysis (BEA)

- http://www.bea.gov/industry/gdpbyind_data.htm

Downloaded: 07-09-2015

STructural ANalysis Database (STAN) ISIC Rev. 4 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STANI4

Downloaded: 07-09-2015

Input-Output Accounts from BEA

- http://www.bea.gov/industry/gdpbyind_data.htm

Downloaded: 07-09-2015

Industry Productivity and Costs from Bureau of Labor Statistics (BLS)

- http://www.bls.gov/lpc/

Downloaded: 07-09-2015

Exchange rates and PPP from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ert_bil_eur_a&lang=en Downloaded: 21-10-2015

(Exchange rates)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en Downloaded: 27-10-2015

(Purchasing power parities)

PPP from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=PPPGDP

Downloaded: 27-10-2015
(PPPs: national currency per US dollar)

Remarks

The elaboration of the NACE Rev. 2 GVA (and GDP) database distributed among ICT and non-ICT sectors for United States has been based on NAICS NA GVA data and production data from the Input-Output Accounts provided by BEA compiled according to the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), STAN Database ISIC Rev. 4 provided by OECD and correspondence tables between NAICS and ISIC Rev. 4[28].

BEA has adopted the 2008 SNA in the 2013 Comprehensive Revision of the National Income and Product Accounts. The NA data published from September 2013 onwards has been based on 2008 SNA.

United States GVA dataset does not contain information for the ICT trade sector, Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33), Manufacture of magnetic and optical media (group 268) includes Reproduction of recorded media (class 1820), Services, except trade (divisions 49-99) includes part of Repair and installation of machinery and equipment (division 33), and Repair of computers and communication equipment (group 951) includes part of Repair and installation of machinery and equipment (division 33) and part of Repair of personal and household goods (group 952), Satellite telecommunications activities (group 613) include Other telecommunications activities (group 619) and Computer facilities management activities (class 6203) include Other information technology and computer service activities (class 6209).

We obtain NACE Rev. 2 GVA dataset in euros and PPS using exchange rates and purchasing power parities respectively coming from OECD and Eurostat.

2.2 EMPLOYMENT

2.2.1 European Union and its Member States

Sources

National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10_e&lang=en

Downloaded: 26-10-2015
(Employment by A*10 industry breakdowns)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_e&lang=en

Downloaded: 26-10-2015

[28] The correspondences between different versions of US NAICS and ISIC Rev. 4 are available at http://www.census.gov/eos/www/naics/concordances/concordances.html. Ivie has also elaborated correspondence tables (see Appendix 1).

(National Accounts employment data by industry (up to NACE A*64))

National Accounts (NA) NACE Rev. 1.1 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - employment data)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - employment data)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace60_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - employment data)

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 20-10-2015
(Annual enterprise statistics for special aggregates of activities)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

Structural Business Statistics (SBS) NACE Rev 1.1 from Eurostat
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dade&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DA-DE and total manufacturing)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dfdn&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DF-DN and total manufacturing)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_3b_tr&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on trade)
- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on services (H-K)

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

EU KLEMS Growth and Productivity Accounts ISIC Rev. 3

- http://www.euklems.net/index.html

Downloaded: 11-11-2014
(March 2008 Release)
(November 2009 Release, updated March 2011)

Labour Force Statistics (LFS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_egan2&lang=en

Downloaded: 28-09-2015
(Employment by sex, age groups and economic activity (section level))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_egan22d&lang=en

Downloaded: 28-09-2015
(Employment by sex, age groups and detailed economic activity (division level))

- Eurostat special data request

Downloaded: 20-02-2014
(Employment by economic activity (group level))

Labour Force Statistics (LFS) NACE Rev. 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_egana&lang=en

Downloaded: 30-11-2014
(Employment by sex, age groups and economic activity (section level))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_egana2d&lang=en

Downloaded: 30-11-2014
(Employment by sex, age groups and detailed economic activity (division level))

- Eurostat special data request

Downloaded: 20-02-2014
(Employment by economic activity (group level))

Remarks

The main source of the employment NACE Rev. 2 dataset (in persons) for the EU and its Members States is NA from Eurostat, compiled according to the new European System of National and Regional Accounts (ESA 2010). The ESA 2010 is based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world. It nevertheless incorporates certain differences, particularly in its presentation, which is more in line with its specific use within the Union.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of employment, the sectorial breakdown in both Eurostat and national statistical office (NSO) are limited to 2-digit or division level (A*10, A*21, A*38, A*64 classifications).

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. In the case of ICT sectors, direct NA Employment information is only provided by Eurostat for the sector NACE 61 (telecommunications) for all the European countries. Therefore, many additional sources of data are needed to obtain complete database. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources will be used according to a hierarchy that prioritise Eurostat, other official statistical offices and the OECD over other data.

The NA Employment data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via

Internet, the selected economic activities (additional sectors) and the rest of industries using employment or jobs (employed or employee) from NA, SBS and LFS, EU KLEMS database, correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012)[29]. SBS only provides number of employed person data for France since 2010.

The majority of employment sector gaps have been filled with weights of the same sector using employment (employed or employee) from NA, SBS or LFS of another year. Croatia, Greece, Luxembourg and Malta lack official information for some industries, therefore, we recommend taking the results with caution. The missing data not covered with sources mentioned above has been estimated using European averages ICT shares.

2.2.2 Norway

Sources

National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10_e&lang=en

Downloaded: 26-10-2015
(Employment by A*10 industry breakdowns)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_e&lang=en

Downloaded: 26-10-2015
(National Accounts employment data by industry (up to NACE A*64))

National Accounts (NA) NACE Rev. 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace60_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - employment data)

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 20-10-2015
(Annual enterprise statistics for special aggregates of activities)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))

[29] ICT Sector Definition Transition from NACE Rev. 1.1 to NACE Rev. 2: A Methodological Note. JRC Technical Reports (2012). http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=5919. See in Appendix 1 the correspondence table between NACE Rev. 1.1 and NACE Rev. 2

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

Structural Business Statistics (SBS) NACE Rev. 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dade&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DA-DE and total manufacturing)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_2a_dfdn&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on manufacturing subsections DF-DN and total manufacturing)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_3b_tr&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on trade (G))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se&lang=en

Downloaded: 11-11-2015
(Annual detailed enterprise statistics on services (H-K)

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

Remarks

The main source of the employment NACE Rev. 2 dataset (in persons) for Norway is NA from Eurostat and Statistics Norway, compiled according to the new European System of National and Regional Accounts (ESA 2010). The ESA 2010 is based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world. It nevertheless incorporates certain differences, particularly in its presentation, which is more in line with its specific use within the Union.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of employment, the sectorial breakdown in both Eurostat and Statistics Norway are limited to 2-digit or division level (A*10, A*21, A*38, A*64 classifications).

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. In the case of ICT sectors, direct NA Employment information is only provided for the sector NACE 61 (telecommunications). Therefore, many additional sources of data are needed to estimate each variable. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources will be used according to a hierarchy that prioritise Eurostat, NSO, other official statistical offices and the OECD over other data.

The NA Employment data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via Internet, the selected economic activities (additional sectors) and the rest of industries

using employment or jobs (employed or employee) from NA, SBS, correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012).

The majority of employment sector gaps have been filled with weights of the same sector using employment (employed or employee) from NA, SBS or LFS of another year.

2.2.3 Switzerland

Sources

National Accounts (NA) ESA 2010 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a10_e&lang=en

Downloaded: 26-10-2015
(Employment by A*10 industry breakdowns)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_e&lang=en

Downloaded: 26-10-2015
(National Accounts employment data by industry (up to NACE A*64))

National Accounts (NA) ESA 1995 NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace10_e&lang=en Downloaded: 14-10-2014

(National Accounts by 10 branches – employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace21_e&lang=en

Downloaded: 14-10-2014
(National Accounts by 21 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_e&lang=en

Downloaded: 14-10-2014
(National Accounts by 38 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace64_e&lang=en

Downloaded: 14-10-2014
(National Accounts by 64 branches - employment data)

National Accounts (NA) NACE Rev. 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace06_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 6 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace31_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 31 branches - employment data)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_nace60_e&lang=en

Downloaded: 06-11-2015
(National Accounts by 60 branches - employment data)

Unternehmen. Betriebszählung from Bundesamt für Statistik (BFS) of Switzerland

- http://www.bfs.admin.ch/bfs/portal/de/index/themen/06/02/blank/data.html (Downloaded: 01-10-2015)

(Employment by economic activity NOGA 2008)

Structural Business Statistics (SBS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_sca_r2&lang=en

Downloaded: 20-10-2015
(Annual enterprise statistics for special aggregates of activities)

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for industry (B-E))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_dt_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for trade (G))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_1a_se_r2&lang=en

Downloaded: 20-10-2015
(Annual detailed enterprise statistics for services (H-N and S95))

STructural ANalysis Database (STAN) ISIC Rev. 3.1 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STAN08BIS

Downloaded: 11-11-2015

Labour Force Statistics (LFS) NACE Rev. 2 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_egan2&lang=en

Downloaded: 28-09-2015
(Employment by sex, age groups and economic activity (section level))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_egan22d&lang=en

Downloaded: 28-09-2015
(Employment by sex, age groups and detailed economic activity (division level))

- Eurostat special data request

Downloaded: 20-02-2014
(Employment by economic activity (group level))

Labour Force Statistics (LFS) NACE Rev. 1.1 from Eurostat

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_egana&lang=en

Downloaded: 30-11-2015
(Employment by sex, age groups and economic activity (section level))

- http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_egana2d&lang=en

Downloaded: 30-11-2015
(Employment by sex, age groups and detailed economic activity (division level))

- Eurostat special data request

Downloaded: 20-02-2014
(Employment by economic activity (group level))

Remarks

The main source of the employment NACE Rev. 2 dataset (in persons) for Switzerland is NA from Eurostat and Bundesamt für Statistik (BFS) of Switzerland, compiled according to the new European System of National and Regional Accounts (ESA 2010). The ESA 2010 is based on the concepts of the 2008 SNA ('System of National Accounts 2008', Commission of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations and World Bank, 2009), which provides guidelines on national accounting for all countries throughout the world. It nevertheless incorporates certain differences, particularly in its presentation, which is more in line with its specific use within the Union.

According to the OECD definitions, the ICT sectors are defined on the basis of the NACE Rev. 2 nomenclature up to 4-digit level. Something similar occurs with Retail sale via order houses or via Internet (RS sector), excluded from the OECD definition. In the case of ESA 2010 employment, the sectorial breakdown are limited to A*10 classification.

This disaggregation is not detailed enough to obtain the complete 4-digit datasets. Many additional sources of data are needed to estimate complete disaggregation. These sources will be used to split national accounts official data up to the 4-digit level required. Hence, data included in the dataset will be coherent with the NA official statistics. The alternative data sources will be used according to a hierarchy that prioritise Eurostat, NSO, other official statistical offices and the OECD over other data.

The NA Employment data has been distributed among ICT sectors, according to the comprehensive and operational ICT sector definition, Retail sale via order houses or via Internet, the selected economic activities (additional sectors) and the rest of industries using employment or jobs (employed or employee) from ESA 2010 NA, ESA 1995 NA (A*64 classification), SBS, LFS, correspondence tables between NACE Rev 1.1 and NACE Rev.2 (see Appendix 1) and the methodology described in Mas, Robledo y Pérez (2012).

The majority of employment sector gaps have been filled with weights of the same sector using employment (employed or employee) from NA, SBS or LFS of another year.

2.2.4 Australia

Sources
NA from Australian Bureau of Statistics (ABS)
- http://www.abs.gov.au/ausstats/abs@.nsf/mf/6291.0.55.003

Downloaded: 05-10-2015

Australian Industry from ABS
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/48791677FF5B2814CA256A1D0001FECD?opendocument

Downloaded: 05-10-2015

Experimental Estimates for the Manufacturing Industry from ABS
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8159.02009-10?OpenDocument

Downloaded: 05-10-2015

Information and Communication Technology from ABS
- http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8126.02006-07?OpenDocument

Downloaded: 05-10-2015

Information Media and Telecommunications Services
- http://www.abs.gov.au/ausstats/abs@.nsf/mf/8681.0

Downloaded: 20-10-2015

Retail and Wholesale Industries
- http://www.abs.gov.au/ausstats/abs@.nsf/mf/8622.0

Downloaded: 20-10-2015

Remarks
The main source of the employment (persons employed) NACE Rev. 2 dataset for Australia is ABS. NA from OECD only provided "high-level aggregation A*10", that aggregates the ISIC Rev. 4/NACE Rev. 2 sections into 10 or 11 categories.

The National Accounts employment data has been distributed among ICT (and non-ICT) sectors using employment data from Australian Industry Statistics, experimental

estimates for the manufacturing industry, Information and Communication Technology Statistics provided by ABS and correspondence tables between ANZSIC and NACE Rev. 2 (see appendix 1).

In Australia employment dataset, Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33); Manufacture of electronic components and boards (group 261) includes Manufacture of consumer electronics (group 264) and Manufacture of magnetic and optical media (group 268); Services, except trade (divisions 49-99) include part of Repair and installation of machinery and equipment (division 33); Repair of computers and communication equipment (group 951) include part of Repair and installation of machinery and equipment (division 33), and Retail sale via mail order houses or via Internet (RS sector, class 4791), includes Other retail sale not in stores, stalls or markets (class 4799).

2.2.5 Brazil

Sources
NA from Instituto Brasileiro de Geografia e Estatística (IBGE)
- http://www.ibge.gov.br/home/download/estatistica.shtm

Downloaded: 06-10-2015

Annual Survey of Industry from IBGE
- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 06-10-2015

Annual Survey of Trade from IBGE
- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 06-10-2015

Annual Survey of Services from IBGE
- http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisas.php

Downloaded: 06-10-2015
National Household Sample Survey from IBGE
- http://www.ibge.gov.br/home/estatistica/populacao/trabalhoerendimento/pnad2013/default.shtm

Downloaded: 06-10-2015

Remarks
The elaboration of the NACE Rev. 2 employment (persons employed) database for Brazil has been based on the information published by IBGE.

The National Accounts (CNAE 2.0) employment data has been distributed among ICT and rest of the industries using employment data (employed persons and employees) from Surveys (Industrial, Trade, Services and National Household Sample) provided by IBGE (in CNAE 1.0 and CNAE 2.0). Brazil Employment dataset does not include Retail sale via mail order houses or via Internet sector.

2.2.6 Canada

Sources
NA from Statistics Canada
- http://www5.statcan.gc.ca/cansim/a33?RT=TABLE&themeID=311&spMode=tables&lang=eng

Downloaded: 02-10-2015

Annual Survey of Manufactures and Logging from Statistics Canada

- http://www5.statcan.gc.ca/COR-COR/COR-COR/objList?lang=eng&srcObjType=SDDS&srcObjId=2103&tgtObjType=ARRAY

Downloaded: 02-10-2015

Labour Force Survey from Statistics Canada

- http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=2820008

Downloaded: 02-10-2015

Remarks

The main source of the employment (jobs) for Canada is National Accounts from Statistics Canada (CANSIM database), since OECD has not published any NACE Rev. 2 data yet.

The National Accounts data of jobs has been distributed among ICT and non-ICT sectors using correspondence tables between NAICS and NACE Rev. 2[30], employment (employed and employees) data from Annual Survey of Manufacturing and Logging and Labour Force Survey provided by Statistics Canada.

Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33); Manufacture of magnetic and optical media (group 268) includes Reproduction of recorded media (class 1820); Services, except trade (divisions 49-99) includes part of Repair and installation of machinery and equipment (division 33); and Repair of computers and communication equipment (group 951) include part of Repair and installation of machinery and equipment (division 33) and part of Repair of personal and household goods (group 952).

2.2.7 China

Sources

World Input-Output Database ISIC Rev. 3 (WIOD)

- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 15-10-2015

(National Input-Output Tables, Released November 2013)

- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 15-10-2015

(Socio Economic Accounts, Released July 2014)

Main Labour Statistics from National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Main industrial economic indicators from National Bureau of Statistics of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Statistics on Production and Management in High-tech Industry by Industrial Sector from Ministry of Science and Technology of China

- http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

Downloaded: 15-10-2015

Remarks

The main source of the employment data (persons employed) for China is National Bureau of Statistics of China and WIOD ISIC Rev. 3 Database. This information has been

[30] The correspondence between different versions of Canadian NAICS and ISIC Rev. 4 is available at: http://www.statcan.gc.ca/concepts/concordances-classifications-eng.htm. Ivie has also elaborated correspondence tables (see Appendix 1).

distributed among ICT and non-ICT sectors using employment data from Main industrial economic indicators provided by National Bureau of Statistics of China, Statistics on Production and Management in High-tech Industry by Industrial Sector from Ministry of Science and Technology of China, and correspondence tables between National Economic Industrial Classification (GB/T 4754-2002), ISIC Rev. 3 and ISIC Rev. 4 (NACE Rev. 2)[31].

China employment dataset does not include RS and ICT Trade sectors; Manufacture of chemicals and chemical products (division 20) includes Manufacture of magnetic and optical media (group 268); Wholesale and retail trade, repair of motor vehicles and motorcycles (divisions 45-47) include Repair of personal and household goods (group 952); Services, except trade (divisions 49-99) include Remediation activities and other waste management services (division 39) and Development of building projects (group 411) and exclude Repair of personal and household goods (group 952); Transportation and storage (divisions 49-53) include Travel agency and tour operator activities (group 791); Professional, scientific, technical, administration and support service activities (divisions 69-82) excludes Travel agency and tour operator activities (group 791) and Veterinary activities (division 75);Divisions 69-75 excludes Veterinary activities (division 75); and Divisions 86-88 includes Veterinary activities (division 75).

2.2.8 India

Sources

World Input-Output Database ISIC Rev. 3 (WIOD)

- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 16-10-2014

(National Input-Output Tables, Released November 2013)

- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 16-10-2015

(Socio Economic Accounts, Released July 2014)

Productivity Database 2015 of Asian Productivity Organization (APO)

- http://www.apo-tokyo.org/wedo/measurement

Downloaded: 16-10-2015

Annual Survey of Industries from Ministry of Statistics and Programme Implementation (MOSPI), Government of India

- http://mospi.nic.in/mospi_new/site/inner.aspx?status=3&menu_id=56

Downloaded: 16-10-2015

Employment and Unemployment Situation in India: 2007-08, Report No. 531, 64th Round (July 2007 - June 2008) from National Sample Survey Office (NSS), MOSPI

- http://mospi.nic.in/Mospi_New/site/inner.aspx?status=3&menu_id=31

Downloaded: 16-10-2015

Key Indicators of Employment and Unemployment in India, July 2009-June 2010, KI (66/10), 66th Round (July 2009 - June 2010) from National Sample Survey Office (NSS), MOSPI

- http://mospi.nic.in/Mospi_New/site/inner.aspx?status=3&menu_id=31

Downloaded: 16-10-2015

Value added and employment generation in the ICT sector in India from MOSPI

- http://mospi.nic.in/mospi_new/upload/val_add_ICT_21june11.pdf

Downloaded: 16-10-2015

[31] The correspondence between Chinese SIC and ISIC Rev. 3 is available at: http://www.stats.gov.cn/tjbz/t20040210_402369833.htm

Remarks
The main source of the employment data (in national currency) for India is WIOD ISIC Rev. 3 Database, since ESA 2010 NA from MOSPI has not published any NACE Rev. 2 data yet. This information has been distributed among ICT and non-ICT sectors using employment data from APO productivity database, Annual Survey of Industry, Key Indicators of Employment and Unemployment, Employment and Unemployment Situation, Value added & employment generation in the ICT sector in India provided by MOSPI. This last source gives the 2008 National Industry Classification (NIC) codes for ICT sectors following the 2007 definition of OECD, which coincide exactly with NACE Rev. 2 ones[32].

India employment dataset does not include RS and ICT trade sectors; Wholesale and retail trade, Repair of motor vehicles and motorcycles (divisions 45-47 NACE Rev. 2) includes Repair of personal and household goods (group 952); Wholesale and retail trade and repair of motor vehicles and motorcycles (division 45) includes Retail sale of automotive fuel in specialized stores (group 473); Services, except trade (divisions 49-99) includes Development of building projects (group 411) and exclude Repair of personal and household goods (group 952); Transportation and storage (divisions 49-53) include Travel agency and tour operator activities (group 791); Professional, scientific, technical, administration and support service activities (divisions 69-82) exclude Travel agency and tour operator activities (group 791) and Veterinary activities (division 75); and Human health and social work activities (divisions 86-88) includes Veterinary activities (division 75).

2.2.9 Japan

Sources
Japan Industrial Productivity (JIP) from Research Institute of Economy, Trade and Industry (RIETI) and Hitotsubashi University
- http://www.rieti.go.jp/en/database/JIP2015/index.html

Downloaded: 8-12-2015

EU KLEMS Growth and Productivity Accounts ISIC Rev. 4
- http://www.euklems.net/index.html

Downloaded: 14-10-2015
(ISIC Rev. 4, Rolling updates)

Labour Force Statistics from Statistics Japan
- http://www.stat.go.jp/english/data/roudou/index.htm

Downloaded: 14-10-2015

Annual manufacturing census from Economic and Industrial Policy Bureau, Ministry of Economy, Trade and Industry (METI)
- http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html

Downloaded: 14-10-2015

Survey of selected services industries from METI
- http://www.meti.go.jp/english/statistics/tyo/tokusabizi/index.html

Downloaded: 14-10-2015

Structural Business Statistics ISIC Rev. 4 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC_ISIC4

Downloaded: 14-10-2015

[32] The structure of NIC 2008 is identical to the structure of ISIC Rev. 4 up to 4-digit level (class). NIC 2008 is available at: http://mospi.nic.in/Mospi_New/site/inner.aspx?status=2&menu_id=129.

Remarks
The main source of the employment (persons employed) for Japan is JIP Database provided by RIETI and Hitotsubashi University. This dataset uses its own industry classification, distinguishing 108 industries, covering the whole of the Japanese economy. The JIP Database form part of the World Input-Output Database (WIOD) project.

The JIP employment data has been distributed among ICT and non-ICT sectors using employment (employees) data from annual manufacturing census provided by METI, Survey on Selected Service Industries provided by METI, LFS provided by Statistics Japan, Structural Business Statistics (OECD) and correspondence tables between JIP codes, Japan Standard Industrial Classification (JSIC), ISIC Rev. 3 (NACE Rev. 1) and ISIC Rev. 4 (NACE Rev. 2)[33].

Japan employment dataset does not include RS sector, ICT sector NACE 951 (repair of computers and communication equipment), and NACE 62 (Computer programming, consultancy and related activities) includes ICT sector NACE 5820 (software publishing).

2.2.10 Korea

Sources
Economically Active Population Survey from Statistics Korea
- http://kosis.kr/eng/database/database_001000.jsp?listid=B&subtitle=Employment/Labor/Wage

Downloaded: 08-10-2015

Structural Business Statistics ISIC Rev. 4 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC_ISIC4

Downloaded: 24-09-2015

Mining and Manufacturing Survey from Statistics Korea
- http://kostat.go.kr/portal/english/surveyOutlines/6/2/index.static

Downloaded: 09-10-2015

Service Industry Survey from Statistics Korea
- http://kostat.go.kr/portal/english/surveyOutlines/5/5/index.static

Downloaded: 09-10-2015

Survey of Business activities from Statistics Korea
- http://kostat.go.kr/portal/english/surveyOutlines/6/5/index.static

Downloaded: 09-10-2015

Wholesale and Retail trade Survey from Statistics Korea
- http://kostat.go.kr/portal/english/surveyOutlines/5/2/index.static

Downloaded: 09-10-2015

Remarks
The main source of the employment (persons employed) NACE Rev. 2 dataset for Korea is Economically Active Population Survey from Statistics Korea.

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[33] The correspondences between JIP codes, JSIC, ISIC Rev. 3, ISIC Rev. 4, NACE Rev. 2 are available at: http://www.rieti.go.jp/en/database/d05_data/03-6.pdf
http://www.euklems.net/data/nace2/JPN_sources_12i.pdf
http://www.stat.go.jp/english/index/seido/sangyo/index07.htm
http://unstats.un.org/unsd/cr/registry/regdnld.asp?Lg=1
http://ec.europa.eu/eurostat/ramon/other_documents/NACE_Rev2-JSIC_12/index.cfm?TargetUrl=DSP_NACE2_JSIC12
Ivie has also elaborated correspondence tables (see Appendix 1)

The National Accounts employment data has been distributed among ICT sector, RS sector and the other selected industries using employment from Statistics Korea surveys (Mining and Manufacturing, Business activities, Wholesale and Retail trade and Service Industry), employment data from Structural Business Statistics (OECD) and correspondence tables between KSIC and NACE Rev. 2[34].

Transportation and storage (divisions 19-53) excludes postal and courier activities (division 53), because this sector is included in NACE 61 sector (Telecommunications).

2.2.11 Russia

World Input-Output Database ISIC Rev. 3 (WIOD)
- http://www.wiod.org/new_site/database/niots.htm

Downloaded: 13-10-2015
(National Input-Output Tables, Released November 2013)
- http://www.wiod.org/new_site/database/seas.htm

Downloaded: 13-10-2015
(Socio Economic Accounts, Released July 2014)

Labour Force Statistics (LFS) NACE Rev. 1.1 from Rosstat
- http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766

Downloaded: 13-10-2015

Employed in the ICT sector (NACE Rev. 1.1)
- Information provided by Galina Lyubova (Department of Foreign Statistics and International Cooperation from Rosstat)

Structural Business Statistics ISIC Rev. 3 from OECD
- http://stats.oecd.org/Index.aspx?DataSetCode=SSIS_BSC

Downloaded: 13-10-2015

Remarks
The main source of the employment ICT sector data (persons employed) for Russia is WIOD ISIC Rev. 3 database and NA from Rosstat.

Employment data has been distributed among ICT and non-ICT sectors using LFS employment and employed data provided directly by Rosstat, employment (employees) data from Structural Business Statistics ISIC Rev. 3 (OECD), and the correspondence table between NACE Rev. 1.1 and NACE Rev. 2 (see Appendix 1).

Russia employment dataset does not include ICT trade sector; Manufacture of chemicals and chemical products (division 20) includes Manufacture of magnetic and optical media (group 268); Computer programming, consultancy and related activities (division 62) includes Software Publishing (group 582); Services, except trade (divisions 49-99) includes Development of building projects (group 411); Transportation and storage (divisions 49-53) includes Travel agency and tour operator activities (group 791); Professional, scientific, technical, administration and support service activities (divisions 69-82) exclude Travel agency and tour operator activities (group 791); and Retail sale via mail order houses or via Internet (class 4791) excludes Retail trade via internet.

[34] The correspondences between KSIC and ISIC Rev. 4 are available at:
http://www.kostat.go.kr/kssc/attach/data/data161.xls
http://kostat.go.kr/kssc/main/MainAction.do?method=sub&catgrp=ekssc&catid1=ekssc01
http://kostat.go.kr/portal/english/help/1/index.board?bmode=read&aSeq=249244&pageNo=33&rowNum=10&amSeq=&sTarget=&sTxt=. Ivie has also elaborated correspondence tables (see Appendix 1)

2.2.12 Taiwan

Sources
Labour Force Statistics (Manpower Survey) from National Statistics, Directorate General of Budget, Accounting and Statistics (DGBAS) of Executive Yuan, Taiwan

- http://statdb.dgbas.gov.tw/pxweb/dialog/statfile1L.asp

Downloaded: 07-10-2014

Labour Force Statistics (Manpower Survey): Employed persons, by mid-category of industries and class of workers, 2004-2013

- Information provided by Teresa Chang (Directorate General of Budget, Accounting and Statistics (DGBAS) of Executive Yuan, Taiwan)

Census Statistics from National Statistics of Taiwan

- http://eng.stat.gov.tw/lp.asp?ctNode=1624&CtUnit=774&BaseDSD=7&mp=5

Downloaded: 07-10-2015

Remarks
The elaboration of the NACE Rev. 2 employment (persons employed) for Taiwan has been based on the LFS information by industry provided by National Statistics of Taiwan (Directorate of Budget, Accounting and Statistics (DGBAS) of Executive Yuan).

The LFS employment data has been distributed among ICT sector, RS and other non-ICT sectors using employment (persons engaged) data from Census Statistics provided by National Statistics of Taiwan and correspondence tables between Standard Industrial Classification (SIC) of Taiwan and ISIC Rev. 4 (NACE Rev. 2).

Taiwan employment dataset does not include ICT trade sector; Services, except trade (divisions 49-99) include Development of building projects (group 411); Repair of computers and communication equipment (group 951) includes Repair of consumer electronics (class 9521); and RS sector (Class 4791) includes Other retail sale not in stores, stalls or markets (class 4799).

2.2.13 United States

Sources
NA from Bureau of Economic Analysis (BEA)

- http://www.bea.gov/industry/gdpbyind_data.htm

Downloaded: 14-09-2015

STructural ANalysis Database (STAN) ISIC Rev. 4 from OECD

- http://stats.oecd.org/Index.aspx?DataSetCode=STANI4

Downloaded: 14-09-2015

Industry Productivity and Costs from Bureau of Labor Statistics (BLS)

- http://www.bls.gov/lpc/

Downloaded: 14-09-2015

Labor Force Statistics (Current Population Survey) from BLS

- http://www.bls.gov/cps/

Downloaded: 14-09-2015
Annual Survey of Manufactures from United States Census Bureau

- http://www.census.gov/manufacturing/asm/index.html

Downloaded: 14-09-2015

Remarks
The elaboration of the NACE Rev. 2 employment (persons employed) database distributed among ICT sector, RS sector and other non-ICT sectors for United States has been based on NA employment data from BEA and other employment sources like STAN Database ISIC Rev. 4 from OECD, Bureau of Labor Statistics and United States Census Bureau, and correspondence tables between NAICS and ISIC Rev. 4[35].

Manufacturing (divisions 10-33) excludes part of Repair and installation of machinery and equipment (division 33); Manufacture of magnetic and optical media (group 268) includes Reproduction of recorded media (class 1820); Services, except trade (divisions 49-99) includes part of Repair and installation of machinery and equipment (division 33); and Repair of computers and communication equipment (group 951) includes part of Repair and installation of machinery and equipment (division 33) and part of Repair of personal and household goods (group 952).

2.3 LABOUR PRODUCTIVITY

Sources: see sources in GVA and employment

Remarks: Labour productivity (GVA/employment) dataset is provided in nominal euros per person and in euros PPS per person. See comments in GVA and employment remarks.

[35] The correspondences between different versions of US NAICS and ISIC Rev. 4 are available at http://www.census.gov/eos/www/naics/concordances/concordances.html. Ivie has also elaborated correspondence tables (see Appendix 1)

APPENDIX: TABLES OF CORRESPONDENCES

Table A1. Approximate correspondences between NACE Rev. 2 and NACE Rev. 1.1
(based on the 2007 OECD ICT sector definition)

NACE Rev. 2	ISIC Rev. 4	Description	NACE Rev. 1.1	ISIC Rev. 3.1
261-264, 268	**261-264, 268**	**ICT manufacturing industries**	**2465, 30, 32**	**2429, 30, 32**
261	261	Manufacture of electronic components and boards	321	321
262	262	Manufacture of computers and peripheral equipment	30	30
263	263	Manufacture of communication equipment	322	322
264	264	Manufacture of consumer electronics	323	323
268	268	Manufacture of magnetic and optical media	2465	2429
465	**4651, 4652**	**ICT trade industries**	**5184, 5186**	**5151, 5152**
4651	4651	Wholesale of computers, computer peripheral equipment and software	5184	5151
4652	4652	Wholesale of electronic and telecommunications equipment and parts	5186	5152
582, 61, 62, 631, 951	**582, 61, 62, 631, 951**	**ICT services industries**	**642, 72**	**642, 72**
582	582	Software publishing	7221	7221
61	61	Telecommunications	642	642
62	62	Computer programming, consultancy and related activities	721, 7222, 726	721, 7229, 729
631	631	Data processing, hosting and related activities; web portals	723, 724	723, 724
951	951	Repair of computers and communication equipment	725	725

RS SECTOR

NACE Rev. 2	ISIC Rev. 4	Description	NACE Rev. 1.1	ISIC Rev. 3.1
4791	4791	Retail sale via mail order houses or via Internet	5261, 5263P	5251, 5259P

Note: The P indicates that the NACE (ISIC) codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A2. Correspondences between NACE Rev. 2 and ANZSIC (Australia)

	NACE Rev. 2	ANZSIC 2006
ICT manufacturing industries		
Manufacture of electronic components and boards	261	2429P
Manufacture of electronic components and boards	2611	2429P
Manufacture of electronic components	2619	2429P
Manufacture of computers and peripheral equipment	262	2421
Manufacture of communication equipment	263	2422
Manufacture of consumer electronics	264	2429P
Manufacture of magnetic and optical media	268	2429P
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	3492
Wholesale of electronic and telecommunications equipment and parts	4652	3493
ICT services industries		
Software publishing	582	542
Publishing of computer games	5821	542P
Other software publishing	5829	542P
Telecommunications	61	58, 591P
Wired telecommunications activities	6101	5801, 591P
Wireless telecommunications activities	6102	5802P, 591P
Satellite telecommunications activities	6103	5802P, 591P
Other telecommunications activities	6109	5809, 591P
Computer programming, consultancy and related activities	62	70
Computer programming activities	6201	70P
Computer consultancy and computer facilities management activities	6202-6203	70P
Computer consultancy activities	6202	70P
Computer facilities management activities	6203	70P
Other information technology and computer service activities	6209	70P
Data processing, hosting and related activities; web portals	631	591P, 592
Data processing, hosting and related activities	6311	592
Web portals	6312	591P
Repair of computers and communication equipment	951	9422
Repair of computers and peripheral equipment	9511	9422P
Repair of communication equipment	9512	9422P

RS SECTOR		
	NACE Rev. 2	**NAICS2007**
Retail sale via mail order houses or via Internet	4791	431P

Note: The P indicates that the ANZSIC codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A3. Correspondences between NACE Rev. 2 and CNAE (Brazil)

	NACE Rev. 2	CNAE 2.0
ICT manufacturing industries		
Manufacture of electronic components and boards	261	261
Manufacture of electronic components and boards	2611	
Manufacture of electronic components	2619	
Manufacture of computers and peripheral equipment	262	262
Manufacture of communication equipment	263	263
Manufacture of consumer electronics	264	264
Manufacture of magnetic and optical media	268	268
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	4651
Wholesale of electronic and telecommunications equipment and parts	4652	4652
ICT services industries		
Software publishing	582	6203, 6203
Publishing of computer games	5821	-
Other software publishing	5829	-
Telecommunications	61	61
Wired telecommunications activities	6101	6110, 6141
Wireless telecommunications activities	6102	6120, 6142
Satellite telecommunications activities	6103	6130, 6143
Other telecommunications activities	6109	6190
Computer programming, consultancy and related activities	62	6201, 6204, 6209
Computer programming activities	6201	6201
Computer consultancy and computer facilities management activities	6202-6203	6204
Computer consultancy activities	6202	-
Computer facilities management activities	6203	-
Other information technology and computer service activities	6209	6209
Data processing, hosting and related activities; web portals	631	631
Data processing, hosting and related activities	6311	6311
Web portals	6312	6319
Repair of computers and communication equipment	951	951
Repair of computers and peripheral equipment	9511	9511
Repair of communication equipment	9512	9512

RS SECTOR		
	NACE Rev. 2	**CNAE 2.0**
Retail sale via mail order houses or via Internet	4791	4713P

Note: The P indicates that the CNAE codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A4. Correspondences between NACE Rev. 2 and JSIC (Japan)

	NACE Rev. 2	JSIC Rev. 13
ICT manufacturing industries		
Manufacture of electronic components and boards	261	28 (ex. 283)
Manufacture of electronic components and boards	2611	28 (ex. 2814, 283, 284)
Manufacture of electronic components	2612	2814, 284
Manufacture of computers and peripheral equipment	262	303
Manufacture of communication equipment	263	301 (ex. 3014, 3015)
Manufacture of consumer electronics	264	3014, 302 (ex. 3022)
Manufacture of magnetic and optical media	268	2832
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	5432P
Wholesale of electronic and telecommunications equipment and parts	4652	5432P
ICT services industries		
Software publishing	582	3913, 3914
Publishing of computer games	5821	3913P
Other software publishing	5829	3913P, 3914
Telecommunications	61	37
Wired telecommunications activities	6101	371
Wireless telecommunications activities	6102	372P
Satellite telecommunications activities	6103	372P
Other telecommunications activities	6109	373
Computer programming, consultancy and related activities	62	3911, 3912
Computer programming activities	6201	3911P, 3912
Computer consultancy and computer facilities management activities	6202-6203	3911P
Computer consultancy activities	6202	3911P
Computer facilities management activities	6203	3911P
Other information technology and computer service activities	6209	3911P
Data processing, hosting and related activities; web portals	631	3921, 40 (ex. 4013)
Data processing, hosting and related activities	6311	3921, 4012
Web portals	6312	4011
Repair of computers and communication equipment	951	9021P
Repair of computers and peripheral equipment	9511	9021P
Repair of communication equipment	9512	9021P

Note: The P indicates that the NAICS codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

RS SECTOR

	NACE Rev. 2	JSIC Rev. 13
Retail sale via mail order houses or via Internet	4791	611P, 619P

Note: The P indicates that the JSIC codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A5. Correspondences between NACE Rev. 2 and KSIC (Korea)

	NACE Rev. 2	KSIC Rev. 9
ICT manufacturing industries		
Manufacture of electronic components and boards	261	261, 262
Manufacture of electronic components and boards	2611	261, 262 (ex. 2622)
Manufacture of electronic components	2612	2622
Manufacture of computers and peripheral equipment	262	263
Manufacture of communication equipment	263	264
Manufacture of consumer electronics	264	265
Manufacture of magnetic and optical media	268	266
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	4651
Wholesale of electronic and telecommunications equipment and parts	4652	4652
ICT services industries		
Software publishing	582	582
Publishing of computer games	5821	5821
Other software publishing	5829	5822
Telecommunications	61	612
Wired telecommunications activities	6101	6121
Wireless telecommunications activities	6102	6122
Satellite telecommunications activities	6103	6123
Other telecommunications activities	6109	6129
Computer programming, consultancy and related activities	62	62
Computer programming activities	6201	6201
Computer consultancy and computer facilities management activities	6202-6203	6202
Computer consultancy activities	6202	62021
Computer facilities management activities	6203	62022
Other information technology and computer service activities	6209	6209
Data processing, hosting and related activities; web portals	631	631
Data processing, hosting and related activities	6311	6312
Web portals	6312	6311
Repair of computers and communication equipment	951	95121, 95122
Repair of computers and peripheral equipment	9511	95121
Repair of communication equipment	9512	95122

RS SECTOR		
	NACE Rev. 2	**KSIC Rev. 9**
Retail sale via mail order houses or via Internet	4791	4791

Source : Own elaboration

Table A6. Correspondences between NACE Rev. 2 and SIC (Taiwan)

	NACE Rev. 2	SIC (9th version)
ICT manufacturing industries		
Manufacture of electronic components and boards	261	26
Manufacture of electronic components and boards	2611	2691, 2699P
Manufacture of electronic components	2612	26 (ex. 2691, 2699P)
Manufacture of computers and peripheral equipment	262	271
Manufacture of communication equipment	263	272
Manufacture of consumer electronics	264	273
Manufacture of magnetic and optical media	268	274
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	4641P
Wholesale of electronic and telecommunications equipment and parts	4652	4641P
ICT services industries		
Software publishing	582	582
Publishing of computer games	5821	-
Other software publishing	5829	-
Telecommunications	61	61
Wired telecommunications activities	6101	-
Wireless telecommunications activities	6102	-
Satellite telecommunications activities	6103	-
Other telecommunications activities	6109	-
Computer programming, consultancy and related activities	62	62
Computer programming activities	6201	6201
Computer consultancy and computer facilities management activities	6202-6203	6202
Computer consultancy activities	6202	-
Computer facilities management activities	6203	-
Other information technology and computer service activities	6209	6209
Data processing, hosting and related activities; web portals	631	631
Data processing, hosting and related activities	6311	6312
Web portals	6312	6311
Repair of computers and communication equipment	951	952
Repair of computers and peripheral equipment	9511	9521
Repair of communication equipment	9512	9522

RS SECTOR

	NACE Rev. 2	SIC (9th version)
Retail sale via mail order houses or via Internet	4791	4874

Note: The P indicates that the SIC codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A7. Correspondences between NACE Rev. 2 and NAICS (US and Canada)

	NACE Rev. 2	NAICS2007
ICT manufacturing industries		
Manufacture of electronic components and boards	261	3344
Manufacture of electronic components and boards	2611	334412-334417; 334419
Manufacture of electronic components	2619	334418
Manufacture of computers and peripheral equipment	262	3341
Manufacture of communication equipment	263	3342
Manufacture of consumer electronics	264	3343
Manufacture of magnetic and optical media	268	3346
ICT trade industries		
Wholesale of computers, computer peripheral equipment and software	4651	42343 (41731 in Canada)
Wholesale of electronic and telecommunications equipment and parts	4652	4236P (41732 in Canada)
ICT services industries		
Software publishing	582	5112
Publishing of computer games	5821	5112P
Other software publishing	5829	5112P
Telecommunications	61	517
Wired telecommunications activities	6101	5171
Wireless telecommunications activities	6102	5172
Satellite telecommunications activities	6103	5174
Other telecommunications activities	6109	5179
Computer programming, consultancy and related activities	62	5415
Computer programming activities	6201	541511
Computer consultancy and computer facilities management activities	6202-6203	541512, 541513
Computer consultancy activities	6202	541512
Computer facilities management activities	6203	541513
Other information technology and computer service activities	6209	541519
Data processing, hosting and related activities; web portals	631	5182
Data processing, hosting and related activities	6311	5182P
Web portals	6312	5182P
Repair of computers and communication equipment	951	811212, 811213
Repair of computers and peripheral equipment	9511	811212
Repair of communication equipment	9512	811213

RS SECTOR		
	NACE Rev. 2	**NAICS2007**
Retail sale via mail order houses or via Internet	4791	4541

Note: The P indicates that the NAICS codes are linked with more than one NACE Rev. 2 (ISIC Rev. 4) code.

Source : Own elaboration

Table A8. NABS - NACE Rev. 1.1. correspondence table

NABS 2007		NACE Rev. 1.1	
Code	**Name**	**Code**	**Name**
1	Exploration and exploitation of the Earth	10	Mining of coal and lignite; extraction of peat
		11	Extraction of crude petroleum and natural gas
		12	Mining of uranium and thorium ores
		13	Mining of metal ores
		14	Other mining and quarrying
		29.51	Manufacture of machinery for metallurgy
		29.52	Manufacture of machinery for mining, quarrying and construction
2	Environment	23.3	Processing of nuclear fuel
		37	Recycling
		90.02	Collection and treatment of other waste
3	Exploration and exploitation of space	62.3	Space transport
4	Transport, telecommunication and other infrastructures	34	Manufacture of motor vehicles, trailers and semi-trailers
		35.11	Building and repairing of ships
		35.2	Manufacture of railway and tramway locomotives and rolling stock
		35.3	Manufacture of aircraft and spacecraft
		41	Collection, purification and distribution of water
		45	Construction
		60	Land transport; transport via pipelines
		61	Water transport
		62	Air transport
		63	Supporting and auxiliary transport activities; activities of travel agencies
		64	Post and telecommunications
		74.2	Architectural and engineering activities and related technical consultancy
		90.01	Collection and treatment of sewage
		90.03	Repair and maintenance of aircraft and spacecraft
		excluded here: 60.3, 62.3	
5	Energy	40	Electricity, gas, steam and hot water supply
		60.3	Transport via pipelines
6	Industrial production and technology	15-37	Manufacturing
		72	Computer and related activities
		excluded here: 22.1, 23.3, 24.15, 24.2, 24.4, 29.3, 29.51, 29.52, 29.6, 33.1, 34, 35.11, 35.2, 35.3, 37	
7	Health	24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
		33.1	Manufacture of medical and surgical equipment and orthopaedic appliances
		85.1	Human health activities
		85.31	Social work activities with accommodation
8	Agriculture	1	Agriculture, hunting and related service activities
		2	Forestry, logging and related service activities
		5	Fishing, fish farming and related service activities
		24.15	Manufacture of fertilisers and nitrogen compounds
		24.2	Manufacture of pesticides and other agrochemical products
		29.3	Manufacture of agricultural and forestry machinery
		85.2	Veterinary activities
9	Education	80	Education
10	Culture, recreation,	22.1	Publishing
		91.3	Activities of other membership organizations

NABS 2007		NACE Rev. 1.1	
Code	**Name**	**Code**	**Name**
	religion and mass media	92	Recreational, cultural and sporting activities
11	Political and social systems, structures and processes	74.5 75 85.32 excluded here: 75.22	Labour recruitment and provision of personnel Public administration and defence; compulsory social security Social work activities without accommodation
12 - 13	General advancement of knowledge (joint category for NABS 12 and 13)	73	Research and development
14	Defence	29.6 75.2 2	Manufacture of weapons and ammunition Defence activities
1 - 6, 8	ICT employment in this NACE sub-category is distributed among seven NABS chapters according to corresponding shares in the overall economy by NACE	74.3	Technical testing and analysis

Source: Stančik (2012).
Note: some NACE sub-categories are referred as *excluded* - it is because they are part of a different NABS chapter.

Table A9. NABS - NACE Rev. 2 correspondence table

NABS 2007		NACE Rev. 2	
Code	**Name**	**Code**	**Name**
1	Exploration and exploitation of the Earth	5	Mining of coal and lignite
		6	Extraction of crude petroleum and natural gas
		7	Mining of metal ores
		8	Other mining and quarrying
		9	Mining support service activities
		28.91	Manufacture of machinery for metallurgy
		28.92	Manufacture of machinery for mining, quarrying and construction
2	Environment	38	Waste collection, treatment and disposal activities; materials recovery
		39	Remediation activities and other waste management services
3	Exploration and exploitation of space	51.22	Space transport
4	Transport, telecommunication and other infrastructures	29	Manufacture of motor vehicles, trailers and semi-trailers
		30.11	Building of ships and floating structures
		30.2	Manufacture of railway locomotives and rolling stock
		30.3	Manufacture of air and spacecraft and related machinery
		33.15	Repair and maintenance of ships and boats
		33.16	Repair and maintenance of aircraft and spacecraft
		33.17	Repair and maintenance of other transport equipment
		36	Water collection, treatment and supply
		37	Sewerage
		41	Construction of buildings
		42	Civil engineering
		43	Specialised construction activities
		49	Land transport and transport via pipelines
		50	Water transport
		51	Air transport
		52	Warehousing and support activities for transportation
		53	Postal and courier activities
		61	Telecommunications
		71.11	Architectural activities
		excluded here: 49.5, 51.22	
5	Energy	35	Electricity, gas, steam and air conditioning supply
		49.5	Transport via pipeline
6	Industrial production and technology	10 - 33	(all) Manufacturing
		62	Computer programming, consultancy and related activities
		63	Information service activities
		excluded here: 20.15, 20.2, 21, 25.4, 28.3, 28.91, 28.92, 29, 30.11, 30.2, 30.3, 30.4, 32.5, 33.15, 33.16, 33.17	
7	Health	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
		32.5	Manufacture of medical and dental instruments and supplies
		86	Human health activities
		87	Residential care activities
8	Agriculture	1	Crop and animal production, hunting and related service activities
		2	Forestry and logging
		3	Fishing and aquaculture
		20.15	Manufacture of fertilisers and nitrogen compounds

NABS 2007		NACE Rev. 2	
Code	**Name**	**Code**	**Name**
		20.2	Manufacture of pesticides and other agrochemical products
		28.3	Manufacture of agricultural and forestry machinery
		75	Veterinary activities
9	Education	85	Education
10	Culture, recreation, religion and mass media	58	Publishing activities
		59	Motion picture, video and television programme production, sound recording and music publishing activities
		60	Programming and broadcasting activities
		90	Creative, arts and entertainment activities
		91	Libraries, archives, museums and other cultural activities
		93	Sports activities and amusement and recreation activities
		94.9	Activities of other membership organisations
11	Political and social systems, structures and processes	78	Employment activities
		84	Public administration and defence; compulsory social security
		88	Social work activities without accommodation excluded here: 84.22
12 - 13	General advancement of knowledge (joint category for NABS 12 and 13)	72	Scientific research and development
14	Defence	25.4	Manufacture of weapons and ammunition
		30.4	Manufacture of military fighting vehicles
		84.22	Defence activities
1 - 6, 8	ICT employment in these two NACE sub-categories is distributed among seven NABS chapters according to their corresponding shares in total GBAORD	71.12	Engineering activities and related technical consultancy
		71.2	Technical testing and analysis

Source: Stančik (2012).
Note: some NACE sub-categories are referred as *excluded* - it is because they are part of a different NABS chapter.

Table A10. ICT occupations in ISCO-88 classification

ISCO-88	
123	Computing services managers only persons with 'Computer science' or 'Computer use' field of education
213	Computing professionals
214	Architects, engineers and related professionals only persons with 'Computer science' or 'Computer use' field of education
231	College, university and higher education teaching professionals only persons with 'Computer science' or 'Computer use' field of education
311	Physical and engineering science technicians only persons with 'Computer science' or 'Computer use' field of education
312	Computer associate professionals
313	Optical and electronic equipment operators only persons with 'Computer science' or 'Computer use' field of education

Source: Stančik (2012).

Table A11. ICT occupations in ISCO-08 classification

ISCO-08	
133	Information and communications technology services managers
215	Electrotechnology engineers only persons with 'Computer science' or 'Computer use' field of education
216	Architects, planners, surveyors and designers only persons with 'Computer science' or 'Computer use' field of education
235	Other teaching professionals only persons with 'Computer science' or 'Computer use' field of education
243	Sales, marketing and public relations professionals only persons with 'Computer science' or 'Computer use' field of education
251	Software and applications developers and analysts
252	Database and network professionals
351	Information and communications technology operations and user support technicians
352	Telecommunications and broadcasting technicians
742	Electronics and telecommunications installers and repairers

Source: Stančik (2012).

Table A12. ICT occupations in COC and SOC classification

2010 COC	2010 SOC	
110	11-3021	Computer and Information Systems Managers
1000 1010 1020 1040 1050 1060 1100 1110	15-1100	Computer Occupations
1400	17-2061	Computer Hardware Engineers
5010 5020 5030	43-2000	Communications Equipment Operators
5800	43-9011	Computer Operators
5830	43-9031	Desktop Publishers
7020	49-2020	Radio and Telecommunications Equipment Installers and Repairers
7420	49-9052	Telecommunications Line Installers and Repairers

Source: Stančik and Rohman (2014).

Table A13. NABS - CIC correspondence table

NABS 2007		CIC 2007	
Code	**Name**	**Code**	**Name**
1	Exploration and exploitation of the Earth	0370-0490	Mining, quarrying, and oil and gas extraction
		3080	Construction, and mining and oil and gas field machinery manufacturing
2	Environment	0680	Sewage treatment facilities
		7790	Waste management and remediation services
3	Exploration and exploitation of space	3590	Aerospace product and parts manufacturing
		9570	Administration of economic programs and space research
4	Transport, telecommunication and other infrastructures	0770	Construction
		3570	Motor vehicles and motor vehicle equipment manufacturing*
		3580	Aircraft and parts manufacturing*
		3670	Railroad rolling stock manufacturing
		3680	Ship and boat building*
		3690	Other transportation equipment manufacturing
		6070 - 6390	Transportation and warehousing
		6680 - 6690	Telecommunications
		7290	Architectural, engineering, and related services
		excluded here: 6270	
5	Energy	0570 - 0690	Utilities
		6270	Pipeline transportation
		excluded here: 0680	
6	Industrial production and technology	1070 - 2390	Nondurable goods manufacturing
		2470 - 2990	Durable goods manufacturing
		3090	Commercial and service industry machinery manufacturing
		3170	Metalworking machinery manufacturing
		3180	Engines, turbines, and power transmission equipment manufacturing
		3190	Machinery manufacturing, n.e.c.
		3290	Not specified machinery manufacturing
		3360	Computer and peripheral equipment manufacturing
		3370	Communications, and audio and video equipment manufacturing
		3380	Navigational, measuring, electromedical, and control instruments manufacturing*
		3390	Electronic component and product manufacturing, n.e.c.
		3470 - 3490	Electrical equipment and appliances manufacturing
		3770 - 3870	Wood products manufacturing
		3970	Sporting and athletic goods, and doll, toy and game manufacturing
		3980	Miscellaneous manufacturing, n.e.c.
		3990	Not specified manufacturing industries
		7380	Computer systems design and related services
		excluded here: 2180, 2190, 2970	
7	Health	2190	Pharmaceutical and medicine manufacturing
		3960	Medical equipment and supplies manufacturing
		7970 -	Health services, except hospitals

NABS 2007		CIC 2007	
Code	**Name**	**Code**	**Name**
		8180 8270 - 8290	Health services, except hospitals
8	Agriculture	0170 0290	Agriculture, forestry, fishing, and hunting
		2180	Agricultural chemical manufacturing
		3070	Agricultural implement manufacturing
		7480	Veterinary services
9	Education	7860 - 7890	Educational services
10	Culture, recreation, religion and mass media	6470 - 6490	Publishing, except Internet
		6570 - 6590	Motion picture and sound recording industries
		6770 - 6780	Other information services
		8560 - 8590	Arts, entertainment, and recreation
		9160 - 9190	Membership associations and organizations
		9290	Private households
11	Political and social systems, structures and processes	7580	Employment services
		8370 - 8470	Social assistance
		9370 - 9590	Public administration
		excluded here: 9570, 9590	
12 - 13	General advancement of knowledge (joint category for NABS 12 and 13)	7460	Scientific research and development services
14	Defence	2970	Ordnance
		3380	Navigational, measuring, electromedical, and control instruments manufacturing*
		3570	Motor vehicles and motor vehicle equipment manufacturing*
		3580	Aircraft and parts manufacturing*
		3680	Ship and boat building*
		9590	National security and international affairs

Source: Stančik and Rohman (2014).
Note: Some NACE sub-categories are referred as *excluded* - it is because they are part of a different NABS chapter.
* only 50% of this sub-category is included here.

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JRC Mission

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