

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

Satellite Account for Education and Training: Compilation Guide

DRAFT



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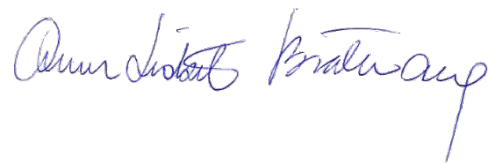
Preface

The idea of viewing human knowledge and abilities as an asset and to estimate its value is not new but has gained more prominence in recent years. In 2016, the United Nations Economic Commission for Europe (UNECE) published the “Guide on Measuring Human Capital” with the objective of pursuing the conceptual development of human capital measurement and with a particular focus on developing experimental human capital satellite accounts. The Human Capital Guide showed the feasibility of setting up human capital satellite accounts and encouraged countries and international organizations to continue the work on estimating the role of human capital. The guide discussed two approaches for valuing human capital, either the “cost-based approach” or the “lifetime income approach”. Mainly due to data constraints and methodological issues, the Human Capital Guide recommended as a first step to develop a satellite account for education and training using a cost-based approach. It was underlined that the efforts should be synchronized to facilitate cross-country comparisons with the aim of leading to a better understanding of country differences in human capital and potentially requiring improved guidance on data and measurement issues.

Based on the recommendations and the approval of the UNECE Guide on Measuring Human Capital by the Conference of European Statisticians (CES), a Task Force on Satellite Accounts for Education and Training (SAET) was established in 2017. The objective of the Task Force was to develop a framework and coordinate the pilot testing of the satellite accounts in countries with different economic circumstances and data availability. The Task Force has developed a compilation guide for a satellite account for education and training where the focus has been on setting up the framework, discussing methodology and assessing the availability of the necessary data sources, in addition to pilot testing in five countries. An important aim of the guidelines is to help countries construct internationally comparable satellite accounts and thus, lead to improved cost-based measurement of human capital. In addition to providing estimates of the total expenditure on education and training, the objective of such a satellite account is to distinguish and provide breakdowns of the various expenditures, including the identification of the financing arrangements for these expenditures. In developing the compilation guide, the Task Force has also considered other international work in the field of education, such as the UNESCO Methodology of National Education Accounts, the UNESCO-OECD-Eurostat Manual for data collection on formal education and the OECD publication “Education at a Glance”. Particularly beneficial for the Task Force’s work was the Eurostat project “Improvement of expenditure data on education”. The close involvement of Eurostat in the discussions of the Task Force ensured synergies between the two initiatives.

I want to thank everyone who has contributed to the debate and been involved in the preparation of this Guide.

Ann Lisbet Brathaug
Chair of the Task Force on Satellite Accounts for Education and Training



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The Guide was developed, reviewed and approved by the entire Task Force. Some members took primary responsibility in drafting certain chapters, as follows: Ann Lisbet Brathaug for Chapter 1; Alessandra Righi for Chapter 2; Arkady Schneider, Osnat Hazan, Alessandra Righi and Ann Lisbet for Chapter 3; Wulong Gu for Chapter 4; Gueorguie Vassilev and Vasileios Antonopoulos for Chapter 5; Alessandra Righi and Paolo Passerini for Chapter 6.

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List of abbreviations and acronyms

AES	adult education surveys
CAD	Canadian dollar
CES	Conference of European Statisticians
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption According to Purpose
COPNI	Classification of the Purposes of Non-Profit Institutions Serving Households
CLA	Classification of Learning Activities
CPA	Classification of Products by Activity
CPC	Central Product Classification
CVTS	Continuing Vocational Training Survey
CVT	continuing vocational training
DAC	Development Assistance Committee (of OECD)
EFTA	European Free Trade Association
EP	education and training purpose
ESA	European System of National and Regional Accounts
EU	European Union
Eurostat	Statistical Office of the European Union
HE Finance Survey	Higher Education Finance Survey (in the United Kingdom)
GBP	pound sterling
GDP	gross domestic product
GFCF	gross fixed capital formation
GFS	Government Finance Statistics
HBS	household budget survey
IECED	index of early childhood development
IMF	International Monetary Fund
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification (of All Economic Activities)

LFS	labour force survey
MIAD	Methodologies for an Integrated Use of Administrative Data in the Statistical Process (of the European Commission)
MICS 4	multiple-indicator cluster survey to assess the situation of children and women (in the Republic of Belarus)
MOOCs	massive open online courses
NACE	Statistical Classification of Economic Activities in the European Community
NEA	National Education Accounts
NIS	Israeli new shekel
NOK	Norwegian krone
NPI	non-profit institutions
NPISH	non-profit institutions serving households
NSI	national statistical institutes
OECD	Organisation for Economic Cooperation and Development
OKED	National Classification of Economic Activities (of Republic of Belarus)
ONS	Office for National Statistics (of the United Kingdom)
PIM	perpetual inventory method
R&D	research and development
SAET	satellite account for education and training
SNA	System of National Accounts
SUTs	supply and use tables
UK	United Kingdom of Great Britain and Northern Ireland
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IIEP	UNESCO International Institute for Educational Planning
UNESCO-UIS	UNESCO Institute for Statistics
UNSD	United Nations Statistics Division
UOE	UNESCO-OECD-Eurostat
VAT	value added tax
WES	Workplace and Employee Survey (of Statistics Canada)

Chapter 1

Introduction, Overview and Main Conclusions

1.1 Why is this guide needed?

- 1.1 The idea of viewing human knowledge and abilities as an asset and to estimate its value is not new, but has gained more prominence in recent years, especially in the context of sustainable development. To respond to this need a UNECE¹ Task Force developed and published the Guide on Measuring Human Capital, 2016 (hereafter referred to as the Human Capital Guide). According to the Human Capital Guide “Understanding and quantifying human capital is becoming increasingly necessary for policymakers to better understand what drives economic growth and the functioning of labour markets, to assess the long-term sustainability of a country’s development path, and to measure the output and productivity performance of the educational sector” (paragraph 3).
- 1.2 The Human Capital Guide showed the feasibility of setting up human capital satellite accounts and encouraged countries and international organizations to continue the work on estimating the role of human capital. The estimates of human capital can be initiated by developing a satellite account on education and training or by going beyond the present System of National Accounts to fully integrate estimates of human capital in the National Accounts.
- 1.3 For estimating the value of the human capital stock, the Human Capital Guide recommended the use of either the “cost-based approach” or the “lifetime income approach”. Due to data constraints and methodological issues the Guide recommended as a first step to develop a satellite account for education and training using a cost-based approach (paragraph 522). It was underlined that the efforts should be synchronized to facilitate cross-country comparisons and should lead to a better understanding of country differences in human capital, hence, requiring improved guidance on data and measurement issues.
- 1.4 Based on these recommendations and the approval of the Human Capital Guide by the Conference of European Statisticians (CES) and support of the proposed future work, a Task Force on Satellite Accounts for Education and Training was established by the CES Bureau in 2017. The objective of the Task Force was to develop a framework and coordinate the pilot testing of satellite accounts on education and training in countries with different economic circumstances and data availability. Based on the pilot testing, the Task Force should develop a compilation guide that will help countries construct internationally comparable satellite accounts on education and training and, thus, lead to improved cost-based measurement of human capital. In addition to providing estimates of the total expenditure on education and training, the objective of such a satellite account is also to distinguish and provide breakdowns

¹ United Nations Economic Commission for Europe (UNECE).

of the various expenditures, including the identification of the financing arrangements for these expenditures.

- 1.5 Another important issue in the Mandate for the Task Force was to ensure coordination with parallel work undertaken by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Organisation for Economic Cooperation and Development (OECD) and the Statistical Office of the European Union (Eurostat). The Satellite Account for Education and Training (SAET) can be seen as a bridge between national accounts and other education statistics, such as UNESCO National Education Accounts (NEA), the UNESCO-OECD-Eurostat (UOE) data collection on formal education and other international data collections on education and vocational training. The NEA framework and the UOE data collection on formal education provide a set of coherent and internationally comparable data that can be used in the compilation of the SAET. However, they both differ in several ways from the SNA, e.g. regarding the scope of the accounts (see Chapter 6 for a more complete comparison). In the future, additional efforts should be made to align the different standards in order to avoid duplication, improve consistency and ensure coherence at a certain level of aggregation.
- 1.6 The Advisory Expert Group on National Accounts has identified well-being and sustainability as one of the priorities for the research agenda of the System of National Accounts, 2008 (2008 SNA) and agreed that the presentation of well-being and sustainability statistics could be enhanced. It is suggested clearer links be established between the 'core' national accounts and material well-being, including for example distributional measures, and broader issues of well-being and sustainability. The latter could be further elaborated by developing a broader accounting framework, e.g. by combining the current framework with unpaid household activities, environmental-economic accounts, health and education. The SAET can provide an important tool in this context.

1.2 Importance and policy relevance

- 1.7 Understanding human capital is of significant interest to policymakers. In his annual "spring statement" (2018) on the economy to the Parliament of the United Kingdom (UK), the UK Chancellor of the Exchequer (finance minister) stated "Because we currently understand more about the economic pay-back from investing in our infrastructure than we do about investment in our people, I have asked the Office for National Statistics (ONS) to work with us on developing a more sophisticated measure of human capital, so that future investment can be better targeted."
- 1.8 As stated in the Human Capital Guide (paragraph 5), measuring the stock of human capital can serve many purposes, i.e. to better understand what drives economic growth, to assess the long-term sustainability of a country's development path, and to measure the output and productivity performance of the education sector. While all these perspectives emphasise the importance of measuring the total stock of human capital, more recent discussions on 'Beyond

GDP² have led to growing attention being paid to the distribution of human capital across households and individuals, and on the non-monetary benefits stemming from it.

- 1.9 It is also recognised that people’s material condition (i.e. their economic well-being) are determined by more than current income and consumption with human capital seen as an important factor (see Stiglitz et al. 2009; OECD, 2011; and various European Union (EU) initiatives). The asset “human capital” normally generates an income stream over the individual’s lifetime and can provide a buffer against sudden shocks. This individual perspective suggests that, beyond looking at the total stock of a country’s human capital, measures of how this capital is distributed are also important.
- 1.10 To serve those two objectives, the proposed SAET includes a set of core tables: the supply and use tables and the financing/cost tables by education and training purpose. In addition, the SAET includes a set of supplementary tables such as educational attainment of the resident population and the number of students and graduates and participation in vocational training and lifelong learning. Those supplementary tables provide additional demographic and labour detail related to education and training that can be used to show the distribution of human capital investment across groups of individuals.
- 1.11 In addition to measuring the stock of human capital, an important goal is the analysis of what factors contribute to this capital formation, such as education and training, and the need for policy makers to plan for such investments. Important in this context is the financing of the education system. When countries are looking for ways of making reforms, they often look to other countries for inspiration and are seeking understanding of the structure of funding systems for education.
- 1.12 Hence, the structure of a satellite account for education and training has several purposes:
- a) Estimating the annual investments in human capital valuing this as the sum of expenditures related to education and training. The annual investments contribute to the total capital stock as with other assets within the National Accounts framework;
 - b) Showing the total costs for different categories of education and training, showing who is producing each category and who is providing the financing.
- 1.13 A central aim of the proposed SAET is the elaboration of classifications, methodology and data sources that can be used to produce international comparable statistics on education and training.

1.3 Overview of the Guide

- 1.14 The Guide discusses the concepts and definitions for a SAET and how the results can be presented in tables. Central to this work is the elaboration of classifications, methodology and sources to be used and how they can be processed and incorporated into a satellite account.

² Gross domestic product (GDP).

Recommendations aimed at helping the production of the SAET are given throughout the chapters, and a summary of recommendations is presented at the end of this chapter (Section 1.4). An important aim in developing this guide has been to test the proposed framework and several country-specific case studies have been carried out. A summary of the challenges faced in this work are included, hopefully it can provide help for new countries developing a SAET. Since the Task Force was also mandated to ensure coordination with parallel work undertaken by other international organizations, a specific chapter is devoted to a discussion and comparison of the different international initiatives for collecting data on education expenditure.

1.3.1 Chapter 2: Principles and Definitions of the Satellite Account for Education and Training

- 1.15 The chapter discusses the principles and definitions of the Satellite Account for Education and Training and the scope and definition of expenditures to be included. In the context of the 2008 SNA and the European System of National and Regional Accounts, 2010 (ESA 2010), satellite accounts can be developed to rearrange elements of the national accounts central framework, possibly adding detail and introducing complementary information.
- 1.16 The SAET framework is built on the definitions and principles in 2008 SNA/ESA 2010, but also takes into account existing international work in the field of education, namely, the UNESCO Methodology of National Education Accounts, 2016 and the UOE Manual on concepts, definitions and classifications for data collection on formal education, 2016. Efforts are taken to avoid duplication, improve consistency with national accounts and other sources/system to ensuring coherence at a certain level of aggregation.
- 1.17 The SAET covers the activities of resident units. The producers of education and training, funding entities and households are considered resident units of the territory where they have a centre of predominant economic interest. The education expenses for students studying abroad are considered domestic expenditures (imports) as long as they remain members of resident households. Whereas the expenditures in the domestic economy of students who are members of non-resident households are treated as exports. SAET at this stage is calculated at current prices, future development of the account could lead to calculations in volume terms.
- 1.18 The scope of education and training activities in the SAET covers public and private expenditure for formal education and vocational training, i.e. education programmes offered at any stage of a person's life defined according to the International Standard Classification of Education (ISCED), 2011, for non-formal education and training in various fields (e.g. music, arts, and sports, on-line courses etc.), for in-house training by employers and for some associated goods and services directly related to the delivery of education and training. Consequently, the expenditure for education and training activities to be considered refers to the following items:
- A) Teaching, administrative and other activities in formal education and vocational training services;

- B) Non-formal cultural, recreational, sport and vocational education and training activities (also including free courses and e-learning);
- C) In-house training by employers;
- D) Associated goods and services directly related to the delivery of education and training services;
- E) Gross fixed capital formation in the education industry.

1.19 The goal of the SAET is to compile the total expenditure on education and training consistent with the framework of the national accounts. The proposed Table 2.1 outlines the compilation of education expenditure. This can be seen either from the supply side (production approach) or from the expenditure side. Producing data from both perspectives allows confrontation of the alternate estimates to improve the quality of both. Current expenditure is the focus, that is, all current education and training costs for non-market educational/vocational training institutions and sales of market producers; these items can also be split by education and training purpose. The total expenditure on education and training activities is the sum of the compensation of teaching and administrative staffs, the costs of intermediate inputs such as textbooks and school supplies, and the consumption of fixed capital such as buildings, machinery and equipment and intellectual property assets. In addition, the expenditures also cover the return to capital for market producers of education services, as well as the expenditures of households on associated goods and services. However, to give a broader picture and to give an estimate of the total contribution to human capital it is also recommended that the SAET present the gross fixed capital formation related to education activities (industries).

1.3.2 Chapter 3: Classifications and Tables for the Satellite Account for Education and Training

1.20 The chapter elaborates the classifications needed for compiling the SAET. Two sets of classifications are important, i) classification of production and financing units by institutional sector and ii) classification of education and training by purpose. The former classification is that used in the 2008 SNA while the latter is mainly based on ISCED 2011 levels. The proposal is a classification with seven education and training purposes (EPs), where the first four are directly related to ISCED. In addition, there are 3 purposes which are outside the scope of ISCED (non-formal), namely: cultural, sports and recreation education; other education and vocational training; and in-house training.

1.21 Internships and apprenticeships are given specific consideration. An internship can be part of formal or non-formal education and the expenditure related to the supervision of interns as part of the general training process should be included, whereas the expenditure for the wages of interns are generally not included in SAET because the paid internship could be considered as work. Apprenticeships that are part of a formal education program should be included in the relevant EP e.g. cases where the students have not yet finished their education and are not allowed to work on their own. They are normally not paid or paid a relatively low wage for their work. If paid, the wages of the apprentices or interns would not be included in education costs. Employers may be financed by the government for related costs. The circumstances for

internships and apprenticeships may differ from country to country, which means that compilers should consider their own situation carefully.

- 1.22 The chapter also gives general clarifications related to industry classification, where to allocate products and services given for free, treatment of research and development, associated products, educational administrative expenditures and professional military training.
- 1.23 Finally, the chapter discusses the setup of the SAET in tables. The first two tables are based on supply and use tables (SUTs) which offer in general a detailed picture of the economy by providing the elements of the production process, the use of the goods and services (products) and the income generated, as illustrated in figure 5.1 in the Human Capital Guide. The SAET provides a simplified version of the SUTs, highlighting the supply and the use of the same EPs. The third table shows the financing of education and training while the fourth table covers the cost structure of the production. These tables are simplified versions of the tables set out in the Human Capital Guide (resources and uses tables) again including only those financing and cost flows associated with the delivery of education and training. These are the core tables for the SAET and form the foundation of the SAET.
- 1.24 The SAET can also include supplementary tables on student enrolment and education attainment of employed workers and working age population, which are used to assess the contribution of education and training to economic and productivity growth and to assess the outcome and productivity performance of education sectors.

1.3.3 Chapter 4: Methodology of the Satellite Account for Education and Training: Compilation and analysis

- 1.25 The chapter explains the compilation of the SAET and shows how the SAET is used to derive statistics and indicators on total costs of education and training, the production of education and training, the expenditure and financing of the education and training sectors, and the production and use of education and training by purpose. The chapter also discusses the main uses and application of the SAET and underlines that the total cost of education and training can be used to derive a measure of human capital investment using the cost-based approach (UNECE, 2016).

1.3.4 Chapter 5: Data Sources

- 1.26 This chapter discusses general guidelines related to data fundamentals, sources, and how they can be processed and incorporated into an education and training satellite account.
- 1.27 A SAET requires the collection and processing of data from a variety of sources. This is a challenging exercise and requires collaboration with other government departments or teams responsible for reporting international data on education, such as the UOE joint data collection on formal education. Nevertheless, a starting point of a SAET should be the data sources used in the national accounts. National accounts are based on comprehensive data from a variety of sources, many of which will provide additional detail not necessarily reflected in the national account outputs. In the case of formal education, it is likely that the national account sources have most of the data needed for the SAET.

- 1.28 It is important that the surveys and other data sources used for the SAET follow statistical principles for the quality of data based on Data Quality Assessment tools, such as the Data Quality Assessment Framework of the International Monetary Fund (IMF).
- 1.29 As the chapter shows, there is a range of sources that can be used for the SAET. As a first step, countries should research the detail of the data available within the national accounts. In addition, a wide range of survey and administrative data sources can be used to complete the SAET, e.g. Government Finance Statistics (GFS), a vital source to identify government flows for all levels of government to education. To conclude, it is recommended to collaborate closely with a wide range of teams within the national statistical institutions, and also across government ministries and internationally, to find good data sources.

1.3.5 Chapter 6: Comparison of International Guidelines on Education Data Collection

- 1.30 This chapter presents a comparison between the proposed SAET and other international guidelines on education accounts, namely, the National Education Accounts proposed by the UNESCO Institute for Statistics (UIS), the UNESCO International Institute for Education planning (IIEP) and the IIEP Pôle de Dakar (2016), which followed the lines of the French Education account (one of the earliest experiences in a national account on education) and the UOE financial data collection.
- 1.31 A goal for all approaches is to present information on education financing and expenditure, and all approaches classify education according to ISCED 2011. However, there are differences in the coverage. All approaches include formal education. The French satellite account also includes non-formal education, while NEA includes non-formal education and training only optionally (never including non-formal adult education). The SAET includes as a standard framework both formal, non-formal education and training programmes (continuing vocational training (CVT)/in-house training and other out-of-school type training programmes), and has a larger scope than the other education accounts. Only the SAET explicitly recognises expenditures related to i) resident students abroad (imports); and ii) non-resident student consumption of domestic production (exports).
- 1.32 Regarding the definition of expenditure there are some differences for associated goods/services directly related to the delivery of education services. For example, the UOE data collection includes (under certain conditions) non-instructional expenditures such as costs for transportation, meals, accommodation, medical and dental care. Such expenses are not included in the SAET as they do not directly contribute to the formation of human capital.

1.3.6 Chapter 7: Country Case Studies

- 1.33 The chapter includes five country studies based on the framework presented in the guide: from the Republic of Belarus, Canada, Israel, Norway and the United Kingdom.
- 1.34 The studies show the feasibility of setting up the SAET. One of the conclusions from the compilation of the Norwegian SAET is that availability of SUTs in the national accounts was

very helpful for the construction of the SAET tables. While there was still a need for estimates to overcome data limitations, the task would have been far more challenging without SUTs.

- 1.35 A general experience is that the compilation of SAET brings together data related to education and training from various statistical programs including the SUTs, education statistics programs, government finance statistics programs, Classification of the Functions of Government (COFOG) statistics on government expenditures, Classification of Individual Consumption According to Purpose (COICOP) statistics on household expenditures and trade-in-service statistics. The exercise provides a method to assess the relevance, coherence and quality of statistics on education and training. The confrontation can indicate which data sources align, which may need to be improved and which types of data need to be strengthened to provide consistent, reliable and up-to-date information on education and training.
- 1.36 Both Canada and Republic of Belarus report that the current classification of education products in their standard accounts are too broad to support the level of detail in the proposed EP classification. In the Canadian pilot study, this is solved by aggregating some of the EPs.
- 1.37 The greatest challenge, reported in the case studies, is the availability of data sources to estimate expenditures related to in-house training. For example, Norway used data from the Continuing Vocational Training Survey (CVTS), Canada's estimate is based on their Workplace and Employee Survey (WES), Israel used information from existing corporations and non-profit institutions serving households surveys and financial statements of government units, while the UK has not yet estimated in-house training.
- 1.38 In-house training constitutes a significant part of the total expenditures on education and training. According to the pilots, the contribution from in-house training differs significantly from country to country, from 20 per cent in Canada to 1 per cent in Israel and Belarus. The differences in these estimates underlines the challenges related to data sources and, clearly, comparability across countries is difficult to assess.
- 1.39 Another challenge is the estimation of household consumption of associated goods and services and their allocation to education purposes. Due to the difficulty of allocating these expenditures to EPs, it is recommended that if relevant information is not available, they should be allocated according to total expenditure proportions or presented in an unallocated category in the SAET use table.

1.4 Summary of recommendations and proposals for future work

- 1.40 This section provides a brief summary of the main recommendations of the Guide and suggests several areas for future work.
- 1.41 Recommendations on principle and definitions:
- 1) SAET framework builds on the definitions and principles in 2008 SNA/ESA 2010;
 - 2) **SAET covers the activities of resident units.** The producers of education and training, funding entities and households are considered resident units of the territory where

they have a centre of predominant economic interest. The education expenses for students studying abroad are considered domestic expenditures (imports) as long as they remain members of resident households;

- 3) Expenditures on education and training covers public and private expenditure for **formal education, non-formal education and training** in various fields (e.g. music, arts, and sports, on-line courses etc.), **in-house training** and for **some associated goods and services**;
- 4) The main focus is on **current expenditure**, that is, all current education and training costs for non-market educational/vocational training institutions and sales of market producers. However, to give a broader picture and to give an estimate of the total contribution to human capital the Guide also recommends to include as part of the SAET the **gross fixed capital formation** related to education activities;
- 5) As a first step, countries should research the detail of the data in the national accounts and in government financial statistics. The Guide also recommends collaborating **closely with a wide range of teams** within the national statistical institutions, and also across other government ministries and internationally, to identify good data sources;
- 6) **SAET at this stage is calculated at current prices**, future development of the account could lead to calculations in volume terms;
- 7) The current expenditures should be allocated to **Education and training purposes, 7 altogether**. These are based on ISCED levels for formal education, with additional categories for non-formal courses in various fields as music, art, language, etc. and in-house training;
- 8) The EPO which covers pre-primary education, includes early childhood educational development and pre-primary education. **Child care expenditures of kindergartens should be excluded, if possible**;
- 9) **Associated goods and services** related to the delivery of education and training services include those goods and services that are **required primarily for the delivery of education** such as textbooks, dictionaries, stationaries, computers, software and safety equipment. However, transportation, meals, accommodation, medical and dental care should not be included because they are not part of the provision of education and training;
- 10) **Professional military training** is part of education expenditures in SAET and should be included in a relevant EP. The same is the case with **apprenticeships** that are part of the formal education program. **Internships** can be part of formal or non-formal education and the expenditure related to the supervision of interns as part of the general training process should be included in the EP covering in-house training or another relevant EP;
- 11) The guide recommends setting up **a simplified version of supply and use tables** covering only the supply and use of education and training purposes. In addition to

current expenditure, the supply table also shows **own account production and production for sale of research and development (R&D)** for the education industry as a memorandum item;

12) The inclusion of **in-house training** is an extension of the SNA production boundary. For simplification, the imputed production of in-house training by market producers is recorded on the user side as **intermediate consumption** in the producing unit. For non-market producers, where the output can be seen as a reallocation of existing output, the guide recommends to allocate the output to **final consumption expenditure**;

13) Also tables showing the **financing** of education and training by purpose and **the cost structure** of education and training by purpose are recommended. As is the setup of **supplementary tables** which can be used to assess the contribution of education and training to economic and productivity growth and to assess the outcome and productivity performance of education sectors.

1.42 The recommendations for further work include:

- 1) Exploration and improvement of the quality and availability of data sources related to non-formal and informal education and training. This covers in particular:
 - a) Improved availability of data sources for in-house training, in order to enhance comparability across countries. Direct data sources are not available in all countries. Some countries carry out the CVTS, which can provide necessary data. As discussed in Chapter 5, Section 5.9.1 if CVTS is not available, business accounts may provide information on training budgets, or if these are also unavailable, model-based estimates of assigning intermediate costs may be conducted. In addition, existing data sources often do not distinguish between education and training purchased by employers for their employees and training provided directly by the employer (in-house training);
 - b) Work on identification and development of data sources related to free courses and particularly e-learning. Paid on-line courses offered both by education institutions and other providers will be captured in the estimates using data from household surveys or company accounts. Free on-line courses provided by resident non-market education institutions will also be implicitly included in the total costs. The most problematic part are the informal free courses provided by units outside of the education sector. These latter offerings would generally not be captured within these measures (such as informal learning on digital platforms);
 - c) Work on identification and development of data sources for other non-formal and informal education and training. Even though education attainment as classified by ISCED can be attained through formal and non-formal programs, the international data collection exercises on education (mappings, surveys, censuses, etc.) are currently mainly focused on formal education (ISCED 2011,

§45). Country experience with data sources for non-formal and informal training is needed;

- 2) Derive long time series on education and training expenditures in the form of a SAET. Time series are needed to understand how expenditures for the different education and training purposes are evolving and contributing to human capital development;
- 3) Extend the SAET to provide expenditure on education and training in volume terms (or base year prices). A demand for analysing the volume growth of education and training purposes is recognized;
- 4) Continue work to ensure better consistency between the SAET and the methodologies of existing data collection in education statistics at some level of aggregation. SAET can be seen as a bridge between national accounts and other education statistics, such as UNESCO National Education Accounts, UOE data collection on formal education, other international data collections on education and vocational training. The core data sources and coverage of these alternate data on education remain largely the same, but a number of conceptual differences remain due to historical reasons, different purposes, uses and compiling institutions/units. While the purpose, scope and use of the various data sets will vary, it will be important that the broad definitions and classifications used be aligned as much as possible and that the differences are clearly identified and explained. This will require communication and coordination between national accountants and education statistics experts both at national and international levels. The work undertaken by Eurostat for UOE is a good example in this respect. As part of a larger project “Improving of expenditure data on education”, Eurostat has launched work on updating the UOE Manual on data collection on formal education and its links to national accounts, including work on improving the methods and definitions on household expenditure, ancillary services and public transfers. Reconciliation exercises between UOE and national accounts data are carried out in several countries. The national accounts community in general should follow the outcomes of these processes and, if needed, provide input to ensure better links to UOE education statistics;
- 5) One of the objectives of a SAET is to improve the cost-based measurement of human capital. The Task Force recommends further research into how to incorporate the SAET estimates into the national accounts, by ‘capitalising’ these expenditures as investments in human capital, including how to apply a perpetual inventory method (PIM) type-model to derive assets;
- 6) It is strongly recommended that other countries start testing the SAET framework. It is suggested that the Group of Experts on National Accounts could provide a forum for countries to share their experiences regarding both the setup and presentation of the accounts and challenges regarding data sources. Experience with alternate data sources is needed to better judge where secondary sources may be sufficient and where investment in new data sources may be justified. This will facilitate improvements to the guide.

Chapter 2

Principles and Definitions of the Satellite Account for Education and Training

2.1 Introduction

- 2.1 The UNECE Guide on Measuring Human Capital (hereafter Human Capital Guide), published in 2016, recommended as a first step toward the measurement of the value of human capital to set up a Satellite Account for Education and Training (SAET) based on expenditures. This cost-based approach should be the first attempt to estimate more complete and detailed flows for education and training and form the foundation for the cost-based approach to estimating a Human capital satellite account. The Human Capital Guide presented a prototype of this account based on the national accounts as presented in the System of National Accounts, 2008 (2008 SNA) and the European System of National and Regional Accounts, 2010 (ESA 2010).
- 2.2 The SAET framework presented in this chapter builds on the definitions and principles in 2008 SNA/ESA 2010, but also takes into account existing international work in the field of education, namely, the UNESCO Methodology of National Education Accounts (NEA), 2016 and the UNESCO-OECD-Eurostat (UOE) Manual on concepts, definitions and classifications for data collection on formal education, 2016 (hereafter UOE Manual). The NEA framework and the UOE data collection on formal education provide a set of coherent and internationally comparable data that can be used in the compilation of the SAET. However, they both differ in several ways from the SNA, e.g. regarding the scope of the accounts (see Chapter 6 for a more complete comparison). In the future, additional efforts should be made to align the different standards in order to avoid duplication, improve consistency and ensure coherence at a certain level of aggregation.
- 2.3 The SAET is built primarily on national accounts principles and the data needs of human capital measures. The framework presented in the Human Capital Guide has been further developed in order to match as much as possible the concepts and definitions of the other education accounts. This chapter presents a general outline of the SAET. The basic principles and scope of SAET are described in sections 2.2 and 2.3, and the definition of total expenditure in line with production and expenditure approaches follows in section 2.4.

2.2 Main principles, accounting rules and geographical scope

- 2.4 In the context of the 2008 SNA, satellite accounts can be developed to rearrange elements of the central framework of the national accounts, possibly adding detail and introducing complementary information. Satellite accounts can also be used to explore estimates that go beyond the framework of the national accounts such as extensions of the scope or the production boundary.

- 2.5 The SAET combines a functional approach, which provides a useful starting point for satellite accounts (2008 SNA, paragraph 29.2), with an activity and product analysis and is largely based on monetary data already available from the national accounts. However, it provides a more detailed description and assessment both of the production activities that contribute to the formation of human capital and of the financing agents. According to ESA 2010 (paragraph 22.21) a functional satellite account focuses on describing and analysing the economy related to a function or functions (in our case the education and training activities aimed at the formation of human capital) and providing for those functions a systematic accounting framework. This allows the account to show detail not visible in the central framework and focus on the elements of the accounts important to the functions to be addressed.
- 2.6 As with other satellite accounts, the SAET includes monetary and non-monetary data to broaden the analysis and this is made possible by the rich set of statistics on education already collected by countries in the context of the UOE data collection on formal education or for internal purposes.
- 2.7 The concepts and methods of the SNA provide a quantitative description of the economic activity related to education and training in the national economy, allowing the determination of its relative importance and its relationships with other sectors. Consequently, having access to the value of output by different education and training services and to the imports and exports of education and training services allows the production of valuable information such as:
- i) total expenditure on education and training;
 - ii) the relative importance of the financing agents and the producers (e.g., who finances education and training and where does the funding go);
 - iii) to what education and training outputs the resources are allocated (e.g., what are the funds being spent on);
 - iv) education and training flows with the rest of the world (flows from domestic producers to non-residents and access of residents to non-resident producers).
- 2.8 Additionally, the SAET provides the main building blocks for cost-based estimates of human capital formation and related information (e.g., unit costs), thus providing a valuable dataset to advance research on measuring human capital.
- 2.9 The SAET, in accordance with the SNA accounting principles, is recorded on an accrual basis. This means that data are recorded when the economic value is created, transformed or extinguished and consequently, the output is recorded when produced and not when the corresponding payments are made.
- 2.10 As in 2008 SNA, the SAET covers the activities of resident units. The producers of education and training, funding entities and households are considered resident units of the territory where they have a centre of predominant economic interest. The education expenses for students studying abroad are considered domestic expenditures (imports) as long as they remain members of resident households. Whereas the expenditures in the domestic economy of students who are members of non-resident households are treated as exports.
- 2.11 The SAET at this stage is calculated at current prices. Future development of the account could lead to estimates in volume terms.

2.3 Scope of education and training

2.12 The SAET largely respects the current production boundary of education and training in the national accounts. There is only a slight expansion of the production boundary so as to include the output from in-house training (own account training). The scope of education and training activities in the SAET covers public and private expenditure for formal education, i.e. education programmes offered at any stage of a person's life defined according to the International Standard Classification of Education (ISCED), 2011³; for non-formal (non-ISCED) education and training in various fields (e.g. music, arts, and sports, on-line courses etc.); for in-house training and for some associated goods and services directly related to the delivery of education and training. Consequently, the expenditure for education and training activities to be considered refers to the following items:

- A) Teaching, administrative and other activities in formal education and vocational training services;
- B) Non-formal cultural, recreational, sport and vocational education and training activities;
- C) In-house training by employers;
- D) Associated goods and services directly related to the delivery of education and training services;
- E) Gross fixed capital formation in the education industry.

2.13 It should be noted that according to the recommendation in the Human Capital Guide the SAET should include the expenditures on education and training for all residents of a country, as this is what is needed to measure investment in human capital. Following this, the SAET will cover expenditures related to domestically produced education, as well as that imported (resident students abroad). Expenditures of non-resident students contribute to the human capital of another country and should thus be recognized as exports.

³ According to the *ISCED 2011 Manual* (UNESCO-UIS, 2012), formal and non-formal education cover a variety of full time and part time education programmes, such as initial education, regular education, second chance programmes, literacy programmes, adult education, continuing education, open and distance education, apprenticeships, technical or vocational education, training, or special needs education. Formal education is education that is institutionalized, intentional and planned through public organizations and recognized private bodies and formal education programmes are recognized by the relevant national education or equivalent authorities. Formal education takes place in educational institutions that are designed to provide full-time education for students in a system designed as a continuous educational pathway, but programmes that take place partly in the workplace (often provided in cooperation between educational institutions and employers, e.g. apprenticeships) may also be considered formal education if they lead to a qualification that is recognized by national education authorities. Non-formal education covers programmes contributing to adult and youth literacy and education for out-of-school children, as well as programmes on life skills, work skills, and social or cultural development. It can include training in a workplace to improve or adapt existing qualifications and skills, training for unemployed or inactive persons, as well as alternative educational pathways to formal education and training in some cases, in some cases referred to as special needs education or training.

A. Teaching, administrative and other activities in formal education and vocational training services

2.14 All the teaching, administrative and other educational activities carried out in formal education or formal vocational training at education institutions⁴ or at vocational education institutions (both market and non-market) are included. The output of and expenditure for both public and private education sector activities are broken down by level of education and training. To the extent possible administrative services expenditures should also be broken down by category of education and training output, with estimates needed both for general government and the private sector.

2.15 The expenditures for the following activities are also considered:

- i) Apprenticeship programmes that take place partly in the workplace (often provided in cooperation between educational institutions and employers leading to a qualification that when recognised by national education authorities is included in formal education (UNESCO-UIS, 2012);
- ii) Professional military training;
- iii) Expenditures related to the payment of formal education fees for students studying abroad; this can be recognised in the national accounts as imports of education services, while expenditures of non-resident students in the country should be presented as exports;
- iv) Free courses supplied by non-market education institutions should be implicitly covered in their accounts, while free courses supplied by other providers should in theory have been included, but due to lack of data sources may not be covered.

2.16 Research and development (R&D) activities conducted in all subjects within universities or other tertiary institutions are recorded as gross fixed capital formation (GFCF) in the national accounts; consequently, the expenditure of universities, ministries, etc. on R&D are shown as a separate memorandum item along with other investments in fixed capital for education and training.

B. Non-formal cultural, recreational, sport and vocational education and training activities

2.17 Non-formal cultural, recreational, sport and other educational activities include different activities aimed at improving the employability of people involved, in particular:

- i) Cultural, sports and recreation education activities⁵;

⁴ According to *UOE Manual* (2016) these are entities that provide either educational core services or peripheral goods and services to individuals and other educational institutions. They are divided between instructional and non-instructional educational institutions; the first group provides educational programs for students as their main purpose (for example schools, colleges, universities); such institutions are normally accredited or sanctioned by the relevant national education or equivalent authorities. Educational institutions may be operated by government agencies or private organizations, such as religious bodies, special interest groups or private educational and training enterprises, both for-profit and non-profit. Non-instructional educational institutions provide education-related administrative, advisory or professional services for individuals or other educational institutions.

⁵ Summer recreation camps are not included.

- ii) All training courses purchased on the market and the external vocational training for employees paid for by employers;
- iii) Other education and vocational training activities; which covers the instructional part⁶ of the expenditure for the items “Other education and training services n.e.c.” and “Vocational rehabilitation services”;
- iv) Educational programmes for adults, which are not definable by level (Education not definable by level) and related expenses;
- v) Free courses supplied by non-market education institutions should be implicitly covered in their accounts, while free courses supplied by other providers should in theory have been included, but due to lack of data sources may not be covered.

2.18 While educational activities such as workshops and seminars could contribute to the formation of human capital, many conceptual and practical difficulties exist related to their delineation and the availability of data. As it is expected that the expenditures related to these activities will have only marginal impact on the estimates, the guide does not cover them, but these items could remain areas for further work.

C. In-house training by employers

2.19 In-house training by employers, which represents an extension of the SNA production boundary, includes the vocational training for employees, which is produced by the employing enterprises in all sectors of the economy. It also includes in-house vocational training for persons with disabilities.

2.20 As for internships⁷, the expenditure related to the supervision of interns as part of the general training process should be included in this item, whereas the expenditure for the wages of interns are generally not included in SAET because the paid internship could be considered as work.

D. Associated goods and services directly related to the delivery of education and training services

2.21 Associated goods and services directly related to the delivery of education and training services are peripheral education goods/services provided inside the educational institutions or as part of in-house training or purchased by households. These are expenses for education supporting activities (e.g., cost for textbooks and those goods, special clothing or equipment⁸ that are required for education and therefore often provided by education institutions). These expenses should be allocated to the respective education products, when sufficient information is available otherwise they should be presented under an item Associated products and administrative expenditures, not allocated. In the UOE Manual there is another type of non-instructional expenditures (e.g., costs for transportation, meals, accommodation,

⁶ If the estimation of some elements is not possible in practice, the list of activities covered should be provided by countries in order to allow comparability of the estimates.

⁷ A period of work experience offered by an enterprise/organization for a limited period of time typically undertaken by students and graduates looking to gain relevant skills and experience in a particular field and can be paid, unpaid, or partially paid.

⁸ For example, protective clothing or safety goggles for chemistry students or for vocational training in specific fields. School uniforms are not included.

medical and dental care). These expenses are not included in the SAET because they are not part of the provision of education and training. However, as these costs can be relevant for analysing the Education sector organization and costs, they could be processed but set aside for alternate presentation.

2.4 Defining total expenditure

2.22 The goal of the SAET is to compile the total expenditure on education and training consistent with the framework of the national accounts. Table 2.1 summarizes how the supply and use framework can be used to estimate total expenditure related to the education and training activity. Only current expenditure is considered in this table, that is, all current education and training costs for non-market educational/vocational training institutions and sales of market producers; these items can also be split by education and training purposes. A detailed list of items includes:

- Direct costs related to running public educational institutions (intermediate consumption, compensation of employees, consumption of fixed capital, other taxes on production less other subsidies on production);
- Direct expenses by employers for employee training which consist of purchases of education services which is part of intermediate consumption, and expenditures on in-house training;
- Household expenditures for purchased educational services: i) costs for education programmes requested by institutions and the cost of education not specifically required by institutions, that students can incur to study at home (textbooks, supplies); ii) costs for programs of study and/or private lessons carried out by schools linked to the curriculum; iii) costs for non-formal training programs and for private lessons or other courses, these costs are not included in the UOE Manual.

2.23 Loans to students are not included in the SAET as an education expenditure⁹. This differs from the treatment in the UOE Manual, where these are part of the expenditures. In national accounts, loans are recognised as a financial transaction and are therefore not included in current expenditure.

2.24 Table 2.1 outlines the total current expenditure either from the supply side (production approach) or from the expenditure approach. Producing data from both perspectives allows confrontation of the alternate estimates to improve the quality of both.

2.25 As in the national accounts, the output of education and training activities is divided between non-market producers (general government and non-profit institutions serving households) and market producers (corporations and households), two different processes for the calculation of these outputs are presented.

⁹ It should be noted that interest paid on student loans could have been recognized as an expenditure related to the investment in human capital. However, it was decided to keep student loans, including interest paid and eventually part of student loans that are not paid back, outside the scope of the SAET.

Table 2.1

Definition of Total Current Expenditure according to the production approach and the expenditure approach.

Item	Supply	Use
1	<ul style="list-style-type: none"> ▪ Output of market producers of education services equals sales of education services 	<ul style="list-style-type: none"> • Household final consumption expenditure • Expenses in enterprises related to buying education services (part of intermediate consumption) • Part of general government and non-profit institutions serving households (NPISH) final consumption expenditure (transfers in kind: market production in education and training purchased) • Exports (non-resident students studying domestically)
2	<ul style="list-style-type: none"> ▪ Output of non-market producers of education services (both general government and NPISH) equals the total costs of production, i.e. the sum of <ul style="list-style-type: none"> ✓ intermediate consumption ✓ compensation of employees ✓ consumption of fixed capital ✓ other taxes on production less other subsidies on production 	<ul style="list-style-type: none"> • Household final consumption expenditure • Expenses in enterprises related to buying education services (part of intermediate consumption) • General government final consumption expenditure • NPISH final consumption expenditure • Exports (non-resident students studying domestically)
3	<ul style="list-style-type: none"> ▪ Import of education services related to students studying abroad 	<ul style="list-style-type: none"> • Household final consumption expenditure • Part of general government and NPISH final consumption expenditure (transfers in kind: market production in education and training purchased)
4	<ul style="list-style-type: none"> ▪ Output of in-house training provided by enterprises in all sectors of the economy (extension of SNA production boundary) 	<ul style="list-style-type: none"> • Final consumption of a new product in non-market sectors • Imputed intermediate consumption in market sectors
5	<ul style="list-style-type: none"> ▪ Associated goods and services directly related to the delivery of education and training services valued as: <ul style="list-style-type: none"> ✓ the sales of these products produced in several industries ✓ The part delivered to education institutions is part of their intermediate consumption and is covered in “output” (it must not be double counted) 	<ul style="list-style-type: none"> • Household final consumption expenditure for text books, utensils, etc.

- 2.26 **The output of non-market producers of education and training services** equals the total costs of production (i.e. the sum of intermediate consumption, compensation of employees, consumption of fixed capital and other taxes on production less other subsidies on production). In terms of expenditure, this corresponds to the expenses of employers related to buying education and training services from non-market sources (which is part of intermediate consumption), plus the amount of households final consumption expenditure, plus the general government and the NPISH final consumption, plus the purchases of non-resident students (exports) related to output of non-market producers.
- 2.27 On the other hand, **the output of market producers of education and training services** corresponds to the sales of education and training services. In terms of expenditure, this is defined by the sum of the expenses of employers related to buying market education services (which is part of intermediate consumption), plus the households final consumption expenditure, plus the part of general government and NPISH final consumption covering transfers in kind of purchased market production of education services, plus the exports (purchases of students from abroad related to output of market producers, that constitute final consumption of non-residents in economic territory).
- 2.28 The importation of education and training services related to students following courses offered by non-residents is matched by households final consumption expenditure and possibly by general government final consumption expenditures (transfers in kind).
- 2.29 The output of in-house training by enterprises in all sectors, an extension of SNA production boundary, is imputed by estimating the cost elements corresponding to the provision of the in-house training. These would include compensation of employees and other costs such as books and materials. For non-market producers, where total output is already recorded by the sum of costs, it follows that output related to in-house training is a reallocation from other output categories. On the user side the output will accordingly be recognized as final consumption expenditure (reallocation of other final consumption categories). For simplification, the imputed production of in-house training by market producers, is recorded as intermediate consumption in the producing unit. While it is recognized that in-house training is produced for the benefit of individuals (households), no transfers between the enterprise and households is proposed, as it is the enterprises that finance the in-house production.
- 2.30 Finally, the associated goods and services directly related to the delivery of education and training services are valued as the sales of goods/services produced in several industries. When these goods and services are delivered to education producers, the cost becomes part of their intermediate consumption and is consequently already covered in the output and thus it should not be double counted. In terms of expenditure, it corresponds to the sum of household (final consumption) expenditure.
- 2.31 Summing up all the cost listed according to the expenditure approach (total current expenditure) will correspond in the production perspective: the supply of market and non-market education producers, plus the supply of in-house training provided by market and non-market producers, plus the supply of education related goods and services, plus imports.

- 2.32 All the expenses considered are allocated in the SAET according to seven classes expressing different education and training levels or types. As it will be described in Chapter 3 of this Guide, four of them refer to formal education and are linked to the ISCED levels, the others refer to non-formal education and training activities and in-house training.
- 2.33 Capital expenditure refers to the GFCF in the Education system, that is, R&D by education system and expenses on GFCF other than R&D. Expenditure on GFCF plays a crucial role in the provision of education services by maintaining or expanding the production capacity. It is also important information when estimating the total investments in human capital. It should also be noted that consumption of fixed capital in education is already included in the current production costs. Therefore, GFCF must be clearly distinguished from the current expenditure on education, and not included in the current expenditure. The investments in the education industry are included in the SAET framework in Table A.2, see Chapter 3.

Chapter 3

Classifications and Tables for the Satellite Account for Education and Training

3.1 Introduction

3.1 The purpose of this chapter is to elaborate on the classifications needed for compiling the Satellite Accounts for Education and Training (SAET). The SAET framework includes a set of main tables presenting monetary data and are the core set of accounts on which countries should focus their efforts. In addition, the Guide proposes some supplementary tables complementing the system with non-monetary information. These classifications and tables are important for defining the scope of the SAET, thereby clarifying which data should be included and which data should be excluded, and setting a standard for aggregating data. To that end, this chapter discusses two sets of classifications:

- Classification of production and financing units by institutional sector
- Classification of education and training by purpose

3.2 Reference is also made to the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev.4).

3.2 Classification of production and financing units

3.3 Since the general intention is that SAET should align with the System of National Accounts, 2008 (2008 SNA), the classification of production / financing units is the SNA classification of institutional sectors¹⁰:

- General government^{11,12}:
 - Central government
 - State government
 - Local government
- Non-financial corporations¹³
- Financial corporations¹⁴

¹⁰ Regrouping sectors after compiling data may be required due to either methodological issues, lack of data or extremely small figures. For example, coupling the financial and the non-financial corporate sectors.

¹¹ Since in many countries a large portion of the education and training is produced by the general government sector, to avoid a loss of information, it is beneficial to compile data for central government, state government and local government separately.

¹² Please note that the general government sector includes governmental non-profit institutions (NPIs), which are to be included respectively, within the central, state and local government sectors.

¹³ Including non-financial government corporations.

¹⁴ Including financial government corporations.

- Non-profit institutions serving households (NPISH)¹⁵
- Households
- Rest of the world.

- 3.4 **General government:** Government units are unique kinds of legal entities established by political processes that have legislative, judicial or executive authority over other institutional units within a given area. Viewed as institutional units, the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes, to redistribute income and wealth by means of transfers, and to engage in non-market production. (2008 SNA, paragraph 4.117). The general government sector consists of the following groups of resident institutional units: All units of central, state or local government and all non-market NPIs that are controlled by government units. (2008 SNA, paragraph 4.127). In the SAET, units included in this sector as production units may be, for example, schools and kindergartens controlled and operated by local, state and central government or local, state and central government units supervising education. Whereas units included in this sector as financing units may be, for example, government ministries and municipalities.
- 3.5 **Non-financial corporations:** Non-financial corporations are corporations whose principal activity is the production of market goods or non-financial services. (2008 SNA, paragraph 4.94). For example, production units may be private schools and colleges, in-house training departments within corporations, driving schools etc. Financing units may be corporations (financing external training for employees or making charitable contributions to colleges, etc.).
- 3.6 **Financial corporations:** Financial corporations consist of all resident corporations that are principally engaged in providing financial services, including insurance and pension fund services, to other institutional units. (2008 SNA, paragraph 4.98). For example, production units may be banks and insurance corporations (providing in-house training for employees). Financing units may be banks and insurance corporations (financing external training for employees).
- 3.7 **Non-profit institutions serving households:** NPIs are legal or social entities, created for the purpose of producing goods and services, whose status does not permit them to be a source of income, profit or other financial gain for the units that establish, control or finance them. (2008 SNA, paragraph 4.83). NPISH consist of non-market NPIs that are not controlled by government. They provide goods and services to households free or at prices that are not economically significant. Most of these goods and services represent individual consumption but it is possible for NPISHs to provide collective services. (2008 SNA, paragraph 4.93). For example, production units may be colleges controlled and operated by NPIs. Financing units may be labour unions (financing vocational training), religious organizations (financing education institutions), etc.
- 3.8 **Households:** The household sector consists of all resident households. (2008 SNA, paragraph 4.158). For the purposes of the SNA, a household is defined as a group of persons who share

¹⁵ In many countries due to lack of administrative information, separating NPISH from government NPIs is rather difficult, and thus less accurate. Therefore, in some cases data may be compiled for both government NPIs and NPISH together, and separated later according to some criteria.

the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. In general, each member of a household should have some claim upon the collective resources of the household. At least some decisions affecting consumption or other economic activities must be taken for the household as a whole. (2008 SNA, paragraph 4.149).

- 3.9 Household unincorporated market enterprises are created for the purpose of producing goods or services for sale or barter on the market. (2008 SNA, paragraph 4.155). For example, household production units may be individual tutors. Financing units may be households financing formal education in schools, universities etc., and non-formal education such as sports, arts, skills development courses, etc.
- 3.10 **Rest of the world:** For purposes of the SNA, the rest of the world consists of all non-resident institutional units that enter into transactions with resident units or have other economic links with resident units. (2008 SNA, paragraph 4.172).
- 3.11 Since SAET aims at measuring the human capital of a country, it includes expenditures of resident students abroad (imports of education services) and excludes the expenditures of non-resident students in the country (exports of education services). Note that students who go abroad for full-time study (even if the course of study exceeds a year) should be treated as resident households, since they generally continue to be resident in the territory in which they were resident prior to studying abroad (2008 SNA, 26.38a).
- 3.12 For example, non-resident production units may be educational institutions abroad. Financing units may be non-resident governments and universities (financing resident student learning at non-resident institutions), or non-resident foundations and households (donating to domestic educational institutions).
- 3.13 **Market and non-market producers:** The education and training production units discussed above are usually distinct in their nature, such that they are either market or non-market producers. Market producers are establishments for which all or most of the output is market production. Non-market producers consist of establishments owned by government units or NPISH that supply goods or services free, or at prices that are not economically significant, to households or the community as a whole (2008 SNA, paragraph 6.133). The distinction between market and non-market producers is important as it affects how the education and training outputs are valued (described in Chapter 4, paragraph 4.27).

3.3 Classification of Education and Training Purposes

- 3.14 The classification of education and training purposes is based on the International Standard Classification of Education (ISCED 2011) levels, with additional categories for non ISCED levels. There are seven education and training purposes (EP):
- EP0 - EP3 classify education and training purposes, regrouping ISCED levels 0-8;
 - EP4 - EP6 classify education and training purposes, basing on the Human Capital Guide (Chapter 5, paragraph 354).
- 3.15 Table 3.1.1 in Annex 3.1 elaborates the correspondence of EPs with other existing classifications. While the satellite account aims at allocating education and training

- expenditures to the various educational purposes, Table 3.1.1 of Annex 3.1 associates the education and training purposes to educational levels (ISCED), products (CPC¹⁶), producers (ISIC), functions of non-market institutions (COFOG¹⁷, COPNI¹⁸) and purposes of individual consumption (COICOP¹⁹).
- 3.16 **EP0 - Pre-primary education:** EP0 includes early childhood educational development for children²⁰ and pre-primary education. (See Table 3.1.2 in Annex 3.1).
- 3.17 Different countries have quite different starting ages for school (ranging from 3 to 7). Sometimes educational programs are included in the pre-primary level in countries that have an older starting age. EP0 includes only the education part of pre-primary education. Child care expenditures of kindergartens should be excluded. There might be some practical difficulties making the split in cases where child care and education programmes are combined²¹. From this follows that ISIC 851 could be used as a proxy for the education part of pre-primary education, while ISIC 889 which includes kindergartens, should be excluded.
- 3.18 **EP1 - Primary education:** EP1 includes primary education (in most cases 6 years of schooling) (See Table 3.1.2 in Annex 3.1).
- 3.19 **EP2 - Secondary education:** EP2 includes lower-secondary education and upper-secondary education – covering both general and vocational education. Further, it includes post-secondary non-tertiary education (See Table 3.1.2 in Annex 3.1).
- 3.20 Vocational education refers to "programs designed for learners to acquire the knowledge specific to a particular occupation. Successful completion leads to labour-market relevant vocational qualifications acknowledged as occupationally-oriented" (ISCED 2011).
- 3.21 **EP3 - Higher education:** EP3 includes short-cycle tertiary education (usually two-year educational colleges), and long-cycle tertiary education: Bachelor's, Master's and Doctoral degrees or equivalent level. EP3 also includes further education, which refers to programs for university graduates, such as psychotherapy, further education for teachers, etc. (See Table 3.1.2 in Annex 3.1).
- 3.22 When ISCED 4 (in EP2) and ISCED 5 (in EP3) are provided by the same institution, the split should be made using detailed ISCED data. If data are not available, then the total should be classified according to the prevailing activity.
- 3.23 **EP4 - Cultural, sports and recreation education:** EP4 includes instructional courses in various fields such as music, arts, and sports, including on-line courses and educational programmes

¹⁶ *Central Products Classification (CPC)*, version 2.1.

¹⁷ *Classification of the Functions of Government (COFOG)*.

¹⁸ *Classification of the Purposes of Non-Profit Institutions Serving Households (COPNI)*.

¹⁹ *Classification of Individual Consumption According to Purpose (COICOP)*. This Guide uses as reference the COICOP 1999 version, which is currently in use in many countries. An updated white cover version of COICOP was published in 2018 (for more information see list of references).

²⁰ Expenditures on early childhood education are expected to be small.

²¹ If child care cannot be separated out, identification of the programmes with child care embedded should be provided.

for adults which could also be formal education but not definable by level (See Table 3.1.3 in Annex 3.1).

- 3.24 While training includes personal and cultural activities classified in CPC 92911 Cultural education services and CPC 92912 Sports and recreation education service, the intention is to cover only the instructional part of these activities if data sources allow. However, since there are recognized practical limitations, a list of activities covered under these activities should be provided so the coverage and comparability of the estimates is clear.
- 3.25 **EP5 - Other education and vocational training:** EP5 includes vocational training for persons with disabilities or for unemployed persons; training for employees, funded but not provided by the employer; and vocational training that households purchase (See Table 3.1.3 in Annex 3.1).
- 3.26 **EP6 - In-house training:** EP6 includes the vocational training for employees, which is produced by the employing enterprise, both market and non-market. In addition, it includes in-house vocational training for persons with disabilities (See Table 3.1.3 in Annex 3.1).
- 3.27 EP6 represents an extension of the SNA production boundary reflecting own account education and training. The addition of EP6 allows specific presentation of in-house training separate from other training purchased by employers, which is allocated to the appropriate EPs.

3.3.1 General Clarifications

- 3.28 **Industry Classification:** With the inclusion of in-house training, enterprises in all industries may be producers of education and training; however, the majority of education will likely be found to be produced by enterprises classified to industry 85 in ISIC Rev 4, the Education Industry. The general administration and supervision of education may be found in public administration industries, while some forms of education such as apprenticeships may be delivered by organizations classified to a variety of industries. Some parts of the data presentation for the SAET will be limited to producers classified to the education industry.
- 3.29 **Products and services given for free:** Free courses, including e-learning, supplied by non-market education institutions should be implicitly covered in their accounts, while free courses supplied by other providers should in theory have been included but due to lack of data sources are not covered.
- 3.30 **Research and Development (R&D):** the SAET follows the national accounts concept. Thus, the expenditures of universities or other tertiary institutions, ministries, etc. that are related to R&D will be shown as a separate memorandum item “R&D in education and training” in the supply and use table of SAET and not added to education expenditures. This will allow presentation of the total capital formation in education.
- 3.31 **Associated goods and services related to the delivery of education and training services:** The scope of SAET includes those goods and services that are required primarily for the delivery of education such as textbooks, dictionaries, stationaries, computers and software (provided inside the educational institutions or purchased by households). However, transportation,

- meals, accommodation, medical and dental care should not be included²² (including services that the government provides for free) because they are not part of the provision of education and training. These expenditures should be allocated to the respective education purposes, when sufficient information is available. If such information is not available, they could be allocated according to total expenditure proportions or presented in an unallocated category.
- 3.32 **Educational administrative expenditures** including collective administration expenditures will be included in the scope of SAET and allocated to the respective education purposes (EP0-EP3), when sufficient information is available. If such information is not available, expenditures could be allocated to EP0-EP3 according to total expenditure proportions or presented in an unallocated category.
- 3.33 **Professional military training** is part of education expenditures in SAET. It will be allocated to education and training purposes following the same principle as for other products. When the military education is provided by special educational institutions that credits participants with equivalent degree to a university degree it will be allocated to EP3. When the training is provided internally within the ministry of defence for its own staff, it will be allocated to EP6, and if the ministry purchases non-formal external courses then it will be allocated to EP5.
- 3.34 **Internships** can be part of formal or non-formal education and the expenditure related to the supervision of interns as part of the general training process should be included as part of EP6 – In-house training, whereas the expenditure for the wages of interns are generally not included in SAET because the paid internship could be considered as work. For example, doctors who after graduation need to work for several years before getting licensed for individual practice.
- 3.35 **Apprenticeships** that are part of the formal education program should be included in the relevant EP. Apprenticeships include cases where the students have not yet finished their education and are not allowed to work on their own. They are normally not paid or paid a relatively low wage for their work. If paid, wages paid to the apprentice would not be included in education costs, whereas the training cost incurred by the employer would be included. Employers may be financed by the government for related costs.
- 3.36 The circumstances for internships and apprenticeships may differ from country to country, which means that compilers should consider their own situation carefully. For example, in Germany the number of students starting university studies only slightly outnumbers the number of young people starting a dual-system apprenticeship programme. These combined school- and work-based programmes are highly relevant in Austria and Switzerland, as well. For each occupation, the procedure of the apprenticeship, its content, duration, examination, certification, etc. are governed by legal regulations. The company or public entity is responsible for ensuring that apprentices get the required quantity and quality of on-the-job training, complemented by practical lessons and workshops provided internally or externally (e.g. by the guilds and chambers of commerce).²³

²² In the *UOE Manual* they are included as ancillary services (see .3.7.1.1.3.3 Expenditures on ancillary services).

²³ According to the *OECD Handbook for Internationally Comparable Education Statistics* (<http://www.oecd.org/education/oecd-handbook-for-internationally-comparative-education-statistics-9789264279889-en.htm>), apprentices participating in these dual-system apprenticeship programs are

3.4 Transactions between Financing Sectors and Producing Sectors

3.37 The majority of financing units may fund education and training produced by the majority of producing units, a detailed transactional matrix is presented in Table 3.1.

Table 3.1

Transactions between Financing Sectors and Producing Sectors by Education and Training Purposes.

Financing Sector		Producer														
		Non-market:						Market:						Rest of the world		
		General government and NPISH						Corporations and households								
		Purposes														
		(EPO)	(EP1)	(EP2)	(EP3)	(EP4)	(EP5)	(EP6)	(EPO)	(EP1)	(EP2)	(EP3)	(EP4)	(EP5)	(EP6)	(EPO-EP5)
Central government	S.1311	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X
State government	S.1312	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X
Local government	S.1313	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X (*)
Financial/Non-financial corporations	S.11	X	X	X	X	X	X	-	X (*)	X (*)	X (*)	X	X	X	X	X (*)
NPISH	S.12	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X (*)
Households	S.15	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X
Rest of the world	S.14	X (*)	X (*)	X (*)	X	X (*)	X (*)	-	X (*)	X (*)	X (*)	X	X (*)	X (*)	-	-

* Cells likely to have small or non-identified flows

3.5 Main tables

3.38 The SAET tables are based on monetary data available in the national accounts, but at the same time they provide a more detailed description and assessment of the education production activities and education financing. The SAET consists of a set of main or core tables and a number of supplementary tables. The monetary tables follow the national accounts focusing on the production aspects of the Education system; indeed, national accounts register the expenditure incurred by the different agents within the field of education as components of

classified as full-time students even though the school-based component comprises only part of the program (OECD 2017, p. 39). This is because the work-based component is a mandatory requirement to fulfill the program. As a consequence, expenditures on these programs are considered education expenditures. These expenditures include expenditure on the training itself (e.g. salaries and other compensation of instructors and other personnel, and the costs of instructional materials and equipment). Salaries or other compensation paid to apprentices are excluded (OECD 2017, pp. 57/58). Depending on the entry requirements and the duration of the specific program, the allocation of dual-system apprenticeship programs and preparation courses for advanced professional certificates such as the examination for master craftsman's certificate varies (ranging from ISCED 2011 level 3 to 6).

the production costs, linked to their different activities as providers of educational goods/services. The proposed structure of the SAET tables constitutes the encouraged lay-out of the accounts. Nevertheless, depending on country circumstances, countries could opt for more detailed breakdowns.

3.39 These tables consist of:

- i) Education and training output, by provider and education purpose (Current prices) (Table A.1);
- ii) Education and training expenditure, by purchaser and education and training purpose (Current prices) (Table A.2);
- iii) Financing, by sector and education and training purpose (Current prices) (Table B.1);
- iv) Cost structure, by education and training purpose (Current prices) (Table B.2).

3.40 The first two tables are based on supply and use tables (SUTs)²⁴ which offer in general a detailed picture of the economy by providing the elements of the production process, the use of the goods and services (products) and the income generated, as illustrated in figure 5.1 in the Human Capital Guide. The SAET provides a simplified version of the SUTs, highlighting the supply and the use of the EPs. The reason for this simplification is that the main purpose of the satellite account is to estimate the expenditure related to education and training. The Tables, showing the detailed breakdown of the education purposes, provide the value of the output of the education and training activities broken down by type of producer, that is, non-market (general government (central, state and local) and NPISH), market producers in the education industry and other market producers (outside the education industry), on one hand, and the uses - final consumption by general government (central, state and local), NPISH and households and intermediate consumption of domestic sectors - and exports, on the other hand.

3.41 The supply table shows the output by education and training producer, imports and the taxes less subsidies on education products. The sum equals the Total supply (at purchasers' prices). In the rows, the output of education and training is divided by EP. Expenditures related to associated goods and services which can't be allocated to the respective education purposes (EP0-EP6) due to insufficient information are presented in a separate row (the not allocated part). Note that households can be producers of education and training services, and if so, they will be included in the column Market producers in education industry.

3.42 Output of non-market producers is by convention estimated as the sum of costs: intermediate consumption, compensation of employees, other taxes (less subsidies) on production and consumption of fixed capital. Output of market producers is equal to income from sales. The imputed output related to in-house training is estimated by costs, including an estimate of net operating surplus for market producers.

²⁴ Supply and use tables (SUTs) are in the form of matrices that record how supplies of different kinds of goods and services originate from domestic industries and imports and how those supplies are allocated between various intermediate or final uses, including exports. They contain the full framework for establishing the connection between the various valuation concepts used in NA. The distribution of margins, taxes and subsidies on products are included since they are used to pass from basic prices to producers' prices and finally to purchasers' prices.

- 3.43 In addition to current expenditure, the supply table also shows own account production and production for sale of R&D for the education industry as a memorandum item. The last rows in the use table show gross fixed capital formation (GFCF) for the education industries. It is proposed to split the investments between R&D and other GFCF. It should be noted that the supply of capital formation (fixed assets) in the education industries, except own account production of R&D, is not shown in the supply table as this is produced by other industries or imported.
- 3.44 The headings of the Use table show the final consumption expenditure of the EPs split by central, state and local government, NPISH and households and a column for intermediate consumption. Education and training services purchased by employers for their employees are identified as intermediate consumption. In addition, in-house production of training by market producers is included in the column for intermediate consumption, while in-house training by non-market producers is included in final consumption expenditures (see Chapter 2 paragraph 2.29). Finally, there is a column showing exports.
- 3.45 Final consumption expenditure for general government and NPISH is by convention estimated as their output (sum of costs) less fees (e.g. sales to households, corporations) plus transfers in kind – purchased market production (example: central government pays the tuition fee for households in a private schools). If fees and transfers in kind are zero for central government, the final consumption expenditure for central government in the use table will be equal to the output of central government in the supply table.
- 3.46 In-house training is recorded as an additional purpose in SAET. It is proposed that the estimated output for market producers, for simplicity, is allocated to the corresponding industries as intermediate consumption in the use table, while non-market production of in-house training is allocated to final consumption expenditure. What is important is that expenses related to in-house training are recognized. For non-market sectors such as NPISH and general government, the output of in-house training is recorded as a separate (new) output that is part of supply by the non-market sector. Market production of the education industry (ISIC 85) is identified separately in the supply table. All other education and training production by market producers (for example in the arts and recreation areas) and in-house training for market producers is recorded in a single column of the supply table.
- 3.47 The final section of the Use Table covers the GFCF for the education industry. It reports on only GFCF for education industries as it will be impossible to estimate education specific GFCF for other industries. An estimate of the GFCF is relevant because of the role that these assets have for future production. Following 2008 SNA, it's composed of the value of R&D and other types of assets (investment in buildings, etc.).

Table A.1

Education and training output, by provider and education and training purpose. Current prices.

		Supply								
		Central government	State government	Local government	NPISH	Market producers in education industry ²⁵	Other market producers	Imports	Taxes less subsidies on products	Total
Educa- tion and training purpose	EP0 - Pre-primary education									
	EP1 - Primary education									
	EP2 - Secondary education									
	EP3 - Higher education									
	EP4 - Cultural, sport and recreation education									
	EP5 - Other education and vocational training									
	EP6 - In-house training									
	Associated products and administrative expenditures, not allocated									
Total output = Total current expenditure										
R&D production of ISIC 85 (own account and production for sale by the Education Industry)										

²⁵ Includes households as producers.

Table A.2
Education and training expenditure, by consumer and education and training purpose.
Current prices.

		Use							
		Final consumption expenditures					Intermediate consumption – market producers	Exports	Total
		Central government	State government	Local government	NPISH	Households ²⁶			
Education and training purpose	EP0 - Pre-primary education								
	EP1 - Primary education								
	EP2 - Secondary education								
	EP3 - Higher education								
	EP4 - Cultural, sport and recreation education								
	EP5 - Other education and vocational training								
	EP6 - In-house training								
	Associated products and administrative expenditures, not allocated								
Total output (intermediate and final consumption) = Total current expenditure									
		Gross fixed capital formation in education industry (ISIC 85)							
		Central government	State government	Local government	NPISH		Market producers in education industry		Total
R&D (both purchased and produced for own account)									
Capital formation (excluding R&D)									
Total gross fixed capital formation									

3.48 Table B.1 shows the financing of education and training purposes while the fourth table covers the cost structure of production. These tables are simplified versions of the tables set out in the Human Capital Guide (Resources and Uses tables) again including only those financing and cost flows associated with the delivery of education and training. The aim with the financing table is to allow the analysis of the financing of the education and training output, while the cost side shows the cost structure by education purpose. The breakdown of both the financing

²⁶ Households as consumers only

- and costs by education purpose allows one to measure the resources devoted to each level of education.
- 3.49 The headings/rows of the Financing Table show how education and training activities by purpose are financed by the different sectors. The general government should be broken down by Central, State and Local levels and the table gives information concerning the type of flow, that is, if it is a direct financing (final consumption expenditure) or a current transfer (e.g. to Households, NPISH) or subsidies to other sectors.
- 3.50 The responsibility for producing and financing education and training can vary significantly across countries. It is the case that often transfers and subsidies form a considerable part of the financing but again the nature of these can vary greatly by country. To show all forms of financing transactions would require a very lengthy and detailed table, therefore it is recommended that countries provide detail for the most important forms of financing and group others as appropriate for understanding the financing of education and training purposes. The pilot estimates in Chapter 7 provide examples of these choices. It should be noted that only current transfers and subsidies that are directly financing the education and training expenditure are included. Capital transfers are excluded.
- 3.51 Household funding largely consists of expenditures incurred for education and training services such as tuition fees, and for associated goods and services required for education and is part of final consumption expenditure of households. The households don't always bear the total expense themselves, since they may receive transfers from general government e.g. scholarship. Such transfers must be deducted from household funding since it's a part of government resources. The transfers in cash from general government to households match the transfers in cash to households recorded under government financing. Households may also make contributions, e.g. donations/gifts, to education entities either in NPISH or general government sectors or in the corporate sector.
- 3.52 The final consumption expenditures on education and training activities incurred by NPISH is in large part financed out of transfers from general government or from donations and contributions from households or other sectors. These transfers are subtracted from NPISH final consumption expenditures to arrive at NPISH funding. NPISH can also make transfers directly to households or to other sectors, for example support to research and other costs of universities.
- 3.53 Regarding other sectors, they contribute to the financing of education purposes by purchasing training courses, etc. from education providers and by funding the costs related to in-house training. Other sectors may also finance education and training activities such as apprenticeships, possibly with subsidies from the general government. The same amount will be found under Government financing (subsidies to other sectors). Their expenditure is equal to the part estimated as intermediate consumption. In addition, corporations can give donations/contributions to NPISH or households.
- 3.54 Exports provide funding from the rest of the world. International financial support for education may also exist in the form of transfers and it is proposed to include these with other transfer receipts by sector.

Table B.1

Financing, by sector and education and training purpose. Current prices.

		Education and training purposes								Total
		EP0 Pre- primary educa- tion	EP1 Primary educa- tion	EP2 Second- ary educa- tion	EP3 Higher educa- tion	EP4 Cultural, sports and recreation education	EP5 Other education and vocational training	EP6 In-house training	Associated products and administra- tive expenditure, not allocated	
Resources										
Central govern- ment	Final consumption expenditure of central government									
	Plus - transfers / subsidies to other sectors (detail to be country specific)									
	Less – transfers / subsidies from other sectors (detail to be country specific)									
	Central government financing									
State govern- ment	Final consumption expenditure of state government									
	Plus - transfers / subsidies to other sectors (detail to be country specific)									
	Less - transfers / subsidies from other sectors (detail to be country specific)									
	State government financing									
Local govern- ment	Final consumption expenditure of local government									
	Plus - transfers / subsidies to other sectors (detail to be country specific)									
	Less - transfers / subsidies from other sectors (detail to be country specific)									
	Local government financing									

NPISH	Final consumption expenditure of NPISH									
	Plus - transfers to other sectors (detail to be country specific)									
	Less – transfers / subsidies from other sectors (detail to be country specific)									
	NPISH financing									
Households²⁷	Final consumption expenditure of households									
	Plus - transfers to other sectors (detail to be country specific)									
	Less – transfers / subsidies from other sectors (detail to be country specific)									
	Household financing									
Other sectors²⁸	Intermediate consumption									
	Plus - transfers to other sectors (detail to be country specific)									
	Less – transfers / subsidies from other sectors (detail to be country specific)									
	Other sectors financing									
Rest of the world (exports)										
Total resources										

3.55 The headings of the Cost structure table (Table B.2) show the cost elements related to the domestic production process by purposes, both current expenditure (compensation of employees; intermediate consumption; taxes on production and imports, less subsidies; operating surplus for market producers) and the consumption of fixed capital. Cost structures of in-house training could vary widely, and data sources may be limited so it may not be possible to estimate this detail.

²⁷ Households as consumers only.

²⁸ Corporate sectors and households as producers.

Table B.2

Cost structure, by education and training purpose. Current prices.

		Education and training purposes								Total
		EPO Pre- primary education	EP1 Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation education	EP5 Other education and vocational training	EP6 In- house training	Associated products and administrative expenditures, not allocated	
		Uses								
All sectors (or by sectors if desired)	Compensation of employees									
	Intermediate consumption									
	Consumption of fixed capital									
	Taxes on production and imports, less subsidies									
	Operating surplus									
Total current domestic expenditures										
Rest of the world (imports)										
Total current expenditure										

3.6 Supplementary tables

- 3.56 As suggested in the European System of National and Regional Accounts, 2010 (ESA 2010) for other Satellite Accounts, Supplementary tables with non-monetary information complete the information framework of the SAET. The types of information that should be considered are: population, enrolled students (by ISCED level), adults in continuing vocational training and in lifelong learning (broken down by sex and age group), teachers/staff (by ISCED level) or employed persons by educational attainment. Figures should refer to the stocks at the end of the year.
- 3.57 Monetary data coming from the Main tables and non-monetary information from Supplementary tables can provide relevant indicators for education and training coherent with the national accounts framework. The calculation of cross sectional time series on *per capita* or per student expenditure could offer important information for policy, e.g. the average costs and fees per student.
- 3.58 Five examples of tables that could be relevant follow, but each country can enrich the SAET with specific tables relevant to their particular situation.

- 3.59 Table S.1 provides information on the resident population, broken down by sex, age group (0-14 years, 15-34, 35-64, 65 and over) and educational attainment (by ISCED level or group of levels). Information on migration flows (broken down by sex, age group) could also be of interest, even though figures broken down by level of skills are not currently available.

Table S.1

Supplementary information for the population.

	Educational attainment				
	Age group	ISCED 0	...	ISCED 8	Total
Resident population	Total				
Total	0-14				
	15-34				
	35-64				
	65 and over				
Male	Total				
	0-14				
	15-34				
	35-64				
	65 and over				
Female	Total				
	0-14				
	15-34				
	35-64				
	65 and over				

- 3.60 Tables S.2 and S.3 show, respectively, the number of enrolled pupils/students (broken down by sex, age group 0-5, 6-14, 15-34) between formal (by level of education) and non-formal education and the number of adults in continuing vocational training or in lifelong learning (in formal and non-formal education, broken down by sex, age group (15-34,35-64). These figures allow the calculation of the yearly per student costs needed to achieve a certain qualification. Other information, such as for example the number of teachers can complete the information framework.
- 3.61 Care should be taken in the use of student and graduate counts to ensure that the counts are consistent with the monetary data. The inclusion/exclusion of resident students studying abroad and non-resident student studying domestically needs to be consistent with the basis of the monetary data – domestic or national basis.

Table S.2

Supplementary information on pupils / students enrolled and teachers.

	Age group	Education			Non-Formal	Total
		Formal				
		ISCED 0	...	Total		
Number of students	Total					
Total	0-5					
	6-14					
	15-34					
Male	Total					
	0-5					
	6-14					
	15-34					
Female	Total					
	0-5					
	6-14					
	15-34					
Average costs (per pupil/student)						
Number of teachers	Total					

Table S.3

Supplementary information on adults in continuing vocational training and in lifelong learning.

	Age group		
	15-34	35-64	Total
Number of people in in-house training			
Male			
Female			
Average costs per person			
Number of adults in permanent education			
Males			
Females			
Average costs per person			

3.62 In Table S.4 information on outcomes are reported, that is, the number of graduates by field of education and gender.

3.63 In Table S.5 the number of employed persons by educational attainment is reported; a table on employment by sex, occupation and educational attainment level (and possibly by education field) could give other important information on the differential access to labour markets and to careers of people with different educational attainment.

Table S.4

Supplementary information on graduates by sex and field of education.

ISCED 2011	Short-cycle tertiary education			Bachelor's or equivalent level			Master's or equivalent level			Doctoral or equivalent level			Tertiary education (levels 5-8)		
	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F
Education (teaching)															
Humanities and arts															
Social sciences, business and law															
Science, mathematics and computing															
Engineering, manufacturing and construction															
Agriculture and veterinary															
Health and welfare															
Services															
Total															

Table S.5

Supplementary information on employment by sex, occupation and educational attainment level.

ISCED 2011	All ISCED levels			Less than primary, primary and lower secondary education (levels 0-2)			Upper secondary and post-secondary non-tertiary education (levels 3 and 4)			Tertiary education (levels 5-8)		
	T	M	F	T	M	F	T	M	F	T	M	F
ISCO 08²⁹/Sex												
Total												
Managers												
Professionals												
Technicians and associate professionals												
Clerical support workers												
Service and sales workers												
Skilled agricultural, forestry and fishery workers												
Craft and related trades workers												
Plant and machine operators and assemblers												
Elementary occupations												
Armed forces occupations												

²⁹ International Standard Classification of Occupations, 2008 (ISCO 08).

Annex 3.1

Table 3.1.1

Education and Training Purposes and Correspondence with ISCED 2011, CPC ver.2.1, ISIC rev.4, COFOG, COPNI, COICOP 1999.

Education and training purpose (EP)	ISCED 2011	CPC ver.2.1	ISIC rev.4	COFOG	COPNI	COICOP 1999
EP0 Pre-primary education	ISCED 0 Early childhood education	921 Pre-primary education services	851 Pre-primary and primary education	09.1 Pre-primary and primary education	04.1 Pre-primary and primary education	10.1 Pre-primary and primary education
EP1 Primary education*	ISCED 1 Primary education	922 Primary education services	851 Pre-primary and primary education	09.1 Pre-primary and primary education	04.1 Pre-primary and primary education	10.1 Pre-primary and primary education
EP2 Secondary education*	ISCED 2 Lower-secondary Education	923 Secondary education services	852 Secondary education	09.2 Secondary education	04.2 Secondary education	10.2 Secondary education
	ISCED 3 Upper-secondary education					
	ISCED 4 Post-secondary non-tertiary education	924 Post-secondary non-tertiary education services	853 Higher education (only Post-secondary non-tertiary education)	09.3 Post-secondary non-tertiary education	04.3 Post-secondary non-tertiary education	10.3 Post-secondary non-tertiary education
EP3 Higher education*	ISCED 5 Short-cycle tertiary education	925 Tertiary education services	853 Higher education (excluding Post-secondary non-tertiary education)	09.4 Tertiary education	04.4 Tertiary education	10.4 Tertiary education
	ISCED 6 Bachelor's or equivalent level					
	ISCED 7 Master's or equivalent level					
	ISCED 8 Doctoral or equivalent level					

Education and training purposes (EP)	ISCED 2011	CPC ver.2.1	ISIC rev.4	COFOG	COPNI	COICOP 1999
EP4 Cultural, sports and recreation education	Non ISCED	92911 Cultural education services	8542 Cultural education	08.2 Cultural services	03.2.0 Cultural services	09.4.2 Cultural services
		92912 Sports and recreation education services	8541 Sports and recreation education	08.1 Recreational and sporting services	03.1.0 Recreational and sporting services	09.4.1 Recreational and sporting services
EP5 Other education and vocational training	Non ISCED	92919 Other education and training services, n.e.c. (external)	8549 Other education n.e.c.	09.5 Education not definable by level	04.5 Education not definable by level	10.5.0 Education not definable by level 07.2.4 Driving lessons
		93411 Vocational rehabilitation services for persons with disabilities (external)	881 Social work activities without accommodation for the elderly and disabled (only vocational rehabilitation activities for disabled persons)	10.12 Disability (only the vocational training)	05.1.0 Social protection services	12.4.0 Social protection
		93412 Vocational rehabilitation services for unemployed persons	889 Other social work activities without accommodation (only vocational rehabilitation activities for unemployed persons)	10.50 Unemployment (only the vocational training)	05.1.0 Social protection services	12.4.0 Social protection
EP6 In-house training	Non ISCED	92919 Other education and training services, n.e.c. (internal)				
		93411 Vocational rehabilitation services for persons with disabilities (internal)				

**These purposes also include the education and training associated products classified to COICOP 1999 categories 09.5.1; 09.5.4; 09.1.3 and 09.1.4 (only the segment that is allocated to education).*

Table 3.1.2

Education and Training Purposes and Correspondence with CPC ver.2.1 (detail).

EP	ISCED 2011	CPC ver. 2.1	
EP0	ISCED 0	921	- Early childhood educational development - Pre-primary education
EP1	ISCED 1	922	- Primary education
EP2	ISCED 2-4	923 924	- Lower secondary general education - Lower secondary vocational education - Upper secondary general education - Upper secondary vocational education - Post-secondary non-tertiary general education - Post-secondary non-tertiary vocational education
EP3	ISCED 5-8	925	- Short-cycle tertiary general education - Short-cycle tertiary vocational education - Bachelor's or equivalent level - Master's or equivalent level - Doctoral or equivalent level

Table 3.1.3

Education and Training Purposes and Correspondence with CPC ver.2.1 (detail).

EP	CPC ver. 2.1	
EP4	92911 Cultural education services	- piano and other music instruction - art instruction - dance instruction and dance studios - art instruction except academic - photography instruction
	92912 Sports and recreation education services ^{a)}	- sports instruction (baseball, basketball, cricket, football, hockey, tennis, figure skating, etc.) - camps, sports instruction - gymnastics instruction - riding instruction - swimming instruction - martial arts instruction - card game instruction (such as bridge) - yoga instruction
EP5	92919 Other education and training services, n.e.c. ^{b)} (external)	- training for car, bus, lorry and motorcycle driving licenses - training for flying certificates and ship licenses - services provided by music camps, science camps, computer camps and other instructional camps, except for sports - computer training services - management training services
	93411 Vocational rehabilitation services for persons with disabilities (external)	- vocational rehabilitation services for persons with disabilities, where the social assistance component is predominant
	93412 Vocational rehabilitation services for unemployed persons	- vocational rehabilitation services for unemployed persons, where the social assistance component is predominant
EP6	92919 Other education and training services, n.e.c. ^{b)} (internal)	- computer training services - management training services
	93411 Vocational rehabilitation services for persons with disabilities (internal)	- vocational rehabilitation services for persons with disabilities, where the social assistance component is predominant

a) Including sports instruction services by sports camps and schools or by professional sports instructors, teachers or coaches to groups of individuals. Excluding the provision of such services by academic schools, colleges and universities.

b) Including:

- Services related to literacy programs for adults
- Higher education services comparable to the regular education system
- Cultural education services other than academic
- Education services provided by instructors, coaches, etc.

Also includes any type of vocational training that is given by the employer.

Chapter 4

Methodology of the Satellite Account for Education and Training: Compilation and Analysis

4.1 Introduction

- 4.1 The structure of the Satellite Account for Education and Training (SAET) is presented in Chapter 3 of this guide. This chapter discusses the sources³⁰ and methods that can be used to construct a SAET.
- 4.2 As noted in chapter three of this guide the SAET consists of three sets of tables:
- Supply and use tables (SUTs) by education and training purpose (EP),
 - Financing/cost tables by EP, and
 - Supplementary tables that may include: (1) resident population by sex, age and educational attainment; (2) employment, by sex, educational attainment and occupation; (3) student enrolment by sex, age, education level; (4) the number of graduates by sex, age and education level; (5) number of adults in continuing vocational training and in lifelong learning.
- 4.3 The supply and use tables and the financing/cost tables by education and training purpose form the core tables of the SAET. The supplementary tables include educational attainment of the resident population and the number of students and graduates and participation on vocational training and lifelong learning.
- 4.4 The SAET SUTs are a simplified version of the System of National Accounts, 2008 (2008 SNA) supply and use tables. These SUTs focus on the production and use of education and training.
- 4.5 The supply table of the SAET presents the output of education and training services by institutional sector and industry while the use table presents the final expenditure on education and training by institutional sector and intermediate consumption for market producers. The financing/cost tables show the sources of funds used to finance education and training and its allocation between compensation of employees, intermediate consumption and consumption of fixed capital. The supplementary tables provide additional demographic and labour detail related to education and training.
- 4.6 The SAET uses the 2008 SNA framework to present data on the production and use of education and training services, and on the source of funds used to finance education and training. This ensures that the SAET is comparable and consistent with national account aggregates such as general government and household final consumption expenditure, investment, and economy wide measures of output and value added. The use of the 2008 SNA also ensures the SAET will be comparable from one country to another since most countries

³⁰ Chapter 5 has a more extensive discussion of sources.

use the 2008 SNA to construct their national accounts. Finally, the SAET can be used to provide an estimate of investment in human capital and its contribution to economic and productivity growth.

- 4.7 The SAET can also be compared with the National Education Accounts (NEA) of UNESCO. The main focus of the NEA is expenditures and sources of funds for education and training services. The focus of SAET goes beyond this to include the production and use of education and training products.³¹
- 4.8 The outline of this chapter is as follows: sections 4.2 and 4.3 discuss the compilation of the SAET, section 4.4 presents the analysis and main uses of SAET and section 4.5 concludes.

4.2 Compilation of SAET main tables

- 4.9 The definitions and classifications used to construct the SAET SUTs and financing/cost tables are discussed in Chapter 3 of this guide. The SAET adheres to the main concepts and methods of 2008 SNA with four main extensions.
- 4.10 First, the SAET extends the production boundary of 2008 SNA to recognize own account production of education and training activities. This provides users with more comprehensive data on the expenditures on education and training. In-house training will be recorded for all industries providing in-house training services to its employees and is recorded as an additional purpose (EP6). It will be estimated for all industries in the SUTs.
- 4.11 In the 2008 SNA, external training that is purchased on the market by employers is already included as part of the employer's intermediate consumption and an output of the sector that provided the training.
- 4.12 In general, 2008 SNA recommends against recording the output of own-account services. The 2008 SNA does note that on exceptional occasions compilers may want to record the output of own-account services for analytical purposes in order to shed light on a specific activity. This is the case for in-house training.
- 4.13 Within the context of the SAET, own-account in-house training services will be recorded as output on the supply side of SUTs and as intermediate consumption by enterprises on the use side of SUTs for market producers.
- 4.14 For non-market producers such as non-profit institutions serving households (NPISH) and general government, own-account in-house training will be recorded as output on the supply side and as final consumption on the use side. A corresponding negative adjustment will be made to other outputs of non-market sectors such that the total output of the non-market sectors does not change.
- 4.15 The overall effect of including all expenditures incurred for in-house training of employees is an equal increase in output and intermediate consumption of market producers. For non-market producers, there is no change to output, intermediate consumption, or final

³¹ Chapter 6 presents a more detailed comparison of UNESCO NEA and SAET.

- consumption. But the composition of output and final consumption will change. There are no changes to value added.
- 4.16 The method on how own-account in-house training is recorded in SAET is different between market and non-market producers. This is because the output of non-market sector is measured by the sum of input costs in the national accounts. In SAET, the output of non-market sectors as measured by total input costs do not change. But the total costs of inputs will be reallocated between in-house training output and other non-market outputs. For market sectors, own account training is introduced as a separate product that is produced for own use in addition to the outputs that are produced for sale.
- 4.17 A second extension in the SAET is the inclusion of expenditures by households on associated goods and services directly related to the delivery of education and training services. The expenditures by producers of education and training on associated products related to the delivery of education and training products are recorded as intermediate consumption and are already reflected in the value of education products.
- 4.18 Associated goods and services directly related to the delivery of education and training are peripheral education goods/services that are purchased by households. They can be produced inside or outside education institutions. These are expenses for education supporting activities (e.g., cost for textbooks, special clothing or equipment that are required for education and training). It should be noted that the costs of transportation, meals and accommodation are not included in the associated products related to the purposes of education and training, as those expenditures are not part of the provision of education and training.
- 4.19 The expenditures on these associated products should be allocated to the respective EPs, when sufficient information is available. Otherwise, the associated goods and services that cannot be allocated to specific EPs should be included in a separate row of the SUTs.
- 4.20 In standard use tables, household consumption is classified according to the Classification of Individual Consumption According to Purpose (COICOP) that includes education services as a category. The education services according to COICOP only capture the education services produced by educational institutions. It does not include the associated value of goods and services that are purchased by households for the purpose of education. The expenditures on the associated value of goods and services related to education can be estimated using household budget surveys.
- 4.21 Third, in the SUTs, exports of education services are included as the domestic purchases of non-residents on domestic territory and the imports of education services are included in the direct purchases abroad by residents³². The column of final consumption expenditure of households in the use table includes final consumption of residents and direct purchase of non-residents on domestic territory. To estimate the exports of education products as the direct purchase of education services by non-residents, the direct purchase of non-residents on domestic territories needs to be allocated among products to arrive at the purchases of education services on the domestic territory by non-residents. The difference between

³² Cross border purchases may be made by directly households or employers as part of in-house training. Increasingly these purchases are in the form of on-line courses.

household final consumption expenditure in the use table and the purchases of education services on the domestic territory by non-residents is the purchase of education services by resident households.

- 4.22 Similarly, to estimate the imports of education services by residents from abroad, the direct purchases of residents from abroad have to be allocated among products in sufficient detail to separately identify education services.
- 4.23 The allocation of the direct purchase of residents abroad and the allocation of the domestic purchase of non-residents can be based on the survey of visitors. The exports and imports of education services can also be estimated by the number of international students (obtained from administrative records) times their expenditures on education services and associated products per pupil obtained from financial statements of schools for tuition fees and the surveys of student expenditures on associated products (such as the Tuition and Living Accommodation Costs survey in Canada). To estimate exports and imports of education and training products, tuition and associated costs for textbooks, school supplies and equipment are included. But costs of meals, transportation and accommodation should be excluded.
- 4.24 Fourth, the classification of education and training products and the classification of the production units for education and training in the standard accounts are often too broad for the purpose of SAET. To construct the SUTs of the SAET, the classification detail needs to be expanded for products and industries related to education and training using various data sources as outlined in Chapter 5 of this guide.

4.2.1 Compilation of the supply table of the SAET

- 4.25 The standard supply table contains two important matrices: the production matrix and the import matrix. The production matrix has a row structure defined by categories of products and it has a column structure based on the classification of industries. The import matrix has a row structure defined by categories of products. The horizontal aggregation of all elements in a row is the total supply of a product at basic price. That is, it is the sum of domestic production and imports. The vertical aggregation of all elements in a column of the production matrix is the total output of an industry at basic price.
- 4.26 The SAET supply table aggregates producers by sector with market producers in the education industry separately identified and all other market producers grouped together (see Table A.1 in Chapter 3). Market education producers consist of those education institutions that provide education services at market prices, including for-profit schools and universities. Non-market education service producers consist of those education institutions that provide education services free of charge or at prices that are not economically significant. They include the colleges and universities that are publicly funded and regulated by government. The market and non-market producers can be further disaggregated into those industries that are mainly engaged in delivering different education products such as primary education, secondary education and higher education.
- 4.27 The market output of education and training services is estimated from the revenues from the sale of these services. The non-market output of education and training services is estimated as the sum of production costs (intermediate consumption, compensation of employees,

- consumption of fixed capital and other taxes (less subsidies) on production) since there is no price for this production (at least a significant one). Net operating surplus is assumed to be zero for the production of non-market output of education and training services. The production costs of non-market output of education and training services include the costs of system organization that are paid for out of the school budgets.
- 4.28 In-house training for all sectors will be estimated as the sum of costs (intermediate consumption, compensation of employees, consumption of fixed capital). Net operating surplus is assumed to be zero for non-market sectors. For market sectors, a positive net operating surplus is imputed for in-house training (paragraph 3.135, 2008 SNA).
- 4.29 While the main or characteristic outputs of education sectors are education and training services, the education sectors also engage in other production activities such as investment activities, non-residential rental services, and professional services. The industries producing education and training may also have more than one education activity. For example, while the elementary and secondary schools mainly produce elementary and secondary school services as the characteristic product, they also may provide adult training and engage in other education activities.
- 4.30 When education institutions produce the non-market outputs of multiple EPs plus other secondary products, the costs of support and administration services must be allocated among the multiple products to derive the output of each EP valued as the sum of the costs of production. If there are cost accounting records showing how much of the administration and support costs is attributable to the separate EPs, they should be allocated on this basis. If the necessary information is not available, the cost of the central support and administration services should be distributed over the multiple non-market EPs in proportion to the compensation of teachers engaged in different levels of education services or the costs of production other than support and administration services. A more detailed discussion of the allocation method can be found in Chapter 5 of United Nations Statistics Division (UNSD) Handbook of Input-Output Table Compilation and Analysis (1999). Educational institutions often engage in research and development (R&D) activities and this R&D output should not be included in the output of education products. The SAET supply table provides for the recording of this R&D output as a memorandum item. While the output of R&D products is not included in the output of education, the consumption of R&D capital is included in the costs of production for education products.
- 4.31 The data sources used to compile the production matrix come from the financial statements of education institutions or enterprise surveys and production surveys of education institutions that provide data on turnover, operating costs, investments and compensation of employees.
- 4.32 The imports of education services in the import column of the supply table represent direct purchases of education services and associated products abroad by residents. These direct education and training purchases abroad by residents should cover all such purchases of goods and services made by residents from abroad. These purchases have to be allocated to EPs and to sector of use for the Use table. Sources for the data are trade in service statistics of the balance of payments and tourism satellite accounts.

- 4.33 The scope of training in SAET includes the training of employees by their employers both in-house training (produced by the enterprise itself) and external training (produced by third-party organizations). It covers training activities which have as their primary objectives the acquisition of new competencies or the development and improvement of existing ones. In-house training includes both structured job-related training such as courses, seminars and workshops and informal job-related training. It may also include job-related programmes that lead to formal educational credentials. In-house training of employees by their employers is mainly classified as EP6 (In-house) in SAET but may also include some formal education and training in EP2 for example. External training is mainly classified as EP5 (Other education and vocational training) but may include some formal training in EP3 for example.
- 4.34 The cost of training is the sum of compensation of employees on training and related direct enterprise expenses. The compensation of employees on training is the costs of employee time spent on training, which refers to the actual training time spent during paid working time. The related enterprise expenses include the labour costs of trainers, the costs for training centres, training rooms and teaching materials, and other training related expenses, consumption of fixed capital including an imputed net operating surplus for market sector producers.
- 4.35 The compensation of employees on training is estimated as the hours trained, (calculated as numbers of workers trained times average duration of training), multiplied by the average hourly cost of employees on training. Ideally, this is calculated for different types of workers cross-classified by industry, education, gender and age, as training participation differs by the characteristics of employees. The number of employees on training and the average duration of training can be obtained from household surveys such as the European Union Labour Force Survey and Adult Education and Training Survey that provide data on individual participation on training. Alternatively, they can be estimated from enterprise surveys such as continuing vocation training surveys (CVTS) that collect data on the number of participants on training, time spent on training, and the number of persons employed in an enterprise.
- 4.36 The direct enterprise costs of training can be obtained from enterprise surveys such as CVTS. For the purpose of SAET, the direct costs of training must be divided between the costs of internal training which is generally recorded in EP6 and external training which is recorded by provider in the appropriate EP.
- 4.37 E-learning is included in SAET but there are many practical difficulties related to its measurement. Paid on-line courses offered both by educational institutions and other providers will be captured in the estimates using data from household surveys or company accounts. Free on-line courses provided by resident non-market education institutions will also be implicitly included in the total costs. The most problematic part are free courses provided by units outside of the education sector, which will likely remain un-observed.
- 4.38 If internships are paid and have characteristics of regular work the wages paid to the intern should not be included in SAET. Examples are doctors who, after graduation, need to work for several years before getting licenced for individual practice. However, the supervision of interns, which is part of the general training process should be included as part of in-house training provided by private or public entities. Apprenticeships that are part of a formal education programme should be included e.g. cases where the students have not yet finished their education, and they are normally not paid (or have low pay) and are not allowed to work

on their own. Any wages paid to the apprentice are not included in education costs but the firms training costs are included. It should be noted that the situations covered by the terms internship and apprenticeship may differ from country to country, which means that compilers need to review the domestic situation carefully.

4.2.2 Compilation of use table of SAET

- 4.39 The use table (see Table A.2 in Chapter 3) has two main objectives. It shows in rows the use of education and training purposes as intermediate consumption by corporations, or as final consumption by households, NPISH, general government and rest of the world.
- 4.40 The use table contains two important parts:
- matrix of final consumption at purchasers' prices;
 - intermediate consumption at purchasers' prices.
- 4.41 The matrix of intermediate uses in the standard SUTs shows the intermediate consumption of products by industries which are used to produce education and training outputs. These purchases constitute the intermediate consumption of industries, which include the purchase of associated products such as text books, school suppliers as intermediate consumption. Since the SAET use table only shows the intermediate consumption used for employee education and training (purchased and own account), these must be identified within the full intermediate use matrix.
- 4.42 The matrix of final demand includes the values of the products absorbed by the various categories of final demand. All uses of goods and services – intermediate consumption and final uses – are valued at purchaser prices.
- 4.43 The matrix of value added that is in the standard SUTs is not included in the use table of SAET. Rather this value added matrix is presented in the financing/cost tables. It shows the costs of each industry in terms of factor costs for primary inputs, for example compensation of employees, other net taxes on production, consumption of fixed capital and net operating surplus. Other taxes less subsidies on production include production taxes paid by the industry or subsidies received by the industry (i.e. taxes payable on land, assets, labour, etc., employed in production that cannot be deducted from the producer price) excluding specific taxes on products payable per unit of output such as value added tax (VAT), etc.
- 4.44 R&D expenditures are classified as investment in the 2008 SNA and are recorded as gross fixed capital formation (GFCF) by industries. The GFCF shown in the use matrix is limited to that employed by the education industry units in each sector.
- 4.45 For compiling the use table, two general options are available: the input approach and the output approach. In the input approach the cost structures of industries and input structures of final demand categories are compiled on the basis of specific survey results, while in the output approach the allocation of goods and services is determined with the commodity-flow methodology. As the input approach is based on collected data it is the recommended approach for populating the tables. The data related to education and training includes accounts of education institutions, governments, household budget surveys and trade-in-services statistics.

4.2.3 Compilation of the financing and cost structure tables

- 4.46 The financing/cost tables are the combined current and capital accounts and provide information on the income and expenditures for the institutions producing education and training. The financing/cost tables of the SAET are fully consistent with the SUTs of SAET.
- 4.47 While the financing/cost tables can be produced for both education institutions and for education and training products (Human Capital Guide), the focus of SAET is on the financing/costs tables for education and training purposes.
- 4.48 Tables B.1 and B.2 of Chapter 3 show the financing (resources) and costs (uses) by EPs. They present information on how the resources of the financing agents are allocated among EPs and show the use of resources such as compensation of teachers and other staff, intermediate consumption and the consumption of fixed capital for the production of education and training purposes.
- 4.49 In the resource section of Table B.1 by education purpose, current transfers usually constitute a significant part of income/financing. The estimation of “current transfers” can be obtained from the financial information of the financing agents. The income from sales of education services can be directly obtained from the production matrix of the supply table.
- 4.50 The consumption of fixed capital also has to be estimated for each EP to compile the financing/cost tables. The data used to estimate consumption of fixed capital are available from the surveys of gross fixed capital formation.
- 4.51 The compilation of the financing/cost table by EP is a complex task, because of both the difficulty in estimating costs incurred by the producers for each education product and the exact allocation of the transfers/payments made by the financing agents between various EPs (primary, secondary, high education).
- 4.52 It should be noted that the cost table presents capital, labour and intermediate inputs used to produce the outputs of the education and training sector including both education and training as characteristic products. To characterize the process of production of EPs and compile the financing/cost table by EP, the inputs used for the production of education and training outputs need to be estimated from the SUTs. For that purpose, the SUTs are to be transformed into product/product input-output tables that characterize the process of production of education and training output.
- 4.53 While it is preferred to compile the financing and cost tables by EP using direct estimation and various surveys and administrative files, they can also be imputed using counter party information from the supply and use table of the SAET. In the SUTs, the use of intermediate inputs, labour and capital inputs represents the inputs that are used to produce the outputs of the industries that include both characteristic products (education products) and secondary products. To estimate the inputs used for the production of education outputs, the rectangular SUTs are to be transformed to products/product input-output tables that characterize the production process for the production of an education output (Eurostat, 2008, UNSD 1999 and 2018).

- 4.54 For that purpose, either industry technology model or product technology model can be used. The industry technology model assumes that all products produced by an industry are produced in the same production process. To estimate intermediate input costs, compensation of employees and gross operating surplus by education purpose, the input cost structures for the institutions that produce education purpose EP0-EP6 as their main (characteristic) products will be used.
- 4.55 Alternatively, the product technology model can be used. The product technology model assumes that there is only one way to produce each product. In other words, each product has its own typical input structure. The same proportions of products and factor inputs are used to produce one unit of the product. This alternative model is more complex and may produce input cost estimates that are negative.

4.3 Compilation of the SAET supplementary tables

- 4.56 A wide variety of supplementary tables may be provided in a SAET. Examples of such tables include: (1) resident population by sex, age and educational attainment; (2) student enrolment by sex, age, education level; (3) number of adults in continuing vocational training and in lifelong learning (4) the number of graduates by sex, age and education level; and (5) employment, hours worked and labour compensation by sex, age, educational attainment and industry. Countries may adjust the dimensions and level of detail in these supplementary tables to their own requirements.
- 4.57 Data on student enrolments and graduates (Tables S.2 and S.4 in Chapter 3) are available from education statistics programs of most statistical agencies. The data are often collected from administrative data for schools, universities and colleges on individual student characteristics including gender, age, citizenship, field of study, level, type of attendance (full-time vs part-time), and year of graduation.
- 4.58 The supplementary tables on educational attainment of the resident population (see Table S.1 of Chapter 3) can be estimated using household surveys: population censuses and labour force surveys (LFSs). The tables consist of annual estimates of employment, hours worked and labour compensation for employees cross-classified by age, gender, education and industry.
- 4.59 The main features of the compilation methods are as follows. The compilation begins with the Census of Population. The Census micro-data files can be used to construct the benchmark matrices of population, employment, hours worked and earnings for the Census reference years. The data from the LFS are used to estimate population, employment, hours and earnings matrices for years between the Census benchmarks. For this purpose, the method of iterative proportional fitting is used (for details, see Jorgenson, Gollop and Fraumeni, 1987). A weighted average of the two neighbouring benchmark matrices is used to initialize the method of proportional fitting. The data on population, employment, hours worked and earnings from the labour force are used to control the marginal distribution of population, employment, hours worked and worker earnings by age, gender, education, and industry. All matrices of population, employment, hours worked and worker earnings are then adjusted to annual employment, hours worked and labour compensation by industry in the national accounts. For an application of that method, see Gu et al. (2002) for Canada, Jorgenson, Ho and Stiroh (2005) for the United States.

4.4 Main uses and applications of the SAET

- 4.60 The SAET are used to derive statistics related to education and training, the most important of which is the total cost of education and training by EP. The total cost of education and training can be used to derive a measure of human capital investment using the cost-based approach (UNECE, 2016). More specifically, the SAET can be used to derive the following statistics on education and training:
- 1) total expenditure on education and training by corporations, NPISH, households and general government;
 - 2) the output of various EPs produced by corporations, households, NPISH and general government;
 - 3) exports and imports of various EPs;
 - 4) expenditures on teachers, intermediate consumption and consumption of fixed capital by EP, and
 - 5) a measure of labour input that accounts for the compositional shifts of labour towards more educated and more experienced workers made possible by expenditures on education and training.
- 4.61 The first three statistics can be derived from the SUTs which present a complete picture of the production and purchase of EPs by institutional sector. Total expenditures on various levels of education and training by corporations, NPISH, households, general government and exports to the rest of the world are shown in the rows for education products in the intermediate input and final demand columns of the use table. The output of various EPs produced by corporations, NPISH, general government and imports from the rest of the world are shown in the rows of the supply table.
- 4.62 The spending on teachers, intermediate consumption and consumption of fixed capital can be derived from the financing/costs tables.
- 4.63 The measure of labour input that accounts for the compositional shifts of workers can be estimated using the supplementary tables on employment, hours worked and labour compensation.

4.4.1 Analysis and use of the supply and use tables

- 4.64 The SUTs of SAET extend the SUTs of the 2008 SNA with a focus on the production and use of education and training and related products. The supply tables present the production of education and training purposes by sector. The use table provides information on the use of education and training as a component of intermediate consumption by the market sectors of the economy and the final consumption of education and training by households, NPISHs, governments and the rest of the world.
- 4.65 The SUTs provides internally consistent data on the production and use of education and training services. In the SUTs, the production of education and training services is equal to the use of education and training services.
- 4.66 Those statistics derived from the SUTs of SAET are used to address questions about the cost of education and training, the providers of education and training services, and the sources of

funding for education and training. For example, some typical questions that can be addressed include:

- what are the total expenditures on education and training by corporations, NPISH, households, general government and the rest of the world (rows of use tables)?
- what are the relative roles of NPISH, corporations and general government in the production of education and training products (rows of supply tables)?
- what is the relative importance of corporations, NPISH, households, general government, and the rest of world in the funding of education and training purposes (the resource section of the financing/cost tables)?
- what are the total exports and imports of education and training services by level (the final use matrix of the use tables)?

4.67 In addition, the cost of education and training derived from the SAET provides a measure of investment in human capital for the human capital satellite account (Chapter 6 of the Human Capital Guide) that can be compared with investment in fixed capital to assess the relative importance of those investments.

4.4.2 Analysis and use of the financing and cost structure tables

4.68 The financing and cost tables are presented for each EP.

4.69 The cost table shows how the resources are used and the allocation of the funds between teacher compensation, salaries of administrative staff, intermediate inputs and the consumption of capital.

4.70 The financing table shows information on how the resources of the financing agents are allocated among EPs.

4.4.3 Analysis and use of the supplementary tables

4.71 The supplementary tables on student enrolments by education level combined with costs of various education levels are used to examine the performance of the education sectors in their production of education and training products (Schreyer 2007).

4.72 The supplementary tables on employment, hours worked and labour compensation by education are used to construct a measure of labour input. Unlike the simple measure of hours worked, the labour input measure takes into account the compositional or quality change of the workforce (relatively more educated and older workers). Hours of work (or employment) would be a valid measure of labour inputs for productivity analysis if workers were homogeneous. However, they differ by age, gender, education, and industry and their composition changes over time.

4.73 Labour input measure is constructed as a weighted sum of hours worked of different types of workers using weights based on labour compensation for each type of workers. The change in labour input can be decomposed into changes in hours worked and changes in labour composition. The changes in labour composition made possible through education and training is found to be a significant contributor to economic growth (Jorgenson, Gollop and Fraumeni, 1987).

4.5 Conclusion

- 4.74 The chapter explains the compilation of the SAET and shows how the SAET is used to derive statistics and indicators on total costs of education and training, the production of education and training, the expenditure and financing of the education and training sectors, and the production and use of education and training by purpose.
- 4.75 While the methodologies for the compilation of SAET follow those for the compilation of supply and use tables and financing/cost table of the national accounts, the SAET involves several extensions.
- 4.76 First, The SAET extends the production boundary of the SNA slightly to recognize in-house training activities as own account production of training. The in-housing training is recorded as an additional EP in the SUTs. That requires the estimation of in-house training for all industries.
- 4.77 Second, associated products directly related to the delivery of education and training services that are produced outside of education sectors and purchased by the household sector are included in the total costs of education. The associated products include textbooks and other supplies such as safety clothing or equipment.
- 4.78 Third, in the standard SUTs, the exports of education services are included in the direct purchases of non-residents on domestic territory, and the imports of education services are included in the direct purchases abroad by residents. The purchase of residents abroad and the domestic purchase of non-residents are to be allocated by products to arrive at the imports and exports of education and training services for the compilation of SAET.
- 4.79 Fourth, the classification of education and training purposes and the classification of the production units for education and training are often too broad for the purpose of SAET. To construct the SAET, the classifications need to be expanded to include more detail on products and industries related to education and training using various data sources.
- 4.80 The SAET also includes supplementary tables on student enrolment and education attainment of employed workers and working age population, which are used to assess the contribution of education and training to economic and productivity growth and to assess the outcome and productivity performance of education sectors.

Chapter 5

Data Sources

5.1 Introduction

- 5.1 Producing a Satellite Account for Education and Training (SAET) requires the collection and processing of data from a variety of sources. This is a challenging exercise and requires collaboration with other government departments or teams responsible for reporting international data on education, such as the UNESCO-OECD-Eurostat (UOE) data collection on formal education. This chapter discusses some general guidelines related to data fundamentals, sources, and how they can be processed and incorporated into an education and training satellite account as described by the earlier chapters.
- 5.2 The starting point of an SAET should be data sources used in national accounts. National accounts are based on comprehensive data from a variety of sources, many of which will provide additional detail not necessarily reflected in the national accounts outputs. In the case of formal education, it is likely that the national account sources have most of the data needed for the SAET.
- 5.3 In some cases, national accounts outputs may be readily used in the population of the SAET itself. For example, supply and use tables (SUTs) could provide details about the monetary flows in the education sector by type of education such as in the case of Norway and Canada. However, there are cases where the National Accounts do not provide the required level of detailed monetary flows for education. For example, in the case of the United Kingdom (UK), SUTs provide only aggregate data on the education products and industry, and not detailed data by level of International Standard Classification of Education (ISCED). However, there are supplementary publications such as Government Final Consumption Expenditure, which provide more detailed data. In addition, the sequence of Institutional Sector Accounts can provide data on different types of transactions, some of which may relate to education statistics (for example student loans and student grants), which would be useful for resource/use tables.
- 5.4 Given the diversity of financing agents (such as central government, local government, financial and non-financial corporations, non-profit institutions serving households (NPISH), households and the rest of the world) and producing units (general government, corporations, households, the rest of the world and NPISH) and a context in which financial reporting may not be centralized or harmonized, data will likely be gathered from a variety of diverse sources.
- 5.5 In addition, the quest for comprehensiveness in a SAET exercise requires covering all financial flows related to education and training. Furthermore, some data sources on funding or from specific producers may be challenging to interpret and may require additional surveys or more detailed information for use within a SAET context. For example, different types of legal entities may not keep track or report on their income and expenditure in a consistent, comparable and timely way, due to differing legal regulations for revenue reporting.

- 5.6 Supplementary data on educational and labour market attainment rates, outcomes and levels of education are generally published by national statistical institutes (NSIs), or can be found as aggregated data through international organizations such as UNESCO, World Bank, Eurostat or OECD. Further information applicable to a national scenario may include shares of the population by highest qualifications obtained, average years spent in school, level of non-formal training by age group, or other data as applicable, but the data sources for these are not discussed in this chapter, which focuses on core table compilation.
- 5.7 Finally, the expansion of the national accounts production boundary to account for additional elements of training and human capital formation creates additional measurement challenges. These may require consideration of additional surveys, use of administrative or open-source data, or model-based estimates where no other direct sources exist. All data sources should be clearly described with the release of the estimates.

5.2 Identifying sources of information

- 5.8 A review of existing data sources could help in understanding and mapping out all financing and expenditure mechanisms of education funding, along with related financial flows. This will not only help map all financing agents and education producers and channels through which funding is provided to service providers, but also identify all potential sources of data.
- 5.9 A typical situation may occur in the funding of primary schools, with Central, State/Regional and/ or Local Government providing core funding for teaching and administrative staff in the case of publicly produced education. However, households and NPISH, and to a certain degree the rest of the world, may be the main funders of private primary education. Households usually contribute to private schools via fees.
- 5.10 The surveys and other data sources used for the SAET should follow statistical principles for the quality of data based on Data Quality Assessment tools, such as the Data Quality Assessment Framework of the International Monetary Fund (IMF). Table 5.1 presents a list of principles used in identifying good quality sources.

Table 5.1
Principles for identifying good quality sources.

Concept	Description
Relevance	The education statistics need to meet the needs of SAET. The data should be relevant to education needs. Also, there should be appropriate contact with users on data needs, for example in the case of SAET there is a need for disaggregated data by education level
Sound methodology	The methodological basis for education statistics should follow internationally accepted standards, guidelines, and good practices. Specific manuals can refer to different collection methodologies, such as the European Commission's Methodologies for an integrated Use of Administrative Data in the Statistical Process (MIAD) for assessing the use of administrative data, or UN's Designing Household survey samples: practical guidelines
Accuracy and Reliability	Data sources and statistical techniques shall be sound, and education statistical outputs sufficiently portray reality. For example, the data should be assessed and validated; statistical techniques should follow statistical procedures and be documented
Timeliness	Education statistics are collected on schedule and release of data follows the intended timeline, and is pre-announced
Consistency	Released education statistics are consistent within a dataset and over time, and with other major datasets, and
Accessibility and clarity	Education statistics and metadata are easily available in a clear and understandable manner, and there is adequate user support

5.3 Categories of sources

- 5.11 Processing of data on financing agent expenditures entails classifying all financial flows according to the dimensions of the SAET. Reference may need to be made to international manuals in classifying transactions based on principles of economic ownership, residency and the production boundary (e.g. System of National Accounts, 2008 (2008 SNA), the European System of National and Regional Accounts, 2010 (ESA 2010) and the Manual on Government Deficit and Debt. As the source should generally relate to a specific financing agent, processing consists of codifying expenditures according to education level and education producer. Because of this, using national accounts outputs is preferable as these considerations should have already been reflected in their compilation processes. In cases when national accounts data are not at a detailed enough level, compilers of SAET should consider benchmarking to agreed national accounts levels with standard methodologies.
- 5.12 Alternatively, for countries which do not compile the full range of national accounts data, particularly annual SUTs and COFOG³³ tables, a range of survey and administrative sources will be needed to capture the categories of transactions outlined in earlier chapters. As much as

³³ Classification of the Functions of Government (COFOG)

possible, other education statistics compilation sources should be used for formal education categories, such as UOE data collection.

- 5.13 Finally, it is worth bearing in mind that statistical and modelling techniques may need to be applied after the data sources are obtained, to make them fit for purpose within the SAET framework. For example, interpolation between survey years may be required, or benchmarking between different periodicities of sources. Similarly, balancing across independent measures within the core tables, particularly the SUTs, may be needed, and this is expanded upon in the methodology chapter.

5.4 General government

- 5.14 To derive the most accurate indicators on education financing, it is important to determine as precisely as possible what has effectively been spent. Data on general government expenditure should therefore be for actual expenditure on education, which accounts for what was spent on an accrual basis and incorporates expenditure adjustments associated with budget revisions.
- 5.15 Actual expenditure is recorded by the public accountants according to the classification of budget lines within the government budget. This information is available from the ministry of finance or the administrative and financial departments of each of the ministries in charge of education services. This is particularly useful if the country does not produce the full range of national accounts statistics. As noted earlier, the measurement basis for the SAET is on an accruals basis, and hence information may also need to be found on early and late payments, finance lease payments and other accrual adjustments to cash-based expenditure and income data for general government.
- 5.16 If the central government system of education and training provision is de-centralized, such as where different ministries or levels of government are responsible for the education of different age groups, then multiple reports may need to be combined. For example, in Germany the Federal Statistical Office uses i.a. administrative data from the Finance Ministries of the Länder, data collected by the statistical offices and supplementary data on education by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany. The latter is a consortium of ministers responsible for education and schooling, institutes of higher education and research and cultural affairs of all 16 federal states. These complex arrangements may be combined into coherent central government reports by the finance ministry, as is the case in the UK system with the Online System for Central Accounting and Reporting dataset, or by the federal/regional as well as by NSIs when multiple levels of government are involved.
- 5.17 If the country produces national accounts statistics consistent with international manuals such as 2008 SNA, actual government expenditure by education level can be identified using the COFOG statistics that are available from NSIs. At the national level, the data may be provided from the ministry of finance and the NSIs, such as the case for Israel and UK. The data are

reported in COFOG categories and can be transformed to the ISCED classification³⁴. Also, they can be transformed into SAET education and training by purpose (EP).

- 5.18 Apprenticeships will largely be employed in the corporate sector, though the source of data will generally come from the government accounts. The Norway pilot provides a useful reference here, where local government gives subsidies to corporations that offer apprenticeship schemes/programmes. In Germany, the Federal Institute for Vocational Education and Training collects data on company-based training expenses for dual system apprenticeship programmes. This information is incorporated in the UOE data collection.
- 5.19 When more than one level of general government is involved in education funding and production, there are generally transfers between levels that must be identified to insure no double counting of expenditures. Transfers/subsidies may also be provided to other sectors of the economy and need to be clearly identified and captured in the core tables.

5.4.1 Central government

- 5.20 Data sources on COFOG statistics are generally derived from individual ministry budgetary accounts. For example, the central education ministry would submit a report of its accounts. These should include detailed expenditure items, such as on current and capital expenditure, as well as spending on interest payments and grants, which are needed for identification of specific transactions in the financing/cost tables. Additionally, income items should include ancillary income from taxation and current transfers received, as well as income not associated with education and training provision which are outside the scope of the SAET, such as property income received.

5.4.2 Local and state government

- 5.21 In decentralized contexts, lower levels of government may bear an important share of public funding of education. Expenditure by lower levels of government may come from two major sources: transfers from higher levels of government and locally generated funds. External funding or other private entities may also channel their funding via lower levels of government. Sources that can be used to obtain data on education funding by lower levels of government include:
- COFOG data for State and/or Local Governments, which are generally derived from the sources listed in the section on general government sources, such as ministry of finance or local government reports and/or government institution surveys;
 - A centralized body in charge of the supervision of lower levels of government, such as for local governments, mayoral offices and municipalities;
 - Executed/committed expenditure for lower levels of government from the budget division within the ministry of finance that consolidates the executed/committed expenditure of all ministries with responsibility for education;
 - Statistical surveys about the financial annual accounts of lower levels of government can be used to calculate education funding by lower levels of government. Such

³⁴ Note that currently COFOG does not use the latest version of ISCED.

surveys may be designed for specific activities of local authorities, perhaps with a different population to the one of interest for the SAET, so it is crucial to be aware of the extent of education and training activities undertaken by local authorities.

5.5 Households

- 5.22 Household spending on education includes tuition fees paid directly to educational providers as well as other school related payments made both inside and outside of schools, such as textbooks, specific materials needed for learning etc. The latter have been added as ancillary expenditures into the different education products to which they refer.
- 5.23 The main sources of data on household spending on tuition fees are the finance accounts from private school surveys and higher education surveys. The above surveys include the income that the private institutions receive as tuition fees from households.
- 5.24 In addition, data on the household spending on education and training is usually available from household budget surveys (HBS). These can either be captured using the standard detailed diary-entry, or through associated questionnaires, with the latter potentially having an advantage for education expenditures, as it is a less-frequent expenditure item. Additionally, different surveys may ask for individual or household consumption, and the normal payment methods for education of different cultures may create an advantage for one collection mode over another. See "Household budget surveys in the European Union (EU) - Methodology and recommendations for harmonization 2003" for more information on existing practices.
- 5.25 Generally, HBS ask for very detailed information which is mapped to the Classification of Individual Consumption According to Purpose (COICOP). Households often record categories of educational institutions or items of expenditures in a different way to the requirements of SAET. However, assumptions about the shares of EP spending on specific COICOP items should allow mapping to the relevant education products, such as on textbooks as a share of book category spending. Further sources breaking down this categorization may be used if available, otherwise explicit and transparent choice of assumptions would be encouraged.
- 5.26 This will also be important for capturing cultural and private training activities that households undertake. These will not always be within the COICOP 1999 category 10, and hence individual returns may have to be analysed to understand the country scenario and how specific classes are captured and categorized. For example, evening classes in formal education and training facilities may be captured within COICOP 10 spending, while driving lessons are part of 07.2.4, and a range of cultural lessons are captured as 09.4.1 recreational and sporting services.
- 5.27 Furthermore, NPISH surveys can be used for the household purchases from NPISH, such as religious schools. This is also a useful source for capturing other transactions relevant to the resources and uses, such as current transfers to NPISH like donations to universities, as well as grants given out to individuals from charitable organizations in order to attend education and training activities.
- 5.28 Households as producers of education and training may also be relevant in some countries. These would include unincorporated self-employed businesses, such as those who provide tutoring, home schooling or provision of certain school supplies. Business surveys in some

countries may capture this population (if the sampling frame of business surveys covers unincorporated businesses). In others, activities of private tutors could be covered as part of the adjustments for the informal sector – labour force survey, household budget survey or targeted survey of students could provide the base for the estimates³⁵. Alternatively, detailed tax records on self-employed are generally held by tax revenue ministries, for which if the main classifying activity is education, there would be information on their production and associated costs.

- 5.29 For countries who produce SUTs as part of the national accounts, the SUTs are key for populating data for this sector. In particular, the household final consumption expenditure column in the use table contains the top-level aggregates relating to spending on education. Depending on the level of product classification used for the compilation of national accounts, the data may already be at the right level to map to the relevant education and training purposes (see Chapter 3), or the data may only capture aggregate-level education spending, which will need to be apportioned out, using standard methodologies. This also applies to non-formal education and training purposes, following the COICOP classification as referred to above where possible for further breakdowns.
- 5.30 Within the supply-use tables, there may also be information on households as producers, particularly within the mixed income transactions within the factors of income breakdown of the table. Similar to the spending classifications above, depending on the level of standard industry classification detail in the accounts, the level of education provided by the units may be separately identified within the table, or there may be a need to apportion it out as above.

5.6 Non-profit institutions serving households

- 5.31 NPISH make up an institutional sector in the context of the System of National Accounts consisting of non-profit institutions which are not mainly financed and controlled by government and which generally provide goods or services to households for free or at prices that are not economically significant. Examples include churches and religious societies, sports and other clubs, trade unions and political parties. These institutions may also setup separate educational institutions that are themselves part of the NPISH sector. The coverage of the NPISH sector varies significantly between countries, and hence its measurement is difficult to generalize.
- 5.32 NPISH education and training providers are private, non-market producers which are separate legal entities. Their main resources, apart from those derived from non-market sales, come from voluntary contributions in cash or in kind, from transfers from general government, and from property income.
- 5.33 Data sources may include:
- NPISH internal reports on revenues and expenditures, which would relate to both data required for SUTs and types of income relevant to resources/uses tables;

³⁵ For further information see: UNECE (2008): Non-observed Economy in National Accounts - Survey of Country Practices, Geneva. Available from: <http://www.unece.org/stats/publications/NOE2008.pdf>.

- A NPISH coordination body in cases where there is one that collects member' annual financial reports, such as a trade federation body, a commissioning body for membership, responsible for giving legal status to NPISH units such as charitable organizations, or an ombudsman regulating the specific NPISH industry;
- National Statistical offices may conduct specific surveys on NPISH activities. Also, there may be satellite accounts on NPISH for which they derive data in the field of education. The satellite accounts may provide comprehensive data on expenditure and income by ISCED level and type of expenditure or source of income;
- Finally, as with the compilation of the government sector, for those countries who compile national accounts, the SUTs would be very useful, particularly the NPISH final consumption expenditure column capturing the sum of costs in providing educational and training by purpose. This may be at a total education-level or more disaggregated depending on country compilation practices. In addition, in some countries historically NPISH data have been merged with that of the household sector and therefore needs to be separately identified. Information in the sequence of accounts tables can also provide useful transactional data on current transfers paid and received, as well as subsidies received, which can then be apportioned out to those which have provided and financed educational and training activities.

5.34 The NPISH sector can take on a variety of roles which depends on the specific country context. It is suggested to consult those responsible for sector classification of institutional units to identify which institutions are included in NPISH. A further related note is that sector classifications change over time as the business structures of economic units may change their classification between general government, NPISH and corporate sectors. A specific case is that universities in UK and Israel are currently included in the NPISH sector and are important actors in each countries' educational system, but are undergoing a classification review following changes in the funding structure of degrees. Another example may be faith-based organizations that in some countries play an important role in education.

5.7 Financial and non-financial corporations

5.35 Providers of for-profit formal education, as well as incorporated vocational and professional training suppliers, would be included in these sectors. Data on the income and expenditure of such providers would be captured within the Supply Use framework if detailed enough and published regularly by the country, or generally through business surveys. Private corporations providing formal education are within the coverage of the UOE data collection on formal education, so sources therein should be used where possible. It would be important to capture such companies classified to the education industry, but there may be companies in other industries providing secondary education products, which business surveys may not capture in enough detail. In that case, looking at financial reports as well as tax revenue forms could provide the extra detail. Additionally, for those private sector formal education and professional training providers, there may well be an interest by the national education ministry in this activity and hence an associated survey or set of findings is published for those units.

5.36 SAET includes the monetary flows that companies invest into the education and training of their staff. This is mostly considered as part of education purposes 5 and 6. In addition,

corporations fund learning opportunities for their staff such as Higher education degrees or opportunities for post-secondary education which will be allocated in education purpose 3. Available data can be found in employer skills surveys. These surveys give insight into the skills issues employers face and the action they are taking to address them, providing a unique skills perspective alongside other labour market information. For example, the UK Employer Skills Survey, asks employers to value their investment into human capital formation for its workforce by measuring training undertaken through the organization.

- 5.37 Public corporations are also included in this category. Due to the differing nature of the running of such organizations, with substantial government control on their activities government finance reports may be a good source for any corporations which produce education products, as well as for any training that is provided by them. Alternatively, individual financial accounts of such corporations may be provided to shareholders, to identify production costs, subsidies received, as well as taxes paid in the provision of education and training and any revenue accruing from such provision.
- 5.38 In the case that a country does not produce business skill surveys, information can be found in the financial accounts of the education institutions such as Universities. The financial accounts of education producers should mention what type of institutions provide their income. Otherwise, a residual approach may need to be applied between total expenditure from the different financing agents, and all other sources of spending excluding this sector.

5.8 Rest of the world

- 5.39 There exist several mechanisms through which external funding may be channelled to recipient countries. Sources of data for imports, exports and funding from the rest of the world include:
- Imports and exports of market-based education services can be obtained from balance of payments statistics, which are consistent with the Balance of Payments Manual, Sixth Edition (BPM6). Generally, these are derived from a mixture of administrative data sources on services liable for tax at customs, as well as through surveys on household cross-border flows as well as other business surveys conducted on businesses which undertake international business activities;
 - Input-Output tables may also be useful in getting aggregate-level education spending from abroad from foreign individuals, which are classified to the rest of the world sector;
 - Government ministries that monitor and compile external funding data, such as a Ministry of International Development and foreign ministries;
 - Budget units within the ministry of finance;
 - COFOG statistics, where applicable;
 - The OECD Development Assistance Committee (DAC) database which can be used when national sources are non-existent or cannot be easily accessed;
 - The finance accounts of education producers should mention if the source of finance is coming from rest of the world or if the institutions receive fees or grants from the rest of the world;

- Other analytical efforts such as a Tourism Satellite Account may also provide an additional source of data.

5.9 Non-sector-specific and supplementary tables data sources

5.9.1 Vocational and in-house training

5.40 The SAET extends the production boundary to designate on-the-job training costs as part of the intermediate consumption to produce education outputs. Hence data sources on formal and particularly non-formal training need to be considered. A wide-ranging data source such as the Continuing Vocational Training Survey (CVTS) can provide information for European Union member countries. There, providers of associated training courses can be captured, which is useful for considering the financing agent – producer relationships, both in the supply/use and resources/uses tables. In addition, costs are measured and broken down by:

- labour costs;
- payments for external providers;
- other current expenditure, such as teaching materials.

5.41 Further breakdowns of costs will be needed, based on business expenditure data.

5.42 If the CVTS data is unavailable, there may be other national sources on training and skills. Alternatively, business accounts may provide information on training budgets, or if these are also unavailable, model-based estimates of assigning intermediate costs, such as the labour and capital costs associated with on-the-job training may be conducted, as long as clear explanations are made for the models applied.

5.9.2 Digital courses and informal learning

5.43 Freely provided digital courses may be partially captured if provided by non-market units such as general government and NPISH, as their output is measured as the sum of costs. However, consistent with the SNA, currently all non-market final consumption expenditure is assumed to be actually consumed by resident households i.e. there are no imports or exports of non-market-provided courses. Other freely provided digital content, though included in principle, are likely to remain out of scope of the SAET.

5.44 Additionally, paid-for digital courses, such as certificates for massive open online courses (MOOCs) should be captured either in the household or rest of the world sectors, depending on the residency of the recipient. This information may alternatively be captured from the providing institutions – either through their income associated with providing digital content, such as MOOCs for universities, digital training platforms for private corporations, or online video platforms for self-employed training professions or through inferring costs to provide such services. Adult education surveys (AES), such as the international Eurostat-led AES, may provide useful information on other informal training adults undertake.

5.45 More general informal learning may also be captured, either given as useful supplementary information or included within the core tables if part of the education and training purposes covered above. These may be volume measures through time-use surveys, for example

estimating hours spent on such courses, and working out market-equivalent rates for such free digital goods, such as wage rates or apportioning out the costs of provision. Additionally, innovative methods, for example, website analytics for learning and training platforms from internet service providers may provide useful measures of volume of such activity. Inflating volume measures to get to current price estimates may be done using information on privately-provided professional training prices, identifying the relative value added from professional training as compared to freely-provided courses.

5.9.3 Taxes on production and subsidies

- 5.46 Taxes on production and subsidies can generally be paid out and received respectively, by multiple sectors involved in education. This ranges from private tutors within the households sector, to charitable organizations receiving subsidies classified to the NPISH sector. Generally, the best source of both of these types of transactions will come from government tax revenue authorities, in charge of collection of taxes as well as distribution of subsidies. These should be at a fairly detailed industry-level, for which Chapter 3 on classifications can help inform on mapping to EPs. However, the information may not be known by institutional sector as well. Hence further supplementary information from individual sources may also be needed, such as from financial reports or business surveys.
- 5.47 Alternatively, if this more detailed data for institutional sectors cannot be identified, methodologies for apportioning out total taxes on production and subsidies *per* EP to institutional sectors may include apportioning out according to the relative sizes of sector market output values, or the relative sizes of their compensation of employees, as this would account for non-market education activities also.

5.9.4 Supplementary tables

- 5.48 Supplementary data will be a mixture of labour market and education statistics, as well as country-specific information, which will not be covered here. Internationally comparable labour market statistics, such as the shares of the workforce in certain-skilled posts and the number of teachers and other education-related occupations may be found from international organizations such as the International Labour Organization. In addition, information on mean years of formal schooling and attainment rates by age are available from the UNESCO website, as well several academic education datasets such as Barro & Lee, and the World Bank research papers.
- 5.49 Education statistics such as enrolment rates by education level, gender gaps in education, and teacher to pupil ratios are also generally available from UNESCO and the World Bank, if not already produced by national education and statistical ministries. If regional or local administrations are an important factor of education, there may be regional statistical institutes carrying out such compilation.
- 5.50 Alongside this information, general demographic information would also be useful. For example, population shares by disaggregated age (provided through administrative sources where countries have population registers or through population census/surveys where administrative data are not applicable) can provide useful information on formal education needs. Please note, if these data are compared to the core tables by EP, consideration needs

to be made as to drop-out, grade retention and exclusion rates, and so additional statistics on current enrolment rates would also be useful, which may be provided by national education ministries or NSIs. The UOE data collection includes much of the relevant non-monetary data and may also be a source for these tables. If otherwise unavailable, population surveys may be used to infer the size of individuals at different educational institutions.

5.10 Conclusion

5.51 This chapter recommends to countries a range of sources that can be used for the SAET. As a first step, countries should research the detail of the data in the national accounts if available, as a satellite account should be based on the framework of the national accounts, and this would allow the rest of the analysis to be assessed at the sectoral level. In addition, a wide range of surveys can be used to complete the SAET. COFOG statistics are a vital source to identify general government flows to education, as well as the flows for the lower government sectors. Financial accounts of education institutions can provide useful information on expenditure for education from households, corporations, NPISH and the rest of world sectors. Business skills surveys can give an insight on corporation expenditure for the training of their staff. To sum up, SAET may need a wide variety of data sources to be completed. Therefore, it is important to collaborate closely with a wide range of teams within the national statistical institutions, but also across other government ministries and internationally.

Chapter 6

Comparison of International Guidelines on Education Data Collection

6.1 Introduction

6.1 Besides the approach proposed by the UNECE Human Capital Guide, 2016 and further developed in this Guide, other examples of international guidelines on education accounts exist, namely, the UNESCO Methodology of National Education Accounts (NEA), 2016, which followed the lines of the French Education account (one of the earliest experiences in a national account on education) and the UNESCO-OECD-Eurostat (UOE) data collection on formal education. In section 6.2, these alternative approaches to the collection and organization of monetary³⁶ data on the educational system are briefly described, while section 6.3 underlines similarities and differences between them and the Satellite Account for Education and Training (SAET) through the comparison of their main dimensions.

6.2 Alternative approaches

6.2.1 National Education Accounts

6.2 Three institutions, UNESCO Institute for Statistics (UIS), UNESCO International Institute for Education Planning (IIEP) and IIEP Pôle de Dakar, have recently developed and piloted a National Education Accounts system. This project is mainly based on the principles of existing international standards, such as the System of National Accounts 2008 (2008 SNA), the International Standard Classification of Education (ISCED, 2011) and the 2014 version of the Government Finance Statistics (GFS) Manual, 2014, and it follows also the concepts of the UOE Manual³⁷ and the French Education Account.

6.3 The goal of the NEA is to present information on education financing and expenditure, organizing education financial flows into a coherent framework.

6.4 The NEA approach is presented in the report Methodology of national education accounts (UNESCO-IIEP, UIS, 2016). The scope of education covered is mainly formal education³⁸ (the

³⁶ All these guidelines also include proposals for non-monetary data needed to describe the education system but only the monetary data aspects are covered in this chapter.

³⁷ A joint collection of education data aimed at providing internationally comparable data on key aspects of the formal education systems, specifically on the participation and completion of education programs, as well as the cost and type of resources dedicated to education (UNESCO-UIS, OECD, Eurostat 2016).

³⁸ Specific exclusions are: Training provided by driving schools or pilot schools, unless it forms part of a school training programmes, Education essentially corresponding to sporting or leisure activities, Military service, equivalent national service, or training sessions organized for defense purposes Only military colleges and academies which are delivering initial or continuing training to army staff are considered to be part of the education domain.

educational activities related to military/national service are excluded) with data presented by level of education using the ISCED 2011 classification. However, non-formal education may be included if countries consider it relevant (in this way the NEA intends to provide a certain degree of flexibility to countries). The intention is for the scope to be gradually extended to additional components of non-formal education for all countries. Among the suggested non-formal education activities to be considered for inclusion are: second chance and literacy programmes, specific education programmes such as those for young offenders or detainees, training for the unemployed or for employees; other types of learning (such as driving schools or music/art courses outside of schools) and the education activities taking place outside the country (for example schools operating in foreign countries or financial support for students studying abroad).

- 6.5 The NEA includes both the teaching and research and development (R&D) activities carried out within educational institutions. R&D carried out by higher education institutions is linked to teaching activities (the staff can be both lecturers and researches). The research activities of these institutions can be either merged with teaching activities or, possibly, recorded separately.
- 6.6 All information coming from the institutional entities involved in education (either financing units or producing units) are organized according to different dimensions on which the NEA is based (following the approach in the French accounts) - education activities, economic operations, producing and financing units:
- i) Education activities include teaching or training, definition of content, general administration, supervision and organization of the system, ancillary services (e.g., activities supporting schooling) and connected products (e.g., those not produced by the producing units but related to attendance of an education programme (i.e. textbooks);
 - ii) Economic transactions are compensation of employees, purchase of goods and services, gross capital formation;
 - iii) Financing units are institutional units which provide financial resources, such as government (general: central, state and local), households, corporations, non-profit institutions (NPIs) and the rest of the world;
 - iv) Producing units are institutional units carrying out education activities, namely, public educational institutions, private educational institutions and other producing units (such as the ministry of education, regional or district offices, etc.).
- 6.7 The NEA has two types of tables: 1) a standardized financing table for each type of financing unit (general government, corporations, households, non-profit institutions serving households (NPISHs), rest of the world), broken down by activity and by producing unit/ISCED level; and 2) a standardized income and expenditure table for each type of producing unit. Data in the tables are carefully consolidated and reconciled to ensure accuracy (e.g., information on resources received in kind – paid for directly by the financing units – is added to the income received in the producing unit’s account).

6.2.2 French Education Account

- 6.8 Since the French Education Account was a reference point for the development of the NEA, the main outlines of this account are also briefly described to show how the NEA and other more recent accounts have evolved.
- 6.9 The French Education Account is aimed at obtaining a general and consistent picture of the education sector and its costs, comparing a variety of statistical data available on the French education system, and gathering an overview of all financial flows occurring in the education industry. Thus, the French Education Account is a complete system of information on financial flows related to education, consistent with the central framework of the national accounts, making a clear distinction between the financing and production of education. The French approach is illustrated by Jeljoul et al (2016).
- 6.10 The French Education Account covers formal education³⁹, non-formal education activities⁴⁰ and R&D expenditure is included as soon as the research occurs in a teaching institution. Therefore, all the state funding for research carried on by universities is in scope, as well as R&D contracts for service sold by educational institution to enterprises.
- 6.11 Statistical units operating in the education system are divided between production units (education providers, namely, educational and other institutions) and financing agents (public, private and international sources funding the provision or purchase of education services). Financing agents may be initial financing agents or final financing agents and any transactions among them is recorded as a flow; financial flows may pass through an intermediary financing unit before reaching the intended production unit. The education account presents the sum of final financing dispensed by the units in the field of education, whatever the nature and origin of resources.
- 6.12 Summarizing, in the French Education Account the expenditure is registered on a cash basis and the ISCED 2011 classification is utilized, other characteristics are the following:
- i) Activities are divided between: a) Production activities, namely, teaching and research; support to schooling services (accommodation and catering, school medicine, orientation); organization of the system (general administration); b) Expenditure outside the production units, namely, purchases of goods and related services (transportation, books and supplies, private lessons, clothing and other); transfers (scholarships and transfer to households, other transfers paid, transfers received);
 - ii) Economic operations are described according to the nature of expenses, that is, staff compensation (separately for teachers and for other staff), current operating expenditure, and investment. Capital expenditure (gross capital formation) is

³⁹ These activities exclude training given by driving schools and pilot schools and in sporting or leisure activities; while the education activities aimed at special populations are included only if carried out by teachers employed by the Department of National Education.

⁴⁰ In particular, continuing vocational training (CVT) activities within public administration or enterprises aimed at the employed or unemployed and some other out-of-school type of training programmes, specifically arts education, evening classes and training programmes provided by teachers within the context of self-employment.

included, but the depreciation of capital assets is not recorded;

- iii) Producing units are public educational institutions carrying out educational or educational support activity (e.g., catering, accommodation, etc.); private (subsidized or independent) institutions; public administrative departments and organisations; and a fictional producer for expenditures outside education production units;
- iv) Financing units are general government (broken down into departments, local authorities and other public administration), business enterprises (public/private) and other legal entities, households and the rest of the world.

6.13 The assessment of the French Education account is based on data collected under two different categories: financing unit data sources (describing the expenditure made by financing units) and production unit data sources (describing producer resources and uses). The processing of these sources results in tables by financing unit and in resources and expenditure tables. To ensure exhaustiveness and consistency of information, a consolidation and arbitrage phase occurs. At the end of the process, all the financial flows inside and outside the education industry are considered and data is presented according to the following main tables⁴¹: education expenditure by education level and activity; by initial/final financing unit and education level; by financing unit and activity by each education level; financing of education producers by education level; education producers expenditure by activity and type of expenditure.

6.2.3 UNESCO-OECD-Eurostat data collection on formal education

6.14 The UOE data collection on formal education aims at providing internationally comparable data on key aspects of formal education systems⁴². Within the exercise, Eurostat collects and disseminates data from the European Union (EU) Member States, candidate countries and European Free Trade Association (EFTA) countries. The OECD collects data from non-EU OECD countries (such as Australia, Canada, Japan and the United States), while the UIS collects data from other participating countries. The data are used by the three organizations.

6.15 UOE Manual cover various main features of education activities, such as the participation of individuals, education expenditure and financing, teaching staff and education personnel, learning mobility and foreign language learning. More precisely, statistics cover the following aspects:

- expenditures by educational institutions for personnel, other current inputs and capital inputs;
- financing of educational institutions by financing agents;

⁴¹ Other tables can be produced on request combining the details of different dimensions.

⁴² See the UOE *Manual on concepts, definitions and classifications* https://circabc.europa.eu/sd/a/849a866e-d820-4006-a6af-21cb1c48626b/UOE2016manual_12072016.pdf, p.3. More precisely, the UOE data collection covers formal education programmes that represent at least the equivalent of one semester (or half of a school/academic year) of full-time study. Programmes or studies designated as 'adult education' or 'continuing education' are included only if the content is similar to regular educational programmes or lead to similar potential qualifications. The data collection covers education which takes place entirely in educational institutions or is delivered as a combined school and work-based programme providing the school-based component represents at least 10 per cent of the study over the whole programme. Exclusively (initial and continuing) work-based training is not included in the UOE data collection.

- pupils and students enrolled and new entrants;
- graduates;
- student mobility;
- education personnel, teaching staff;
- language learning.

6.16 The UOE Manual covers domestic educational activity, in other words education provided within a country's own territory regardless of ownership or sponsorship of the educational institutions concerned (whether public or private, national or foreign⁴³) or of the education delivery mechanism (whether face-to-face or at a distance). In particular, all students studying within a country, including internationally mobile students from abroad, should be included in the statistics of the reporting country. Students who have left the reporting country to study abroad should not be included by the reporting country they have left. Concerning short exchange programmes (of at least three months but less than one academic year), students who remain enrolled in their home institution and where credits for successful completion of the study abroad are awarded by the home institution should be reported by the country of the home institution in which they are enrolled. By contrast, educational activities which take place abroad — for example, in institutions run by providers located in the reporting country — should be excluded. In cases of cross-border distance learning/e-learning, students should be reported by the country of the institution providing the service, not the country of residence of the student. Equally, students who commute across borders should be reported by the country where they are enrolled rather than where they are resident.

6.17 Data on educational expenditure are compiled on a cash accounting basis. Expenditure is not limited to that made on instructional services, but also includes expenditure on non-instructional goods and services (ancillary services) and student transportation, school meals, student housing, boarding, student health services, where these services are provided through educational institutions. At the tertiary level, spending on R&D is also included, to the extent that the research is performed by educational institutions. Expenditure includes core educational goods and services, such as teaching staff, school buildings, or school books and teaching materials, and peripheral educational goods and services such as ancillary services, general administration and other activities. Regarding financing of education, transfers from and between financing agents are recorded. Expenditure on student loans is also recorded as the gross loan outlays in the year in which the loans are made, without netting-off repayments from existing borrowers.

6.3 Comparison of different approaches

6.18 The different approaches are now compared focusing on the main dimensions in order to identify the key differences, with the main features of the comparison summarized in Table 6.1.

⁴³ According to the UOE methodology, educational institutions include teaching institutions and also non-teaching institutions, such as ministries, local authorities and student unions. See *Manual on concepts, definitions and classifications* https://circabc.europa.eu/sd/a/849a866e-d820-4006-a6af-21cb1c48626b/UOE2016manual_12072016.pdf, p.15.

6.3.1 Basic accounting principles and geographical coverage

- 6.19 Considering first the geographical scope and the accounting principles, the SAET considers all education related transactions of resident units recording the transactions on an accrual basis (as in the national accounts). The UNESCO NEA (and the French Education account) transactions also relate to resident units, while the expenditure is registered on a cash basis. The UOE Manual records expenditure on a cash basis and covers domestic educational activity.

6.3.2 Scope of education

- 6.20 The SAET covers formal education, non-formal education and training activities and the in-house training courses for employees by their employers and all R&D activities carried out in educational institutions. The UNESCO NEA approach covers formal education, while non-formal education is not covered but may also be included. Non-formal adult education⁴⁴ is however always excluded. This aspect differs from the French Education account that includes formal education but also continuing vocational training (CVT) and other out-of-school type training programmes. Concerning R&D, research within educational institutions is included in the UNESCO NEA (and also in the French Education Account). The UOE Manual covers formal education and R&D activities carried out in tertiary educational institutions.
- 6.21 In a nutshell, all approaches include formal education, SAET and French account both include as a standard framework some non-formal education and training programmes (both contemplate continuing vocational training and artistic and cultural activities, but the French account does not include adult education), while NEA includes non-formal education and training only optionally (never including non-formal adult education) and UOE data collection – only formal education.

6.3.3 Coverage of activities

- 6.22 According to the SAET, the education and training activities include: teaching, administrative and other activities in formal education, non-formal educational activities (divided into cultural, sports and recreation education and other education and vocational training), in-house training courses of employees by their employers and associated goods and services directly related to the delivery of education services. Teaching activities include administrative work done at school level and all administration, organizational and support activities taking place in the central, regional, and local offices of the ministries and agencies supervising the education system. Research carried out by higher education institutions is linked to teaching activities, as academic staff can be both lecturers and researchers. The research activities of these institutions are normally split out and included in the R&D estimates of the national accounts. Non-formal educational activities and in-house training covers the cost for teaching,

⁴⁴ According to UNESCO-UIS definition this is Education specifically targeting individuals who are regarded as adults by the society to which they belong to improve their technical or professional qualifications, further develop their abilities, enrich their knowledge with the purpose to complete a level of formal education, or to acquire knowledge, skills and competencies in a new field or to refresh or update their knowledge in a particular field. This also includes what may be referred to as ‘continuing education’, ‘recurrent education’ or ‘second chance education’.

- organizing and delivering these activities. Associated goods and services (such as textbooks and those goods, special clothing or equipment that are required for education) include both those purchased by the enterprise providing education and those purchased directly by participants.
- 6.23 Similarly to the French account, the UNESCO NEA takes into account teaching activities, content definition, supervision, general administration and organization of the system, connected products and ancillary services. Teaching activities include administrative work done at the school level and research activities carried out by higher education institutions, linked to teaching activities. General administration and organization of the system includes all general administration and support activities taking place in the central, regional, and local offices of the ministries and agencies supervising the education system. Research carried out by higher education institutions is linked to teaching activities. The research activities of these institutions are either included and merged with teaching activities or recorded separately. Concerning 'subsidiary' services, NEA distinguish between those purchased within and those purchased outside producing units. The first category is represented by 'connected' products (that is, directly related to school attendance: transport, uniforms, teaching material, etc.), the second one is the ancillary services (e.g., products supporting schooling, such as school meals/canteens, transport to and from schools organized by the school, etc.).
- 6.24 The French account includes teaching activities, organisation of the system, purchases of related goods and services, education support services and transfers. Teaching includes also administrative and management expenditure at educational institutions, earnings of research staff and research related investment. Since 2006, research expenditure is only included for university research (current and capital expenditure) and research into education, which is treated as general organisational expenditure in the education system. Compensation for teacher-researchers is fully included in the teaching activity and only the operating costs of university research are allocated to the research activity. Non-teaching staff expenditure and capital expenditure on research cannot be identified separately and are also included in the teaching activity. Expenditure for organisation of the system covers both general administration and compensation for education staff while in training; the general administration covers both activities of central/local government aimed at organising, managing and regulating the education system, and the educational research initiatives aimed at developing new teaching methods and stimulating reflection on educational programme content. Two kinds of ancillary services are considered: the purchases of related goods and services (initiatives implemented by public administrations to subsidise students transport, textbook and supplies, special lessons, clothing and other) and support services (catering and accommodation services, medical services and school guidance).
- 6.25 The UOE Manual distinguishes expenditure between core educational goods and services and educational peripheral goods and services. The former includes all expenditure that is directly related to instruction and education. It includes all expenditure on teachers, maintenance of school buildings, teaching materials, books, tuition outside schools, and administration of schools. Educational peripheral goods and services are further subdivided in R&D and non-instruction expenditure (mainly ancillary services) which includes all expenditure broadly related to student living costs and services provided by educational institutions for the general public. Core educational goods and services are included whether provided by educational

institutions or purchased outside educational institutions. Educational peripheral goods and services provided inside educational institutions are included in educational expenditure, however, expenditure on educational peripheral goods and services provided outside educational institutions is included only if it is subsidized.⁴⁵.

- 6.26 Summarizing, in-house training is only covered in the UNECE SAET account, while the item associated goods and services directly related to the delivery of education services covers expenses similar to these found in the item connected products in the UNESCO NEA and purchases of related goods and services in the French Account but also covers purchases outside educational institutions. The same is true for the UOE data collection. As for ancillary services in the UOE Manual (or support services in the French account), the SAET does not cover these activities. Expenditures on R&D performed within educational institutions are included in current expenditures in UNESCO NEA, UOE Manual and the French accounts but as capital expenditures in SAET, where the consumption of fixed capital is a current expenditure.

6.3.4 Classification of levels of education

- 6.27 The UNECE SAET classifies the education and training purposes considered according to seven groups expressing different education and training purposes; as it has been described in Chapter 3 of the Guide, four of them refer to formal education and are broken down by ISCED level (EPO – EP3), the others refer to non-formal education and training activities (EP4-EP5) and in-house training (EP6).
- 6.28 The UNESCO NEA approach, instead, classifies all formal education activities following the ISCED 2011 standard. In the case where the option to include non-formal education is exercised, it is recommended that specifically named separate levels be created for these non-formal education activities and that use of a general class ‘not allocated by ISCED level’ should be avoided. The French Education Account has implemented the ISCED 2011 classification and in addition to the main ISCED 2011 categories has an item extracurricular education, which covers continuing vocational training activities within public administrations or companies and other extracurricular activities (e.g., arts education, evening classes, training programmes provided by teachers within the context of self-employment).
- 6.29 The UOE data collection on formal education uses the ISCED 2011 classification. Besides formal initial education programmes, some adult education programmes may also be included in the UOE data collection when they meet the definition of similar formal programmes normally being designed as second chance programmes for youth or adults and offered in the same or similar formal settings as initial education. They do not have the same typical entry age as equivalent programmes in initial education and may have a different, usually shorter, duration. Formal adult education programmes should be assigned to the most appropriate ISCED levels. They should not be treated as a separate level of education.

⁴⁵ See the UOE *Manual on concepts, definitions and classifications* https://circabc.europa.eu/sd/a/849a866e-d820-4006-a6af-21cb1c48626b/UOE2016manual_12072016.pdf, pp. 14-15.

6.3.5 Classification of economic operations

- 6.30 The economic operations considered in the SAET are the compensation of employees (wage and salaries and contribution by the employer to social security), intermediate consumption, taxes on production, and gross fixed capital formation and consumption of fixed capital.
- 6.31 The UNESCO NEA comprises compensation of employees, purchases of goods and services (e.g., recurrent expenditure other than for compensation of employees such as teaching materials or rents paid for school buildings and other facilities and any other non-staff administration costs in schools and administrative offices) and gross capital formation (e.g., construction or major renovation of buildings, durable teaching materials and supplies, computer hardware and software). In the French account, the transactions are staff costs (including employer social contributions), 2) other operating costs (intermediate consumption, production-related taxes and interest paid), 3) investment (gross fixed capital formation, stock variation, net acquisitions of land and intangible assets). In both French and UNESCO approaches, however, the accounts do not include depreciation.
- 6.32 The UOE Manual breaks down expenditure into: 1) Expenditure on compensation of personnel. This is also broken down between teaching and non-teaching staff, on the one hand; and between salaries and non-salary compensation, on the other hand. 2) Current expenditure other than compensation of personnel⁴⁶. 3) Capital expenditure, covering construction, renovation and major repairs of buildings and expenditure on equipment⁴⁷.

6.3.6 Classification of transfers

- 6.33 The SAET consider all current transfers related to education⁴⁸. Transfers can occur between any sectors or sub-sectors of the economy but in the case of education are generally dominated by general government transfers. Financing flows other than purchases (market and non-market) are recorded as transfers with final consumption occurring in the unit producing or purchasing goods and services. Transfers in kind by general government or NPISH are shown as final expenditure of those sectors (included in social transfers in kind) whereas transfers in kind by other sectors are treated as cash transfers. The UNESCO NEA and the UOE Manual only include transfers between financing units (or between the source of funds and the financing agents), such as financial aid to families, other transfers made, and transfers received. Transfers to producing units are recorded as direct expenditure of the producing units. Transfers passing through an intermediate producing unit are considered to be between the financing unit and the recipient (e.g., scholarships transferred through a producing unit

⁴⁶This covers current inputs used in education, but also expenditure on contracted and purchased services and compulsory payments such as property taxes. See the UOE *Manual on concepts, definitions and classifications* https://circabc.europa.eu/sd/a/849a866e-d820-4006-a6af-21cb1c48626b/UOE2016manual_12072016.pdf, pp. 68-69.

⁴⁷ Low-value equipment may be reported under current expenditure.

⁴⁸Social transfers in kind in the national accounts framework include individual goods and services produced by non-market sectors and goods and services purchased directly by general government and NPISH for households. While these expenditures are recorded as final consumption expenditure of general government and NPISH, this separate class of transfers allows in a full set of national accounts a presentation showing that for these goods and services households are the actual final consumers. The NEA, UOE and French systems do not have an equivalent category. Social transfers in kind are not explicitly presented in the SAET.

before reaching families). Transfers in kind are grouped with cash transfers going to the same recipients. In the French account, transfers describe the financial flows between the initial financers, who are shown as bearing the financial costs, and the final financers which recompense the producers or make direct expenditures (such as scholarships and transfers to households, production of education services, connected products and ancillary services).

6.3.7 Classification of producing units

6.34 In the SAET education producing units can be distinguished between non-market producers (e.g., general, central, state and local government and NPISH) and market producers (in the corporate or household sectors). In-house training can take place in both market and non-market enterprises. Non-resident units also are considered covering the import of educational services. In the UNESCO NEA approach, producing units refers directly to the educational institutions and can be divided into three categories: public educational institutions providing core educational services (such as teaching activities and ancillary services), private educational institutions (e.g., those organized by churches, trade unions, for-profit enterprises, etc.) and other producing units (producing peripheral education goods and services; e.g., supervision, support to the policies, production of statistics, research and overall administrative support). Ministries of education, regional or district education offices, non-governmental organizations or autonomous bodies carrying out only ancillary services may be considered as 'other producing units'. The French Education Account distinguishes between public educational institutions, private (subsidized or independent) educational institutions, public administrative departments and organisations and a fictional producer for expenditure outside the previously mentioned production units. The UOE Manual distinguishes between public educational institutions and private (government-dependent or independent) educational institutions. Educational institutions include both instructional and non-instructional institutions⁴⁹.

6.3.8 Classification of financing units

6.35 In the SAET approach, following the national accounts, units in all sectors of the economy can be financing units: government, financial and non-financial corporations, NPISH, households and rest of the world, which is also the case for the UNESCO NEA. The French account includes a more detailed range of government bodies, (public and private) companies and other legal entities, households and rest of the world. Both the French and UNESCO NEA accounts introduce the distinction between initial and final financing units, split between how those units directly or indirectly fund producing units. The UOE Manual includes as financing units different levels of government (central, state and local), households, other non-educational private entities and international organisations.

⁴⁹ See the UOE *Manual on concepts, definitions and classifications* https://circabc.europa.eu/sd/a/849a866e-d820-4006-a6af-21cb1c48626b/UOE2016manual_12072016.pdf, pp. 23.

Table 6.1

Correspondence table among UNECE SAET, UNESCO NEA/French Education Account and UOE data collection on formal education by dimension.

UNECE - SAET	UNESCO - NEA	FRENCH EDUCATION ACCOUNT	UOE DATA COLLECTION
Basic accounting principle			
Registered on accrual basis	Registered on cash basis	Registered on cash basis	Registered on cash basis
Geographical scope			
Resident units	Resident units	Resident units	Domestic activities
Scope of education			
Formal education	Formal education	Formal education	Formal education
Non-formal education	(Non-formal education)	Non-formal education	
(R&D as capital investment)	R&D performed within educational institutions	R&D	R&D performed within tertiary educational institutions
In-house training courses for employees by their employer			
Coverage of activities			
Teaching activities (cost for compensation of R&D staff not included), Administrative services	Teaching and administrative activities (cost for compensation of R&D staff encompassed)	Teaching activities (cost for compensation of R&D staff encompassed)	Teaching
			R&D in teaching activities
	Organization of the system (includes research in education)	System organization (includes research in education)	System organization and general administration
		R&D (operating costs of university research)	Rest of R&D activities costs
Non-formal educational activities:			
Cultural, sports and recreation education and Other education and vocational training			
In-house training courses for employees by their employers			
	Ancillary services	Educational support services	Ancillary services
Associated goods/services directly related to the delivery of Education services	Connected products	Purchased of related goods and services	Core educational goods and services
Classification of levels of education			
ISCED 2011 (aggregated)	ISCED 2011	ISCED 2011	ISCED 2011

UNECE - SAET	UNESCO - NEA	FRENCH EDUCATION ACCOUNT	UOE DATA COLLECTION
Education and training purposes/products			
EPO - Pre-primary education	ALL ISCED LEVELS BY TYPE OF EDUCATION	Pre-primary and primary	ALL ISCED LEVELS BY TYPE OF EDUCATION
EP1 - Primary education		Secondary education	
EP2- Secondary education		Higher education	
EP3- Higher education		Extracurricular education	
EP4 - Cultural, sports and recreational education			
EP5 - Other education and vocational training			
EP6 - In-house training			
Classification of economic operations			
Compensation of employees	Compensation of employees	Staff costs	Compensation of personnel
Intermediate consumption; Taxes on production	Purchases of goods and services	Other operating costs	Other current expenditure
Consumption of fixed capital	Gross capital formation	Investment	Capital expenditure
Gross fixed capital formation			
Classification of transfers			
Current transfers	Transfers between financing units	Transfers between financing units	Transfers between financing units
Classification of producing units			
Non-market producers:	Public educational institutions	Public education institutions	Public education institutions
General government (central, state, local),		Public administrative departments and organizations	Public administrative departments and organizations
			Public non-instructional educational institutions
NPISH			Private government-dependent educational institutions Private independent educational institutions
	Other producing units		Non-market private non-instructional education producers
Market producers: corporate and household enterprises producing education & training	Private educational institutions	Private state subsidized educational institutions	Private government-dependent educational institutions
		Private independent educational institutions	Private independent educational institutions
			Private non-instructional education producers
Non-resident units		Fictional producer for expenditure outside production units	
Classification of financing units			
General government (central, state, local)	General government (central, state, local)	General government: Department of National Education; Other departments; Local authorities; Other public administrations	General government (central, state, local) in detail
Corporations	Corporations	Enterprises (public/private) and other legal entities	Other non-educational private entities
NPISH	NPISH		
Households	Households	Households	Households
Rest of the world	Rest of the world	Rest of the world	international organizations

Chapter 7

Country Case Studies

7.1 Introduction

- 7.1 The main objective of the Task Force was to develop a framework and coordinate the pilot testing of satellite accounts on education and training in countries with different economic circumstances and data availability. The pilot testing has been important in the development of the compilation guide that can help countries construct internationally comparable satellite accounts on education and training. In addition to providing estimates of the total expenditures on education and training, the objective of the satellite account is to distinguish and provide breakdowns of the various expenditures by purpose, and identify the financing arrangements for these expenditures.
- 7.2 The pilot testing includes five country studies based on the framework presented in the guide: from the Republic of Belarus, Canada, Israel, Norway and the United Kingdom (UK). The case studies are presented as annexes to Chapter 7.

7.2 Challenges and lessons learned from the pilot studies

- 7.3 The studies show the feasibility of setting up a Satellite Account for Education and Training (SAET). One of the conclusions from the compilation of the Norwegian SAET is that the availability of supply and use tables (SUTs) in the national accounts was very helpful for the construction of the SAET tables. While there was still a need for estimates to overcome data limitations, the task would have been far more challenging without SUTs. UK also underline that working with others who intimately understand their data, whether that is National Accounts or education statisticians, greatly helps compilation.
- 7.4 Another general experience is that the compilation of SAET brings together data related to education and training from various statistical programs including the SUTs, education statistics programs, government finance statistics programs, COFOG⁵⁰ statistics on government expenditures, COICOP⁵¹ statistics on household expenditures and trade-in-service statistics. These programs use different source data and estimation/compilation methodologies. By combining these disparate distinct data, the SAET acts as a natural data confrontation exercise. The exercise provides a method to assess the relevance, coherence and quality of statistics on education and training. The confrontation can indicate which data sources align, which may need to be improved and which types of data need to be strengthened to provide consistent, reliable and up-to-date information on education and training. And as pointed out by several of the test countries, the data sources are not always aligned either in terms of detail or classification with what is needed for the SAET.

⁵⁰ Classification of the Functions of Government (COFOG)

⁵¹ Classification of Individual Consumption According to Purpose (COICOP)

- 7.5 The UK also experienced trouble delineating some of its government data, particularly around pre-primary and primary education, as well as accounting for market output purchased by general government, given the government data are not broken down to a sufficient level of detail.
- 7.6 In compiling the SAET, in addition to poor or missing data sources, countries identified inconsistencies between both data sources and with the current national accounts estimates (either in terms of product or industry-level detail, or in capturing activity altogether, such as grants from non-profit institutions serving households (NPISH) to general government). In the UK, this was dealt with by keeping all the estimates consistent with the published SUTs and institutional sector accounts, at the expense of not including transactions that they knew had occurred.
- 7.7 Canada points out that the proposed SAET includes seven Education and Training Purposes (EP) in order to provide comprehensive statistics on education and training. However, the classification of education and training products in the standard Canadian accounts are found to be too broad to support this level of detail. Thus, in the Canadian Pilot SAET, EP1 and EP2 are combined and EP4 and EP5 are combined. In addition, no separate estimates of EP0 (early childhood educational development) are available for Canada. Given the importance of early childhood educational development in an individual's future outcomes, it is important to develop estimates for expenditures on the production and use of EP0, as well as the financing and costs of EP0. Israel mentions that the currently available information does not allow for a qualitative assessment of the expenditure on cultural, sports and recreation education which should be allocated to this EP. Therefore, expert assessments were used to calculate such expenditure.
- 7.8 Belarus also identified the lack of sufficient detail in the classification currently used in the national accounts regarding education by level, which leads to certain difficulties in constructing the SAET. Another particular aspect of the national accounts of the Republic of Belarus is that the statistical information is compiled for so called "net" industries (i.e. homogeneous branches) and the estimates are done for the education industry as a whole. For this reason, the breakdown of general government expenditures, as well as the expenditures of other sectors, by education level was the most serious challenge for the compilation of the SAET. In order to overcome this, Belstat used detailed information on the expenditures from the state budget by paragraph and programme (using different administrative data, including information from the Finance ministry), detailed data from statistical reports on enterprise expenditures, surveys of household expenditures, NPISH surveys and reconciled them against information on the number of students, persons trained in different programmes (using administrative data and data from the non-centralized reporting from the Ministry of Education).
- 7.9 One of the greatest challenges reported in the case studies is the availability of source data to estimate expenditures related to in-house training. As an example, Norway used data from the Continuing Vocational Training Survey (CVTS), Canada's estimate is based on the Workplace and Employee Survey (WES), while UK has not yet estimated in-house training. The reason for this is that the CVTS results published for the UK were not sufficiently detailed to differentiate in-house training expenditures, that is training produced by the company itself and training purchased from other providers for the benefit of their employees (and hence captured in

separate EPs in the SAET). Therefore, before including in-house training, the UK wanted to compare separate sources for purchased training, to discount the amounts already in other EPs to avoid double-counting. Similar difficulties existed in Belarus, where the estimates were based on surveys of employees about time spend on training and data on their salaries, but no sufficient information about other related expenditures was available, therefore the latter could not be fully covered. Israel points out that expenditures on employees training in corporations and non-profit institutions are based on the existing surveys that were not designed for this purpose, and it can be challenging to find relevant information for example from financial reports, see Annex 7.4 where this is discussed in more detail.

- 7.10 In-house training constitutes a significant part of the total expenditures on education and training. According to the pilots, in-house training accounted for 11 per cent of total expenditures on education and training in Norway. For Canada, in-house training accounted for about 20 per cent of total expenditures, in Israel and Belarus – about 1 per cent. The differences in these estimates underlines the challenges related to data sources and, clearly, comparability across countries is difficult to assess. However, showing these country estimates is still beneficial and highlights the need for better data. Finally, challenges related to one of the EP-categories does not harm the comparability the other EPs. Clearly explaining the assumptions required during compilation is important in assessing comparability.
- 7.11 Another challenge is the estimation of household consumption of associated goods and services and the allocation of these expenditures to education purposes. Due to the difficulty of allocating these expenditures to EPs, it is recommended that they should be allocated according to total expenditure proportions or presented in an unallocated category in the SAET use table.
- 7.12 Despite challenges with data sources and classifications, the pilot testing is promising and the development of a SAET can provide a good foundation for estimation of human capital investments as well as information necessary for the development and analysis of government policy in the field of education.

Annex 7.1

A pilot of the Norwegian Satellite Account for Education and Training

7.1.1 Introduction

7.1.1 This chapter presents a pilot of the Norwegian satellite account for education and training. The satellite account describes Norway's total current expenditures on education and training and is based on guidelines from the chapters in this guide. The pilot contains comprehensive information regarding educational and training services as an outcome of combining available data integrated in the national accounts for the year 2015. The result is presented in SUTs where education and training expenditures by purpose are grouped respectively by provider and user. The funding of the expenditures is shown in a simplified resource table grouped by central and local government, non-profit institutions, households (as consumers) and others (other industries/sectors). The pilot also presents a cost structure table for the different education purposes.

7.1.2 Definitions used in the pilot

7.1.2.1 Producers

7.1.2 The SAET aims to provide more detailed information on the expenditures related to education and training and breaks the expenditures down by producing sector. We distinguish between five different producers:

- Central government
- Local government
- Market producers of education and training
- NPISH
- Other market producers (as described in Chapter 3).

7.1.3 The Ministry of Education has the overall responsibility for education and training in Norway. The local governments mainly run the primary and secondary schools, while the central government runs higher education, such as universities and colleges. Education at all levels is offered by both private and public providers. Private providers that receive large public transfers are classified as NPISH if more than 50 per cent of their funding comes from public grants. Producers receiving less than 50 per cent are classified as market producers of education and training. Other sectors produce in-house training and associated goods and services directly related to the purpose of delivery of education and training services.

7.1.2.2 Uses

7.1.4 There are five different cost elements used in the production of education and training:

- Compensation of Employees;
- Intermediate Consumption;
- Taxes on production and imports Less Subsidies;
- Operating surplus;
- Consumption of fixed Capital.

7.1.2.3 Financing agents

7.1.5 The SAET describes the financing of the education and training sector and makes it possible to identify the relative importance of the financing agents. The financing agents included are:

- Central government;
- Local government;
- NPISH;
- Households;
- Other sectors.

7.1.6 In Norway education and training services are financed both by public and private sources. Private sources consist primarily of expenditures paid by households and other sectors, while the central and local governments fund the major part of education expenditures.

7.1.2.4 Resources

7.1.7 The resources used to fund education and training are divided into four different transaction flows in the Norwegian pilot:

- Direct expenses/financing;
- Transfers from government to household (in cash and kind);
- Transfers to NPISH from government;
- Transfers to other sectors from government (subsidies).

7.1.2.5 Education and training activities by purpose

7.1.8 The table of classification correspondences, Table 3.1.1 in Chapter 3, is used to link the education and training purposes (EP1-EP6) to the education products in the Norwegian National Accounts (which are classified according to the International Standard Industrial Classification of all Economic Activities, Revision 4 (ISIC Rev.4). Table 7.1.1 illustrates the correspondence between education and training purposes, the International Standard Classification of Education, 2011 (ISCED 2011) and ISIC rev.4. EPO is not included because kindergartens in Norway do not provide any formal education programme and are a part of social care in our national accounts.

Table 7.1.1

Breakdown of education and training services by ISCED level.

Education and training purposes	ISCED level	ISIC rev.4
EP1	ISCED 0-1	8510 – Pre- primary and primary education services
EP2	ISCED 2-4	8520 - Secondary education services
EP3	ISCED 5-8	853– Higher education (excluding Post-secondary non-tertiary education)
EP4	Non-ISCED	8542 - Cultural education
EP5	Non-ISCED	8549 – Other education n.e.c.
EP6	Non-ISCED	In-house training

7.1.3 Constructing the main tables of the SAET

7.1.9 The pilot of the Norwegian SAET takes the national accounts, including government finance accounts, as a starting point and provides further breakdowns of expenditures by education and training purpose, producing unit and source of funding. Comprehensive data from a variety of sources integrated in the national accounts are used in the compilation of the educational expenditures. The national accounts are consistent with Government Finance Statistics (GFS) Manual, 2014, which is the most important source in the compilation of the educational expenditures, together with accounting reports from public and private universities. Both expenditures on formal and non-formal education and training are available from these sources. By extending the boundaries of production and consumption beyond those in the System of National Accounts, 2008 (2008 SNA), the SAET makes it possible to analyse production of education and training services, the source of funding and connect the data to the various education and training purposes.

7.1.10 Supply and use accounts are integrated in the Norwegian national accounts, which makes it easier to construct the main tables in the SAET. The SUTs together with the resources/uses tables can be used to derive central indicators for production and consumption of education and training services and to analyse the composition of inputs used in the production process. The reference year for the Norwegian pilot is 2015, due to availability of the data sources during the compilation process.

7.1.3.1 Expenditures for education and training by education purpose

7.1.11 The total expenditure on education and training amounts to 6.8 per cent of the gross domestic product (GDP) in Norway. Table 7.1.2 presents an overview of the expenditures broken down by education and training purpose. The next section will describe the expenditure in more

detail. In Norway the greatest proportion of education and training expenditures is related to compulsory primary education, which accounts for about 35 per cent of the total costs. 17 per cent is related to secondary education and 28 per cent is spent on higher education. In-house training constitutes the largest part of non-formal education with 11 per cent of total costs. However, the estimate of in-house training must be interpreted with caution, as the estimate is heavily based on information from the CVTS survey for 2015, in combination with information from the Labour Force Survey, see description in paragraphs 7.1.12-7.1.13. The CVTS has been carried out only once and the uncertainty in the estimates must be underlined. Figure 7.1.1 illustrates the shares.

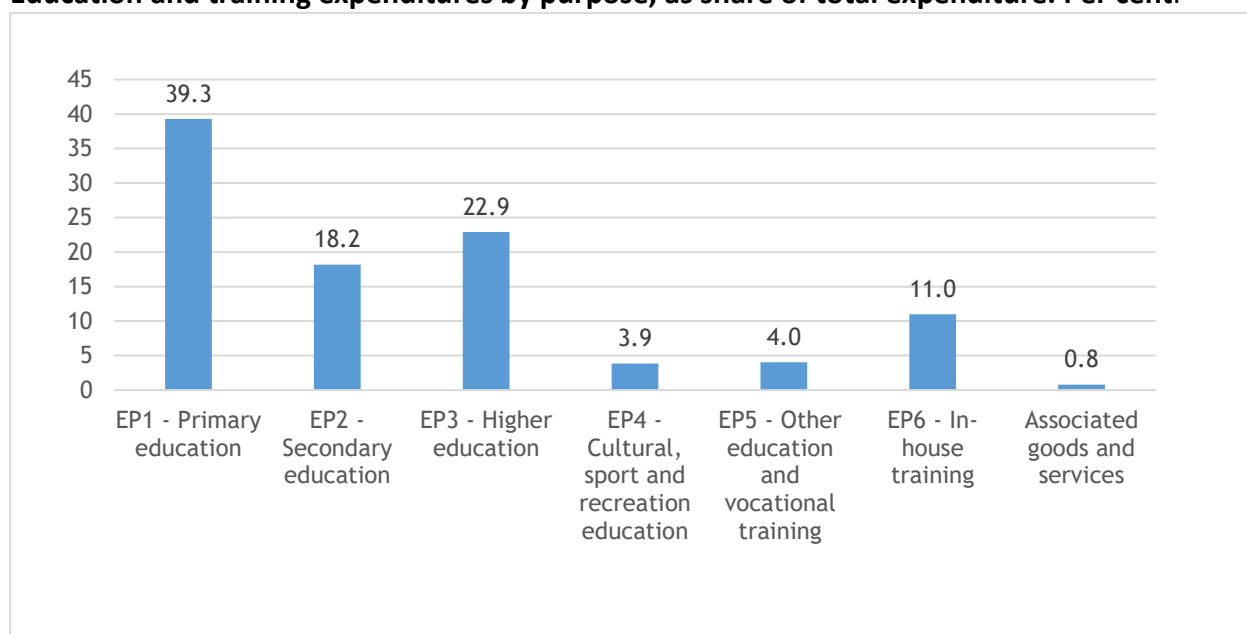
Table 7.1.2

Education and training expenditures, by purpose. Current prices, 2015.

Norwegian kroner (NOK)

Education and training activities by purpose	NOK million	Share
EP1 - Primary education	74 987	39.3
EP2 - Secondary education	34 684	18.2
EP3 - Higher education	43 762	22.9
EP4 - Cultural, sport and recreation education	7 369	3.9
EP5 - Other education and vocational training	7 669	4.0
EP6 - In-house training	21 026	11.0
Associated goods and service, not allocated	1 503	0.8
Total	191 000	100.0

Figure 7.1.1

Education and training expenditures by purpose, as share of total expenditure. Per cent.

7.1.3.2 Expenditures on education and training by provider

- 7.1.12 The production of education and training by provider, except in-house training, is available from the supply side in the Norwegian national accounts. The production of in-house training is estimated by using the CVTS for 2015 developed by Eurostat. The survey is a part of the European Union (EU) statistics on lifelong learning and consists of training where the main objectives are achievement of new qualifications or expansion and improvement of existing ones. The survey covers both CVT courses and other forms of vocational training and measures the cost of continuing vocational training per participant. The costs are divided into participant's labour costs and direct costs, where the direct costs cover the labour costs of trainers, teaching materials, location, fees, travel and subsistence payments related to CVT courses.
- 7.1.13 The survey contains the number of participants but includes only enterprises with 10 or more persons employed in NACE Rev. 2⁵² sections B to N, R and S, and therefore excludes parts of the economy. As an alternative source for number of participants, the Learning Conditions Monitor (an annual ad hoc module to Statistics Norway's Labour Force Survey) is used, where the number of participants in non-formal education by industry is reported. Number of participants are multiplied by the costs per participant to estimate the total expenses related to in-house training. Since the estimate for in-house training is based on average costs it is important to reconcile with direct purchases of education services and associated goods which can be found in the national accounts to avoid double counting. In the Norwegian case the average cost was adjusted to cover only own resource costs. It must be underlined that this adjustment was marginal. In addition, in-house training related to NACE Rev. 2 section P Education, is excluded to avoid double counting since the amount is already included in the output of the producing sectors. The estimate is allocated to EP6 - in-house training. The part connected to public industry (NACE Rev. 2 O and Q) is allocated to the central government while the rest is allocated to non-education industries named "others" in the supply table. Table 7.1.3 is a supplementary table showing the expenditure on in-house training by NACE Rev.2 and the type of cost, and the basis for the estimates. The CVTS is updated every fifth year, so estimates must be done for the in-between years, by using growth rates from other sources such as the national accounts or the central government fiscal account. It is assumed that in-house training in Public Administration, Defence, Human Health and Social Work is provided by the central government, as no more details are available. The rest is allocated to other sectors.

⁵² NACE Rev.2 is the statistical classification of economic activities in the European Community, which corresponds to ISIC Rev. 4.

Table 7.1.3

Expenditures on in-house training, by industry and type of cost. Current prices, 2015.

(NOK millions)

EP6 - In-house training by industry and type of cost			
NACE Rev.2	Direct costs	Labour costs	Total
B-E Mining, manufacturing, electricity and water supply	969	1 415	2 385
F Construction	575	840	1 415
G-I Distributive trade and accommodation and food services	1 383	2 019	3 402
H-K Information and communication services and financial and insurance activities	543	793	1 335
O, Q Public administration, defence, education and human health and social work	3 420	3 139	6 559
A, L-N, R-U Other services	2 410	3 520	5 930
Total	9 300	11 726	21 026

7.1.14 The cost of general administration is based on product 8411 (ISIC rev.4) in the national accounts – ‘General public administration activities’. The part of this product consumed by COFOG 09 – Education is used to calculate the administration costs. Information from COFOG is used to allocate the administration cost to the different education and training purposes e.g. the amount consumed by COFOG 0.91 – ‘Primary and pre-primary education’ connected to education and training purpose 1.

7.1.15 Associated goods and services are goods and services directly related to the purpose of delivering education and training services. Associated goods are produced outside the education industry, and in the supply table (Table 7.1.4) recorded under “other sectors”. Based on this definition textbooks, stationery and computers are included. The expenditures are calculated by using an estimate of the household’s consumption expenditure related to these associated goods. In Norway, textbooks are provided for free by the primary and secondary schools, so the estimate done for textbooks is allocated to EP3. Stationery and computers are not allocated to specific EPs but left in non-allocated associated goods and services due to insufficient information regarding allocation. Transportation of pupils in elementary school provided by the local government is considered as non-instruction related expenses and is not included in the production expenditures.

7.1.16 Since the SAET aims to support the measurement of the human capital of a country, it is necessary to consider student mobility and international trade in education and training services when calculating the expenditures. The cost of students studying abroad is included as a part of Norway’s total expenditures on education and training. The estimate is based on the number of students studying abroad together with data on scholarships and support given to cover tuition fees. The statistics are available from the Norwegian State Education Loan Fund’s annual report. The estimate is classified as import of education and training and is allocated to EP2 for students going to secondary school and to EP3 for students participating in higher education. The import is consumed by the households and financed by the central government through the Norwegian State Education Loan Fund.

7.1.17 Table 7.1.4 presents the supply of education and training and shows the related expenditures broken down by provider and purpose. The local government is the largest producer of education and training and is the main producer of primary and secondary education, together with adult education, which is included in EP5. Other non-formal education, such as driving schools, music schools for children, and special courses for refugees is largely produced by market producers of education. Higher education is mainly produced by the central government, with the expenditures of Norwegian students studying abroad classified as imports. NPISH produce mostly primary and secondary education. 'Other market producers' refers to sectors producing associated goods and services such as textbooks and computers and industries that offer apprenticeship schemes/programmes and training, certificate of apprenticeship or teaching practice positions. The costs in the industries that are employing apprentices are refunded and financed by the local government. The production costs of apprenticeships are set equal to these subsidies and are found in Table 7.1.4 under secondary education provided by other market producers.

Table 7.1.4
Education and training output, by provider and education and training purpose. Current prices, 2015.
 (NOK millions)

		Supply							Total
		Market producers in education industry ⁵³	Central government	Local government	NPISH	Other market producers	Imports	Value added tax	
Education and training purpose	EP1 - Primary education	0	877	71 299	2 811	0	0	0	74 987
	EP2 - Secondary education	476	738	27 858	3 121	2 377	114	0	34 684
	EP3 - Higher education	2 165	37 117	542	1 050	974	1 915	0	43 762
	EP4 - Cultural, sport and recreation education	0	33	7 336	0	0	0	0	7 369
	EP5 - Other education and vocational training	7 111	0	0	558	0	0	0	7 669
	EP6 - In-house training	0	6 559	0	0	14 467	0	0	21 026
	Associated goods and services, not allocated	0	0	0	0	1 202	0	301	1 503
Total output		9 752	45 324	107 035	7 540	19 020	2 029	301	191 000
Research and development (own account and production for sales)		278	16 435	123	235				17 071

7.1.18 Gross fixed capital formation in the form of research and development (R&D) is reported for the education industries and the data are sourced from the national account. Most of the R&D related to education is conducted by the central government (own account production in

⁵³ Includes households as producers.

public universities and production of R&D for sale). Investments in other sectors related to education are omitted due to lack of data. However, this is likely to be of minor importance.

7.1.3.3 Expenditures on education and training by user/consumer

7.1.19 Another intention of the SAET is to give detailed information about the user of education and training. Table 7.1.5 illustrates how the use of the different education and training purposes is divided between final consumption expenditures (government, households and NPISH), intermediate consumption by market producers and exports. The final consumption expenditure is gathered from the use side in the national accounts while the estimate of export consists of the expenditures related to foreign students in Norway. The calculation is based on the number of foreign students in Norway and the average support given to a student. The data are available from the Norwegian State Education Loan Fund's annual report. The estimated number is subtracted from the household's consumption and is financed by the central government through the Norwegian State Education Loan Fund. Expenditures related to intermediate consumption in other sectors is also gathered from the national accounts. In addition, in-house production of training by market producers is included in the column for intermediate consumption, while in-house training by non-market producers is included in final consumption expenditures, as recommended in Chapter 2 (see paragraph 2.28).

7.1.20 The investment in R&D, for own account, shown in Table 7.1.4, and investment in other types of assets bought on the market is included for the education industries only. Investment by other sectors are left out of the table, since it is impossible to calculate. The investment expenditure reported under other sectors refers to Investment by market producers of education services.

7.1.3.4 Financing and cost structure tables by sector and education and training purpose

7.1.21 The financing and cost structure tables focus on the income and cost elements of the sectors producing education and training and how the financing sectors assign their resources to the different education and training purposes. The general government accounts provide for a large part of the total funding of education and training and the primary source is GFS together with COFOG information.

7.1.22 It is assumed that the governments' direct financing is equal to the public production of education and training itself plus transfers in kind. This will be equal to government final consumption expenditure. In addition, government give transfers to households (scholarships and grants) and they finance a large part of the expenditures in private schools. Transfers from the government to the other sectors are found in the GFS.

Table 7.1.5

Education and training expenditure, by consumer and education and training purpose.**Current prices, 2015.**

(NOK millions)

		Use						
		Final consumption expenditures				Intermediate consumption - market producers	Exports	Total
		Central government	Local government	NPISH	Households ⁵⁴			
Education and training purpose	EP1 - Primary education	877	71 123	2 609	378	0	0	74 987
	EP2 - Secondary education	738	27 549	2 489	1 531	2 377	0	34 684
	EP3 - Higher education	34 847	542	1 050	3 749	2 270	1 305	43 762
	EP4 - Cultural, sport and recreation education	33	7 336	0	0	0	0	7 369
	EP5 - Other education and vocational training	534	157	506	5 944	528	0	7 669
	EP6 - In-house training	6 559	0	0	0	14 467	0	21 026
	Associated goods and services, not allocated	0	0	0	1 503	0	0	1 503
Total output (intermediate and final consumption) = Total current expenditure		43 588	106 707	6 654	13 105	19 642	1 305	191 000
Research and development		15 281	0	245	0	274		15 800
Capital formation (excluding R&D)		3 537	15 824	805	0	199		20 365
Total gross fixed capital formation		18 818	15 824	1 050	0	473		36 165

7.1.23 The household's final consumption expenditure consists of tuition fees and expenditures related to associated goods and services required for education. The data are found in the national accounts.

7.1.24 All upper secondary pupils with legal rights to upper secondary education are entitled to a grant from the Norwegian State Education Loan Fund to help cover the cost of learning materials and essential personal equipment. Students who are taking higher education or are engaged in other forms of education that qualify for financial support (county colleges, IT schools, technical vocational schools) also have the right to receive financial support from the general government. The amount is initially given as a loan, but if the student lives away from their parents' home, up to 40 per cent of the amount may be converted to a grant given that the pupil passes all exams and have income and financial wealth less than a given amount. Only the grants and scholarships are included in the transfers from the central government, while the student loans are excluded.

7.1.25 In Norway all public education is free of charge. As Table 7.1.6 shows, the local government is the largest financing agent and has the main responsibility for primary and secondary education. The local government also contributes a large part of the financing for education

⁵⁴ Households as consumers only.

and training classified as non-formal education by organizing and financing music schools for children, adult education and many different courses to integrate refugees.

- 7.1.26 Higher education is mainly financed by the central government through direct financing, transfers to households to cover tuition fee and living expenses and transfers to NPISH.
- 7.1.27 By law private primary and secondary schools run by NPISH receive financial support by the government that covers 85 per cent of the operating costs of publicly owned schools. The rest is paid as tuitions fees by households and thus results in minor financing costs for NPISH.
- 7.1.28 Transfers from the central government exceeds the households' expenditure for higher and secondary education, because the transfer also cover living expenses in addition to tuition fees. However, in Table 7.1.6, we want to show only the financing of the direct education expenditures. Thus, we have chosen to set the transfers from the central government equal to the households' expenditures on the relevant EPs.
- 7.1.29 Households also pay for non-formal education such as adult education, driving schools and other education and training courses.
- 7.1.30 The central government contributes to the operation of higher educational facilities by providing subsidies to private universities and colleges (other sectors) that meet the requirements established by the law for education. They also support non-degree granting colleges. The local government provides subsidies to corporations that offer apprenticeship schemes/programmes and training, certificate of apprenticeship or teaching practice positions at the secondary education level.
- 7.1.31 Other industries cover expenditures on education and training for their employees, by purchasing training courses from education providers in addition to spending own resources on in-house training. Some industries also have apprenticeship-agreements with the local government/secondary schools and thus spend own resources on supervision. The industries will receive financial support from the local government to fund such apprenticeship schemes/programmes and teaching practice positions.
- 7.1.32 The national accounts contain information on the total expenditures, by the different cost elements/uses, involved in the production process of education and training by sector. For each producing sector (e.g. central government), the cost shares are held constant across education products.

Table 7.1.6

Financing, by sector and education and training purpose. Current prices, 2015.

(NOK millions)

		Education and training purposes							Total
		Formal education			Non-formal education			Associated goods and services, not allocated	
		EP1 Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation	EP5 Other education and vocational training	EP6 In-house training		
Resources									
Central government	Final consumption expenditure of central government	877	738	34 847	33	534	6 559	0	43 588
	Transfers to households	31	1 531	3 749	0	0	0	0	5 311
	Transfers to NPISH	1 957	2 141	835	29	130	0	0	5 093
	Subsidies to other sectors producing education	0	0	2 030	0	0	0	0	2 030
	Central government financing	2 865	4 410	41 461	62	664	6 559	0	56 022
Local government	Final consumption expenditure of local government	71 123	27 549	542	7 336	157	0	0	106 707
	Transfers to NPISH	626	83	0	0	181			890
	Subsidies to other sectors producing education	0	2 377	0	0	0	0	0	2 377
		Local government financing	71 749	30 009	542	7 336	338	0	0
NPISH	Final consumption expenditure of NPISH	2 609	2 489	1 050	0	506	0	0	6 654
	Transfers from central government	1 957	2 141	835	29	130	0	0	5 093
	Transfers from local government	626	83	0	0	181	0	0	890
		NPISH financing	26	265	215	-29	195	0	0
Households ⁵⁵	Final consumption expenditure of households	378	1 531	3 749	0	5 944		1 503	13 105
	Transfers from central government	31	1 531	3 749	0	0	0	0	5 311
		Households financing	347	0	0	0	5 944	0	1 503
Other sectors	Intermediate consumption	0	2 377	2 270		528	14 467		19 642
	Subsidies from central government	0	0	2 030	0	0	0	0	2 030
	Subsidies from local government	0	2 377	0	0	0	0	0	2 377
		Other sectors' financing	0	0	240	0	528	14 467	0
Rest of the world (exports)		0	0	1305	0	0	0	0	1305
Total resources		74 987	34 685	43 762	7 369	7 669	21 026	1 503	191 000

⁵⁵ Households as consumers only.

Table 7.1.7

Cost structure, by education and training purpose. Current prices, 2015.

(NOK millions)

		Education and training purposes							Total
		Formal education			Non-formal education			Associated goods and services, not allocated	
		EP1 Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation	EP5 Other education and vocational training	EP6 In-house training		
Uses									
All sectors	Compensation of employees	55 122	23 241	20 612	5 466	4 385	0	335	109 162
	Intermediate consumption	13 074	5 963	10 083	1 238	2 147	0	978	33 483
	Consumption of fixed capital	6 787	2 946	10 904	665	508	0	140	21 949
	Taxes on production and imports, less subsidies	4	2 270	-509	0	1 624		-10	132
	Operating surplus	0	151	758	0	2 252	0	59	3 221
	Imports	0	114	1 915	0	0	0	0	0
Total current expenditure		74 987	34 684	43 761	7 369	7 669	21 026	1 503	191 000

7.1.33 Education and training services are labour intensive services, which is evident from Table 7.1.7 where compensation of employees is the main input in the production of all the EPs. This is especially the case for primary and secondary education, which is closely connected to the number of employees at the different education levels. Approximately 56 per cent of the cost is compensation of employees and consists of salaries, wages and employers' social contributions. Intermediate consumption is expenses on goods and services used to provide the final education and training purpose and is also a significant cost in the production process, especially for associated goods and services. Consumption of fixed capital makes up a substantial part of the production of higher education compared to the other education and training purposes. The subsidies from the central government to industries that are employing apprentices are reflected by the high number of subsidies under EP2. Taxes on production are mainly paid by market producers of education, which are the largest provider of EP4, and explains the high tax for Cultural, sports and recreation education. Costs of in-house training are not included, since the different cost elements used by the sectors producing in-house training are unknown. As a result, the total resources and uses will not balance.

Annex 7.2

A Satellite Account for Education and Training for the United Kingdom

7.2.1 Introduction

- 7.2.1 This report presents the findings from a pilot exercise to develop and compile a UK satellite account for education and training for the year 2014. In producing this SAET, the Office for National Statistics (ONS) used the framework established by the Task Force on Measuring Human Capital in their report ‘Guide on Measuring Human Capital’⁵⁶, as well as the recommendations of this guide.
- 7.2.2 The SAET highlights the investment in both formal and non-formal education and training within the UK, including internal training that is provided by enterprises. It focuses on monetary data, aiming to be consistent with National Accounts classifications where applicable, and is balanced accordingly with the SUTs. The ISCED classification, developed by UNESCO was used as the main classification of education within this compilation.
- 7.2.3 This SAET presents the expenditure, by detailed education and training purpose, for various sectors of the UK. The report gives an overview of the UK education system, explains key differences to the core SAET tables proposed in Chapter 3, and presents main sources and findings, as well as supplementary tables to cover non-monetary education data for the SAET.

7.2.2 UK scenario

- 7.2.4 Within the UK, formal education responsibilities generally rest with the central or local government. The central government provides funding for Academies⁵⁷ and Free schools⁵⁸ that teach primary and secondary education. Both these types of schools have the freedom to set their own term dates and whether they follow the national curriculum. The local government funds state schools, which follow the national curriculum. Additionally, there are

⁵⁶ UNECE (2016) ‘Guide on Measuring Human Capital’

⁵⁷ Academies are publicly funded independent schools, which don’t have to follow the [national curriculum](#) and can set their own term times. They still have to follow the same rules on [admissions](#), [special educational needs](#) and [exclusions](#) as other state schools. Academies get money direct from the government, not the local council. They’re run by an academy trust which employs the staff. Some academies have sponsors such as businesses, universities, other schools, faith groups or voluntary groups. Sponsors are responsible for improving the performance of their schools.

⁵⁸ Free schools are funded by the government but aren’t run by the local council. They have more control over how they manage themselves. They’re ‘all-ability’ schools, so can’t use academic selection processes like a grammar school. Free schools can:

- set their own pay and conditions for staff
- change the length of school terms and the school day

They don’t have to follow the [national curriculum](#).

independent⁵⁹ schools which receive their income from fees that they charge to households. While these schools are not controlled by the government, and need not follow the national curriculum, they are inspected by the regulator, Office for Standards in Education, Children's Services and Skills.

- 7.2.5 Higher education is provided by universities which ONS classifies as NPISH⁶⁰. Universities provide not just degrees, but non-credit-bearing courses. A significant proportion of university income comes from the rest of the world. Research grants are received from a wide range of funders, e.g. by EU Government bodies, charities, industry, etc. Research Councils funded from the UK Department for Business, Energy, and Industrial Strategy, The Royal Society, British Academy and the Royal Society of Edinburgh and UK-based charities – mostly NPISH – also fund university education.
- 7.2.6 In terms of non-formal education and training providers, Further Education Colleges are also classified as NPISH in the UK. They receive income from all sectors. Further Education College provision is allocated to EP2 using the majority principle, even though they also provide some evening classes and non-certificate-bearing classes, which would fit into the classification of EP4. These colleges similarly receive funding from the rest of the world, and also raise their own income. The last main aspect of non-formal education and training provision is the large market sector providing professional training, such as accredited accounting, financial and other business requirements.

7.2.3 Key differences and scope

- 7.2.7 The SAET guide sets out recommendations for the compilation of education and training activities, extending the scope of national accounts to capture in-house training. It also sets out guidelines for classifications and which tables are most relevant for such a satellite account. In the UK, due to specific economic situations and data limitations, the standard set of recommendations could not be taken on. The differences to the standard compilation guidelines are highlighted below.

7.2.3.1 Differences in financing agents in the SAET

- 7.2.8 In the UK, the breakdown is shown as six sectors: general government (split between central and local government sectors), the corporate sector, households, NPISH and the rest of the world. In the UK, there are only two levels of government.

7.2.3.2 Differences in Education products

- 7.2.9 Due to some data limitations, there are several differences in the UK presentation:
- 7.2.10 **Education purpose 0 and 1** (henceforth EP0 and EP1) are merged, since government funding of pre-primary education cannot be separated out. As this education product includes pre-

⁵⁹ Private schools (also known as 'independent schools') charge fees to attend instead of being funded by the government. Pupils don't have to follow the [national curriculum](#). All private schools must be registered with the government and are inspected regularly.

⁶⁰ ONS (2016) 'Households and non-profit institutions serving households'.

primary education, this section includes childcare and early learning services, which help to educate pupils before they join primary school.

- 7.2.11 **Education purpose 2 (EP2)** excludes ISCED 4 (Post-secondary non-tertiary education), which is captured under EP3.
- 7.2.12 **Education purpose 5 (EP5)** expenditure by the Household sector only includes driving licence courses, and spending on education not definable by level, while other sectors' expenditures are not restricted to that definition.
- 7.2.13 **Education purpose 6 (EP6)** has not been estimated in this pilot. There is some potential information from the CVTS, but this has not been taken on yet.
- 7.2.14 Expenditures on associated goods and services directly related to the provision of education and training services include expenditure on equipment, such as textbooks and stationery. Generally, UK sources tend to report expenditure on this as well as including sales for non-educational purposes. As a result, the expenditure reported within the SAET may be an over-estimation. These are distributed to the EPs where Household spending is found.
- 7.2.15 Some government expenditures could not be allocated to an EP, such as current expenditure by the ministry for education in administering policy. This is captured under the category "Associated products and administrative expenditures, not allocated".

7.2.4 Constructing the main tables of the SAET

- 7.2.16 The base year for this SAET is 2014. This year was decided upon after a consideration of the availability and stability of the data at the time of SAET discussions. More up-to-date estimates are now available.

7.2.4.1 Main sources

- 7.2.17 Central and local government expenditure on education is identified from the ONS's European System of National and Regional Accounts (ESA) Tables for Annual Expenditure of Government. These tables are used to identify spending by central and local government within the UK, broken down by the COFOG classification.
- 7.2.18 The data for universities is largely obtained from the [Higher Education Finance Survey](#) (HE Finance Survey) published by the Higher Education Statistics Agency. The HE Finance Survey provides information for the funding by sector into EP3. Financial/non-financial corporations provide research grants and provide expenditure on services that the university provides to them. The research grants are specified as income that universities receive from research grants from UK industry, commerce, and public corporations. Also, the survey captures secondary income that universities receive from the private sector, such as for research projects.
- 7.2.19 One issue with the HE Finance Survey is that it is measured on an academic year basis - September to August. This does not follow the calendar year template that the piloting of the Tables has aimed to fulfil. To convert, data are taken from both the 2013-14 and 2014-15

survey sources and weighted in accordance with the number of months which fall in 2014, as 2014 is the target reference year for this pilot.

- 7.2.20 In part, data for EP2 can be found within the [Further Education Colleges accounts](#) that are published by the Skills Funding Agency and the Education Funding Agency. The above surveys include the entire income and expenditure for every Further Education College in England. As this survey only covers England, ONS has imputed estimates for the wider UK. This is done using ONS' population estimates, scaling up the English population to that of the UK.
- 7.2.21 Expenditure on academy-provided education is within the ['Income and expenditure in Academies in England'](#) publication by the Department for Education. Academies are only operational inside England, there is no need to estimate an entire UK figure. Academies operate as both Primary and Secondary schools. As they are controlled by central government, these figures will be placed within the general government sector.
- 7.2.22 Data on household payments of tuition fees to Independent Schools are sourced from the [Independent Schools Council Annual Census Survey](#) published by the Independent Schools Council. The total amount of expenditure on Independent Schools is derived separately for the fees that are paid from UK pupils and non-UK pupils in order to categorise them into the appropriate financing agent of Table 7.2.1. There are three main types of independent schools: Junior, Mixed-Age, and Senior. Mixed-aged schools are schools that provide both primary-level and secondary-levels. Hence, to allocate to the correct EP, the proportion of pupils attending junior and senior schools are used to separate out mixed-age populations.
- 7.2.23 Spending by households on Childcare and Early Learning are used to measure Pre-Primary education. The source for this information is the Department for Education's [Childcare and Early Year Learning survey of parents](#). This survey indicates payment on childcare by type. Therefore, the following types of childcare are used: 'Nursery School', 'Nursery Class attached to a primary or infants' school', 'Day nursery', and 'Playground or pre-school'.

Balancing with National Accounts

- 7.2.24 Many of the data sources used within Table 7.2.1 are non-national-accounts sources. As a result, the [supply and use](#) tables published by the ONS are used to balance the education part of the results of the SAET with national accounts consistent expenditure on education. These tables give an estimate of the Total government, NPISH, household, financial/non-financial corporations, and rest of the world expenditure on education and training services. By using these respective figures as the total amount spent on education by those financing agents, we can calculate the proportions of spending within each financing agent, based on the sources described above.

7.2.5 Supply and use tables

- 7.2.25 The UK SAET focuses more on the Use table, where more detailed data are available, while more assumptions and methodological steps have to be taken to compile the supply table to the same level of detail.

Supply

7.2.26 The Supply table takes the standard form consistent with National Accounts, but does not include the supplementary information on gross fixed capital formation, nor on R&D. All industries of the market sectors have been combined into one column as there was insufficient information to capture education providers separately from the rest of the market sector.

7.2.27 As detailed COFOG estimates of total output (ESA Code P.1) are not published in the UK's case, the assumption is applied that no sales or fees are collected relating to formal education provision by government, and hence total supply is equivalent to total final consumption expenditure. Additionally, COFOGs 09.6 and 09.8, capturing administrative functions of government relating to education could not be assigned to an EP, and hence are captured in an associated goods and services and administrative costs unallocated category.

7.2.28 For NPISH estimates, the majority of education provision is through universities, but alongside degree-provision costs, the costs of providing non-credit-bearing courses also needed to be allocated to EP4. This was done proportional to the tuition fees received between types of courses.

Table 7.2.1

Supply Table. Current prices, 2014.

Pound sterling (GBP) millions

		Supply							
		Market sector	Central government	Local government	NPISH	Imports	less Subsidies	Taxes	Total
Education and training purpose	EP0 & 1 - Pre-primary and Primary education	6 888	684	20 363	0	0	3	0	27 932
	EP2 - Secondary education	1 251	16 683	17 759	8 256	0	474	0	43 476
	EP3 - Higher education	1 386	944	0	31 716	262	10	0	34 298
	EP4 - Cultural, sport and recreation education	886	0	0	757	0	0	0	1643
	EP5 – Other education and vocational training	11 906	1 251	3 032	0	0	253	1 033	16 969
	EP6 - In-house training								
	Associated products and administrative expenditures, not allocated		2 262	2 165					4 427
Total output		22 317	21 824	43 319	40 729	262	740	1 033	

Use

7.2.29 The Use table takes the form of the standard Use table, with the education and training services split by market and non-market services. While the information to populate Table 7.2.2 is largely constrained to the SUTs published by the ONS, these tables do not have the information to be able to break the education and training services down by purpose.

7.2.30 Information from the [Input-Output Analytical Tables](#) published by the ONS was used to disaggregate education and training services. These tables indicate industry purchases and show education and training services by their market, non-market, or NPISH use. For each

industry, the market education and NPISH education are added together, to provide total market use of education. The market and non-market figures are divided by the total spent on education and training within each industry, thereby providing a proportion of education that is provided by the market and the non-market for each industry. These proportions are then assigned to their respective industry for education services within the published Use tables.

Table 7.2.2

Use Table. Current prices, 2014.

(GBP millions)

		Use						
		Final consumption expenditures				Intermediate consumption by market sectors	Exports	Total
		Central government	Local government	NPISH	Households			
Education and training purpose	EPO and EP1 - Pre-primary and Primary education	684	20 363	0	6 885	0	0	27 932
	EP2 - Secondary education	16 683	17 759	7 459	1 575	0	0	43 476
	EP3 - Higher education	944	0	16 960	11 015	540	4 839	34 298
	EP4 - Cultural, sport and recreation education	0	0	234	1 409	0	0	1 643
	EP5 - Other education and vocational training	1 251	3 032	0	1 017	11 668	0	16 969
	EP6 - In-house training							
	Associated products and administrative expenditures, not allocated	2 262	2 165					4 427
	Total output = Total current expenditure (intermediate and final consumption)	21 824	43 319	24 653	21 901	12 208	4 839	

7.2.5.1 Financing and cost-structure tables

7.2.31 Table 7.2.3 indicates the direct and indirect spending of each sector providing and receiving education and training services. It also highlights the recipients of some of the indirect funding, through current transfers. This table aims to show the different role each sector plays in the direct and full funding of education and training, and the sector through which it is financed. The sources for Table 7.2.3 are largely similar to ones used in Table 7.2.1, though when direct information on where a current transfer is received or paid is not available, the current transfers are allocated based on the assumptions, described below.

Financing

7.2.32 The Current Transfers expenditure for Central and Local Governments are found within the ONS's [ESA tables](#). This does not capture counterparty information outside of the government sector, so information from Higher Education and Further Education authorities is used to

assign some of it, with the rest being assigned to the household sector. Note, though it is known that academies, classified to the government sector, receive current transfers from NPISH organizations such as charities, these are not in National Accounts core estimates. Hence, for consistency with the UK's sector accounts publications, they are also not presented in the SAET.

Table 7.2.3

Financing structure table. Current prices, 2014.

(GBP millions)

		Education and training purposes						Total
		Formal education			Non-formal education		Associated products and administrative expenditures, not allocated	
		EP0-EP1 Pre-primary and Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation education	EP5 Other education and vocational training		
Resources								
Central government	Final consumption expenditure of central government	684	16 683	944	0	1 251	2262	21 824
	Transfers to households	25	0	1 448	86	0	446	2 006
	Transfers to NPISH	0	8 417	6 109	106	0	0	14 631
	Subsidies to other sectors producing education	3	474	10	0	253	0	740
	Central governments financing	712	25 574	8 511	192	1 504	2708	39 201
Local government	Final consumption expenditure of local government	20 363	17 759	0	0	3 032	2165	43 319
	Transfers to non-government sectors	0	0	0	0	0	0	0
	Subsidies to other sectors producing education	0	0	0	0	0	0	0
	Local governments financing	20 363	17 759	0	0	3 032	2165	43 319
NPISH	Final consumption expenditure of NPISH	0	7 459	16 960	234	0		24 653
	Transfers from market sector	0	0	832	0	0		832
	Transfers from central government	0	8 417	6 109	106	0		14 631
	Transfers from overseas	0	0	882	0	0		882
	Transfers from households	0	0	532	0	0		532
	NPISH financing	0	-958	8 605	129	0		7 775

Households as consumers	Final consumption expenditure of households	6 885	1 575	11 015	1 409	1 017		21 901
	Transfers from central government	25	0	1 448	86	0	446	2 006
	Transfers to NPISH	0	0	532	0	0		532
	Households financing	5 973	1 372	10 099	800	886	-446	18 684
Market sector	Intermediate consumption	0	0	540	0	11 668		12 208
	Subsidies from central government	3	474	10	0	253		730
	Transfers to NPISH	0	0	832	0	0		832
	Market sectors' financing	2 374	-28	1 714	185	1 343		5 587
Rest of the world	Exports	0	0	4 839	0	0		4 839
	Transfers from overseas	0	0	882	0	0		882
	Rest of the World financing	0	0	5 721	0	0		
Total resources		27 932	43 476	34 298	1 643	16 969	4 427	

7.2.33 Higher education sources also capture donations and endowments from households to universities, which is another transfer to NPISH. Finally, universities' transfers from the market sector and the rest of the world are also captured.

Cost structure

7.2.34 The Cost-structure table describes the various cost elements that occur in order to produce education and training. These are largely based upon and use the same sources as those within the Resources section. The types of uses are the following:

- Intermediate Consumption;
- Compensation of Employees;
- Taxes on production Less Subsidies;
- Consumption of fixed Capital and Net Operating Surplus were combined into Gross Operating Surplus, as not every institutional sector's data provided enough information to break this down.

7.2.35 For the market sector, there wasn't a definitive source to break down their types of expenditure. SUTs breaking down the costs of the education industry were used to allocate private provision, removing non-market cost structures from more detailed sources. Additionally, the cost structure of provision of associated products needed for education, such as books and stationery, were broken down using ISIC 17 – manufacture of paper products, to distinguish the much higher intermediate consumption to labour ratio in this activity. Note, the intermediate consumption of the market sector here shows the inputs into the production

of the EPs they were involved in, while in the Table 7.2.2 use table, this shows the spending by corporations on purchasing the different EPs.

Table 7.2.4

Domestic provision, Cost structure table. Current prices, 2014.

(GBP millions)

		Education and training purposes						Total
		Formal education			Non-formal education		Associated products and administrative expenditures, not allocated	
		EPO - EP1 Pre-primary and Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation	EP5 Other education and vocational training		
Costs								
Central government	Compensation of employees	540	11 858	92	0	98	710	13 298
	Intermediate consumption	144	5 471	790	0	1 259	1 525	9 189
	Gross Operating Surplus	0	-646	62	0	-106	27	-663
Local government	Compensation of employees	12 840	13 118	0	0	1 709	855	28 522
	Intermediate consumption	6 953	6 107	0	0	1 016	2 883	16 959
	Gross Operating Surplus	570	-1 466	0	0	307	-1 573	-2 162
Market sectors	Compensation of employees	4 625	820	342	493	7 263		13 543
	Intermediate consumption	2 377	446	882	185	1 596		5 485
	Gross Operating Surplus	-114	-14	161	209	3 047		3 289
	Taxes on production less subsidies	0	0	0	0	0		0
NPISH	Compensation of employees	0	5 474	18 986	453	0		24 913
	Intermediate consumption	0	2 251	10 935	261	0		13 447
	Gross Operating Surplus	0	531	1 795	43	0		2 369
	Taxes on production less subsidies	0	0	0	0	0		0

7.2.5.2 Supplementary Tables

7.2.36 Whereas the previous tables indicated the expenditure of the different institutional units on education, Table 7.2.5 and Table 7.2.6 put this information into context, highlighting non-monetary information on the education sector.

Supplementary information on population

7.2.37 Table 7.2.5 shows the information on the educational attainment of the population broken down by ISCED level, sex, and age group. The ISCED groups are ISCED 0-1 (EP1), ISCED 2-3 (EP2), and ISCED (4-8) (EP3).

Supplementary information on students and teachers

7.2.38 Table 7.2.6 shows the number of students and teachers within the UK broken down by the level of education and gender. It also shows the average costs and fees per pupil for each group of ISCED levels using information from Table 7.2.1.

7.2.39 The issue with this data is that it does not differentiate those whose highest attainment is a non-ISCED education level. As a result, the numbers of students within these ISCED levels are higher than they would be if non-ISCED as highest attainment was accounted for. This means that, while this can give a useful picture of the number of students and teachers, it is not a perfect indication.

Table 7.2.5

Supplementary information on highest educational attainment. Per cent, 2014.

	Education attainment				
	Age Group	ISCED 0-1	ISCED 2-3	ISCED 4-9	Total
Resident population	Total	0.1	57.2	42.7	100.0
Male	Total	0.1	59.5	40.4	100.0
	0-14				100.0
	15-34	0.0	61.3	38.7	100.0
	35-64	0.1	58.3	41.6	100.0
	65 and over				100.0
Female	Total	0.1	54.7	45.3	100.0
	0-14				100.0
	15-34	0.0	54.3	45.7	100.0
	35-64	0.1	54.8	45.1	100.0
	65 and over				100.0

Table 7.2.6

Supplementary information on students and teachers, 2014.

	Level of education				
	ISCED 0-1	ISCED 2-3	ISCED 4-8	NON ISCED	Total
Number of students	6 656 613	6 374 674	2 330 335		15 361 622
Male	3 427 448	3 213 094	1 021 894		7 662 436
Female	3 229 165	3 161 580	1 308 441		7 699 186
Average costs and fees (per pupil/student)	4 197	6 894	14 610		6 896
Number of teachers	320 014	412 359	148 524		880 897

Annex 7.3

Satellite Account for Education and Training, Canadian Pilot

7.3.1 Introduction

- 7.3.1 This annex presents a pilot satellite account for education and training for Canada. The Canadian pilot follows the framework for a SAET described in the earlier chapters of this guide. The SAET presents internally consistent statistics on the production and use of education and training and financing and costs of education and training by purpose.
- 7.3.2 The Canadian pilot study will focus on the compilation of the core tables, as the supplementary tables are regularly compiled by the education statistics programme of Statistics Canada for statistics on enrolment and graduates and by the productivity programme of Statistics Canada for statistics on resident population and employment by education.
- 7.3.3 The description of the Canadian pilot study is organized as follows. Section 7.3.2 presents the classification of industries, products and institutional sectors that will be applied in the Canadian pilot SAET. Section 7.3.3 presents the data sources and estimation methods. Section 7.4.4 presents the core tables of the SAET for Canada for the year 2014. The year 2014 is chosen as it is the most recent year that the SUTs are available for Canada. Section 7.3.5 concludes.

7.3.2 Concepts, methods and classifications of SAET

- 7.3.4 The compilation of SAET starts with the classification of education and training by purpose (core and associated products), the classification of production units that produce education and training services, and the classification of the financing units by institutional sector that finance education and training.
- 7.3.5 The classification of education and training purposes is based on ISCED levels, with additional categories for non ISCED levels. There are seven EPs:
- EP0 - Pre-primary education;
 - EP1 - Primary education;
 - EP2 - Secondary education;
 - EP3 - Higher education;
 - EP4 - Cultural, sports and recreation education;
 - EP5 - Other education and vocational training;
 - EP6 - In-house training.
- 7.3.6 Included in education and training purposes EP0-EP6 are associated goods and services that are required for the delivery of education such as textbooks and school supplies. However, transportation, meals, accommodation, medical and dental care are not included.

- 7.3.7 Also included in education and training purposes EP0-EP6 are the value of administrative services.
- 7.3.8 For the Canadian pilot SAET, the value of administrative services is included in education and training purposes. However, the associated goods and services will be presented separately as they have not been allocated among education and training purposes EP0-EP6.
- 7.3.9 The scope of training in SAET includes both in-house training (provided by the enterprise itself) and external training (provided by third-party organizations). It covers training activities which have as their primary objectives the acquisition of new competences or the development and improvement of existing ones for existing employees.
- 7.3.10 In-house training of employees provided by their employers is classified as EP6 (In-house) in SAET. In-house training is not included in the national accounts and needs to be estimated for SAET. External training provided by third-party organizations is already part of education and training in the supply use tables for Canada and it is mostly included in EP5 (Other education and vocational training). It can also be included in EP3 or EP4.
- 7.3.11 The estimates for education purpose EP0 (pre-primary education) are not available and will be excluded from the pilot Canadian SAET.
- 7.3.12 EP1 and EP2 will be combined. EP4 and EP5 will also be combined as no separate estimates are available.
- 7.3.13 The education production units in SAET are classified as follows:
- Non-market producers:
 - Government sector;
 - NPISH;
 - Market producers:
 - Education industry;
 - Other.
- 7.3.14 The production units in SAET are dis-aggregated into non-market and market producers. Non-market education service producers consist of those educational institutions that provide education services free of charge or at prices that are not economically significant.
- 7.3.15 The guide recommends disaggregation of non-market producers into central government, state government and local government and NPISH. For the Canadian pilot SAET, data are presented only for general government, but it should be noted that almost all education services are provided by provincial and local governments.
- 7.3.16 While most education and training services are provided by non-market producers (general government and to lesser extent NPISH), a majority of EP4 and EP5 (cultural, sports, and recreation education, and other education and vocational training) are provided by market producers at economically significant prices.
- 7.3.17 Those market producers include producers that are primarily engaged in the provision of education (classified as market producers-education), and other producers that may provide education and training as secondary products (classified as market producers-other).

7.3.18 The financing units are classified according to institutional sectors in the SNA: corporations, NPISH, government, households and the rest of the world. The corporations are market producers that use education and training (including both external and in-house own account training) as intermediate consumption. NPISH, government, households and the rest of the world are the final use categories in the standard tables that purchase education and training as final consumption. NPISH, governments and households may also engage in production and therefore may purchase education and training as intermediate consumption. For the presentation, this intermediate consumption of education and training by those non-market sectors will be added to final consumption to arrive at total consumption in the use table of education and training.

7.3.3 Data Sources and Estimation

7.3.19 The main data used to construct the core tables of SAET is the official SUTs for Canada complemented with additional data sources that are used to construct in-house training and associated products directly related to the delivery of education and training. Additional data sources are also used to estimate exports of primary and secondary education as no such estimates are currently available.

7.3.20 In-house training expenditure is estimated using the WES of Statistics Canada. The WES is designed to explore a broad range of issues relating to employers and their employees that include training with separate data collection from employers and employees.

7.3.21 The target population for the employer component is defined as all business locations operating in Canada that have paid employees except those employers operating in crop production and animal production; fishing, hunting and trapping; private households, religious organizations and public administration.

7.3.22 The target population for the employee component is all employees working or on paid leave in all business locations operating in Canada with the same exceptions as above.

7.3.23 The WES was conducted for the years from 1999 to 2006, after which it was discontinued. The estimates of employee training for the SAET for Canada were estimated for the years 2005 when the survey results are available for both employer and employee components and are then extrapolated to more recent years using the compensation of employees. The extrapolation is based on the assumption that the ratio of training costs to the total compensation of employees in an industry do not change after 2005. This ratio is found to be quite stable over the period 1999 to 2006 using data from the WES.

7.3.24 Training on both employer and employee components covers: (1) classroom training that includes the types of training intended to develop the employees' skills and/or knowledge through a structured format (classroom training), and (2) on-the-job training (which is less structured).

7.3.25 The ratio of training expenditures to gross payroll from the employer component of the WES is found to be 0.8 per cent for the industries covered by the WES for year 2005. This estimate is under-estimated as only 40 per cent of employers include trainees' salaries in their estimates of training expenditures.

- 7.3.26 In addition, total training expenditures from the employer side include the costs of job-related training that takes place inside or outside the location, therefore it includes both in-house training and external training. Therefore, no-separate estimate of in-house training is available from the employer component of the WES.
- 7.3.27 For the construction of the SAET, the compensation of employees on in-house training is estimated from the employee component of the WES and direct costs are estimated using the employer component of the WES.
- 7.3.28 The employee side of WES makes a distinction between internal and external training. It is assumed that the training provided by outside trainers or equipment suppliers represents external training. The training provided by self-learning, supervisor, fellow workers, and other represents internal training. Internal training accounted for 40 per cent of all training that was received by employees in 2005.
- 7.3.29 The hours spent on in-house training can be estimated directly from the survey for major industry sectors. The compensation of employees on in-house training is estimated as the hours on training times average labour compensation per hour. The ratio of hours spent on in-house training to total hours worked is found to be 1.32 on average.⁶¹ There are differences across industries. The ratio tends to be higher in the service producing industries such as finance and insurance, professional services, and health and education. There are no estimates of hours spent on in-house training for general government. It is assumed that the ratio of hours on in-house training to total hours worked for general government is the same as the industry average.
- 7.3.30 The direct cost of training is estimated from the employer component of the WES. For that purpose, a hedonic regression is estimated that relates the total training /gross payroll ratio of a firm to a set of dummy variables for employers including direct costs and/or trainee costs in the estimates plus industry dummy variables and employer size variables. The ratio of the coefficient on the dummy for direct costs and the dummy for trainee costs is the ratio of direct costs to trainee costs. This ratio is found to be 1.12 on average, which is applied to the compensation of employees on in-house training to derive the direct costs of in-house training.⁶²
- 7.3.31 The expenditures on education and training in the SAET include household expenditures on the associated products for the delivery of education and training (textbooks and school supplies). That expenditure is not available from the standard use tables published by Statistics Canada. The household consumption of education services in the use table measures household expenditures on education services that are provided by the education sectors. These do not include resident household expenditures on associated products.
- 7.3.32 The expenditures on associated goods and services for the delivery of education and training are estimated from the Survey of Household Spending. The estimates in this version of SAET are related to higher education and other education and vocational training. No estimates on

⁶¹ The ratio of hours on external training to total hours worked is 0.87 which is lower than in-house training

⁶² This ratio was lower than that was used for Chapter 5 of *UNECE Human Capital Guide*, but was in line with those reported in other countries.

the associated products are available for primary and secondary education, which are expected to be relatively small.

7.3.33 Imports of education and training by education purpose are available from the national SUTs and trade in service statistics.

7.3.34 While exports of EP3 to EP5 are available from the SUTs and trade in service statistics, the exports of EP1 and EP2 are currently not available. For the construction of the SAET, the export of EP1 and EP2 is estimated as the number of international students in primary and secondary education times the tuition and similar fees per student. The number of international students are estimated as temporary residents who entered Canada mainly to study and have been issued a study permit (with or without other types of permits) using the administrative files on non-resident permits from Immigration, Refugees and Citizenship Canada. The tuition fees per students are obtained using information published by provincial governments.

7.3.4 SAET: supply and use tables of education and training products

7.3.35 The SUTs of education and training provide internally consistent data on the production and use of education and training services. In the SUTs, the production of education and training by purpose is equal to the use of education and training by purpose.

7.3.36 Table 7.3.1 presents the supply table of education and training at basic prices with a transformation to purchaser prices for 2014. Table 7.3.2 presents the use table of education and training at purchaser prices for 2014. They are all in Canadian dollars (CAD).

7.3.37 The supply table of SAET shows that the total output of education and training was CAD 140.4 billion. It is composed of CAD 59.2 billion for EP1-EP2 (primary and secondary education); CAD 37.7 billion for EP3 (higher education); CAD 10.8 billion for EP4-EP5 (other education and vocational training), CAD 30.9 billion for in-house training, and CAD 1.8 billion for associated products.

7.3.38 Most education and training is provided by the government sector, followed by the market sector and NPISH. The government sector provided CAD 104.4 billion of education and training. The market sector provided CAD 27.8 billion of education and training (mostly in-house training). NPISH provided CAD 4.9 billion of education and training. Imports of education and training amounted to CAD 1.4 billion.

7.3.39 The addendum item in the supply table presents R&D investment related to education by sectors. R&D includes both own-account R&D and the production of R&D for sale. R&D investment was CAD 10.2 billion for the government sector (all by universities and colleges). R&D investment for market sector that provides education was small and amounted to CAD 4 million. No estimates of R&D investment are available for other market sectors that produce education and training as secondary products and NPISH, which is expected to be small.

7.3.40 Table 7.3.2 shows the purchases of education and training as intermediate consumption by the market sector that acquires these services for their employees. It also presents the purchase of education and training as final consumption by households, NPISH, governments, and rest of the world.

- 7.3.41 The government spent a total of CAD 92.4 billion on education and training⁶³. Resident households spent CAD 18.4 billion on education and training, which includes CAD 1.7 billion on associated products (textbooks and school supplies) and CAD 16.6 billion on tuition and similar fees. Market sector spent CAD 23.9 billion on education and training, mostly on in-house training as intermediate consumption. This CAD 23.9 billion by market sector is comprised of CAD 0.2 billion for market education sectors and CAD 23.8 billion for other market sector. NPISH spent 2.8 billion dollars on education and training. The exports of education and training were worth CAD 2.9 billion.
- 7.3.42 The CAD 140.4 billion expenditures on education and training is an estimate of the investment in education and training in a full human capital satellite account. This can be compared with CAD 351.3 billion non-residential gross fixed capital formation (GFCF) in Canada. Expenditures on education and training were about 40 per cent of GFCF in non-residential fixed assets.
- 7.3.43 The addendum item in the use table presents R&D investment and GFCF related to education and training by sectors. R&D investment by the government sector in the use table represents own-account R&D, as purchased R&D is estimated to be zero in the government sector. R&D investment by the government sector in the use table is smaller than the production of R&D investment in the supply table, which includes own-account R&D and the production of R&D for sale.

7.3.5 SAET: financing and cost structure tables

- 7.3.44 This section presents the financing/cost tables for education and training by purpose.
- 7.3.45 Intermediate inputs, capital and labour input costs by education purpose in the financing/cost table are estimated as those input costs are only available by industries (that produce both education and non-education outputs) in the standard SUTs.
- 7.3.46 This involves a transformation of rectangular product-by-industry SUTs to square product-by-product input-output tables. The standard rectangular SUTs provide the information on the use of intermediate, labour and capital inputs for the production of all outputs of the education sectors. As the education sectors often produce outputs other than education and training services, the inputs for the education sectors recorded in the SUTs need to be split between the production of education services and the production of non-education products.
- 7.3.47 For the Canadian Pilot study, the industry technology model is used. The industry technology model assumes that all products produced by an industry are produced in the same production process. To estimate intermediate input costs, compensation of employees and gross operating surplus by education purpose, the input cost structures for the institutions that produce education purpose EP1-EP6 as their main (characteristic) products will be used.
- 7.3.48 Alternatively, the product technology model can be used. The product technology model assumes that there is only one way to produce each product. In other words, each product has its own typical input structure. For each product the same proportions of products and factor

⁶³ This total consumption on education and training by the government sector includes CAD 2.3 billion for intermediate consumption and CAD 90.2 billion for final consumption.

inputs are used to produce one unit of the product. This alternative model is not used as it is more complex and may produce input cost estimates that are negative.

- 7.3.49 The largest component of production costs for education purpose EP1 to EP6 is the compensation of employees, followed by intermediate input costs and gross operating surplus (see Table 7.3.3).
- 7.3.50 The costs for the production of in-house training (EP6) are recorded as output in the supply table and intermediate consumption for the market sector and final consumption for the non-market sector in the use table of SAET. They are not allocated between the type of inputs (compensation of employees, intermediate inputs, and costs of consumption) in the financing/use table.
- 7.3.51 The financing side of the financing/cost table records the expenditures by general government, NPISH, corporations and the rest of the world and transfers between them.
- 7.3.52 The consumption expenditures on education by general government and NPISH in the table include both intermediate consumption and final consumption, as government and NPISH are engaged in both production and consumption activities. The total government expenditure on education and training was CAD 92.4 billion (2.3 billion for intermediate consumption and 90.2 billion for final consumption). The largest component of government expenditures is the expenditures on primary and secondary education (56.0 billion), followed by spending on higher education (25.4 billion), in-house training expenditures (9.6 billion) and other education and vocational training expenditures (1.5 billion).
- 7.3.53 Private households spent CAD 18.4 billion for education and training, mostly on higher education. NPISH spent CAD 2.8 billion for education and training, and corporations - CAD 23.9 billion, mostly on in-house training.
- 7.3.54 The exports were worth CAD 2.9 billion which included CAD 1.5 billion for higher education and 0.8 billion for primary and secondary education.
- 7.3.55 Total financing on education purpose by a sector includes direct purchase of education plus transfers and subsidies to other sectors for those sectors' purchase of education and training services. Total government financing on education was CAD 92.7 billion in 2014 which included CAD 92.4 billion on direct purchase of education plus CAD 0.20 billion transfers to households in scholarship and grants, and CAD 0.03 billion transfers to corporations.

7.3.6 Conclusions

- 7.3.56 This chapter presents a pilot SAET for Canada for year 2014. This SAET presents internally consistent statistics on the production and use of education and training products and financing and costs of education and training by purpose.
- 7.3.57 The estimates on education and training in SAET can be directly compared with the estimates on other goods and services as both are derived from the same SNA concepts and methods. This estimate of expenditures on education and training in SAET can be used as an estimate of investment in education and training in a full human capital satellite account.

- 7.3.58 The statistics on the production and use of education and training are largely embedded in the national SUTs published by Statistics Canada. The compilation of Canadian pilot SAET involves a re-organization and extension of those estimates that make those statistics visible and more useful for the users of education and training statistics.
- 7.3.59 The Canadian Pilot SAET shows that the expenditures on education and training is 140.4 billion for year 2014 which was about 40 per cent of GFCF in non-residential fixed assets in Canada for year 2014.
- 7.3.60 The government is the largest producer of education and training, followed by market producers and NPISH sector. The government is also largest spender on education and training.
- 7.3.61 In-house job-related training constitutes a significant part of the total expenditures on education and training in Canada. For example, in-house job-related training accounted for more than 20 per cent of total education and training expenditures in 2014. Despite its importance, the data sources used to compile in-house training estimates are either lacking or not up to date.
- 7.3.62 To provide an accurate estimate of in-house training, both the number of hours spent on training and the direct costs of training need to be estimated. In addition, it is necessary to distinguish between in-house training and external training. To accomplish this, household and enterprise surveys are employed. The household surveys are used to provide estimates of hours spent on training while the enterprise surveys are used to estimate the direct costs of in-house training.
- 7.3.63 No separate estimates on early childhood educational development (EPO) are available in Canada. The provision of EPO services include both informal, privately arranged types of care and a more formal or structured approach such as childcare centres, day-care centres, nursery schools or kindergartens. Given the importance of early childhood education development in an individual's future outcomes, it is important to develop estimates for expenditures on the production and use of EPO, as well as the financing and costs of EPO.
- 7.3.64 The proposed SAET includes seven EPs in order to provide comprehensive statistics on education and training. However, the classification of education and training products in the standard Canadian accounts are found to be too broad for the purpose of SAET. In the Canadian Pilot SAET, EP1 and EP2 are combined, and EP4 and EP5 are combined.
- 7.3.65 The compilation of SAET brought together data related to education and training from various statistical programs including SUTs, education statistics program, government finance statistics program, COFOG statistics on government expenditures, COICOP statistics on household expenditure and trade-in-service statistics. These programs use different source data and estimation/compilation methodologies. By combining the disparate data, the SAET acts as a natural data confrontation exercise. They provide a method to assess the relevance, coherence and quality of statistics on education and training. They indicate which data sources align, which may need to be improved and which types of data need to be strengthened to provide consistent, reliable and up-to-date information on education and training.

Table 7.3.1

Education and training output, by provider and education and training purpose at basic price, with transformation to purchaser price. Current prices, 2014.

(millions of CAD)

	Market producers in education industry	Other market producers	NPISH	Government	Imports	Total supply at basic prices	Total supply at purchasers' prices
EP1 -2: primary and secondary education	0	0	1 780	57 380	3	59 163	59 166
EP3: higher education	0	0	0	36 715	985	37 700	37 723
EP4-EP5: culture, sports, recreation and others	5 984	603	2 913	732	368	10 600	10 844
EP6: in-house training	135	21 040	180	9 583	0	30 938	30 938
Associated products						1 261	1 751
Total	6 119	21 643	4 873	104 410	1 356	139 663	140 422
Addendum							
R&D	4			10 189		10 194	10 194

Note. The total supply of associated products is not allocated between purposes.

Table 7.3.2

Education and training expenditure, by consumer and education and training purpose at purchaser price. Current prices, 2014.

(millions of CAD)

	Intermediate consumption		Final use				Total use
	Market producers in education	Other market producers	Households	NPISH	Government	Exports	
EP1 -2: primary and secondary education	0	0	2 635	6	55 949	575	59 166
EP3: higher education	0	221	10 574	0	25 445	1 483	37 723
EP4-EP5: culture, sports, recreation and others	19	2 507	3 404	2 609	1 469	835	10 844
EP6: in-house training	135	21 040	0	180	9 583	0	30 938
Associated products	0	0	1 751	0	0	0	1 751
Total	155	23 768	18 364	2 796	92 445	2 894	140 422
Addendum							
R&D	11				9 984		9 995
Non-residential GFCF except R&D	251				83 463		83 714
Total non-residential GFCF	262				93 447		93 709

Note. The expenditures on associated products are for EP3 to EP5. No estimates of associated products are available for EP1 and EP2. Exports are estimated as the number of international students multiplied by tuition and similar fees per student.

Table 7.3.3

Financing and cost structure tables by education and training purposes. Current prices, 2014.

(millions of CAD)

Financing	Components	EP1-EP2	EP3	EP4-EP5	EP6	Associated products	Total
General government	Consumption expenditure of government	55 949	25 445	1 469	9 583	0	92 445
	+Transfers in cash to households	58	143	9	0	0	210
	+Transfers to NPISH	0	0	0	0	0	0
	+Subsidies to corporations	0	21	4	0	0	25
	=Total government financing	56 007	25 609	1 482	9 583	0	92 680
NPISH	Consumption expenditure of NPISH	6	0	2 609	180	0	2 796
	-Transfers from households and corporations	0	0	0	0	0	0
	-Transfers from government	0	0	0	0	0	0
	=NPISH financing	6	0	2 609	180	0	2 795
Private households	Final consumption expenditure of households	2 635	10 574	3 404	0	1 751	18 364
	+Transfers to NPISH	0	0	0	0	0	0
	-Transfers from government	-58	-143	-9	0	0	-210
	=Private household financing	2 577	10 431	3 395	0	1 751	18 154
Other sectors	Intermediate consumption	0	221	2 526	21 176	0	23 923
	+Transfers to NPISH	0	0	0	0	0	0
	-Subsidies from government	0	-21	-4	0	0	-25
	Corporation financing	0	200	2 522	21 176	0	23 898
Rest of the world	Exports	575	1 483	835	0	0	2 894
Total resources		59 166	37 723	10 844	30 938	1 751	140 422
Costs							
	Intermediate inputs	8 597	7 550	3 082		1 259	20 488
	Compensation of employees	46 447	19 232	6 929		298	72 906
	Net taxes on production	619	210	79		6	914
	Gross operating surplus	3 499	9 746	386		188	13 819
	Total current domestic expenditures	59 163	36 738	10 476	30 938	1 751	139 066
	Rest of the world (imports)	3	985	368	0	0	1 356
Total current expenditure		59 166	37 723	10 844	30 938	1 751	140 422

Note. The expenditure on EP6 is not allocated between intermediate inputs, compensations of employees and gross operating surplus.

Annex 7.4

A pilot of the Israeli Satellite Account for Education and Training

7.4.1 Introduction

- 7.4.1 In Israel the National Education Expenditure Account has been compiled over many years and includes data on national expenditure on education since 1962. It is prepared by the Central Bureau of Statistics according to UNESCO-OECD-Eurostat (UOE) data collection on formal education framework and based on the methodological approaches outlined in the System of National Accounts, 2008 (2008 SNA). The account includes data on expenditure on education by levels of education according to ISCED 2011. It also provides detailed information by operating and financing sectors. Thus, data on education in Israel is already being compiled and published regularly. The latest publication includes data for the year 2017.
- 7.4.2 In the pilot we created a new process in order to compile data on training, ultimately presenting a comprehensive Israeli satellite account for education and training. This SAET uses the framework of the Guide on Measuring Human Capital and classification and methodological guidance provided in the previous chapters of this guide.

7.4.2 Definitions and explanations

7.4.2.1 Education and training products by purposes

- 7.4.3 During the preparation of the SAET, the education and training products were classified by purposes as noted in Chapter 3. The following describes in more detail their content in the Israeli case.
- 7.4.4 EP0 - Pre-primary education includes only the education part of pre-primary education in kindergartens and day care centres (usually for children under 6 years old).
- 7.4.5 EP1 - Primary education includes primary education schools under the following categories: state- secular, state- religious, ultra-orthodox and special education.
- 7.4.6 EP2 - Secondary education includes general secondary schools, vocational, nautical and agricultural schools, Jewish religious schools and yeshivas.
- 7.4.7 EP3 - Higher education includes institutions that have received recognition and authorization from the Council for Higher Education to award academic degrees (universities and academic colleges). It also includes non-academic tertiary education institutions: technological colleges, regional colleges, kindergarten and school teachers training colleges etc.
- 7.4.8 EP4 - Cultural, sports and recreation education includes instructional courses in various fields such as music, arts, and sports provided by market and non-market producers.

7.4.9 EP5 - Other education and vocational training includes:

- vocational training for unemployed persons, for new immigrants to Israel and for persons with disabilities that are funded by general government sector;
- training courses for employees paid for by the employer;
- vocational training courses and driving lessons purchased by households.

7.4.10 EP6 - In-house training includes the vocational training for employees, which is provided by the employing enterprise, both market and non-market. It should be noted that in some cases the available information does not allow a clear distinction between EP5 and EP6 products.

7.4.2.2 Producers and financing units

7.4.11 To compile the Israeli SAET we used the classification of production and financing units in accordance with the classification of institutional sectors in the national accounts of Israel. That classification includes the following sectors:

- The general governmental sector
 - Central government
Ministries and national institutions (including the Jewish Agency)
 - Local government
Municipalities, local and regional councils
 - Governmental non-profit institutions
Non-profit institutions (NPIs) that are financed primarily by the government and the Jewish Agency
- Households
- NPISH
- Corporations (non-financial and financial)
- The rest of the world.

7.4.3 Main data sources

7.4.12 The Israeli SAET is compiled based on the following sources:

7.4.13 **Central government:** administrative data of the Ministry of Finance on the expenditure of the state budget, classified according to COFOG.

7.4.14 **Local government:** a survey based on a statistical sample of local authorities classified according to COFOG, which consists of 155 local authorities, being 62 per cent of the total local authorities in Israel.

7.4.15 **Governmental NPIs and NPISH:** a survey based on a statistical representative sample of NPIs (both governmental and serving households), which consists of 1,600 NPIs. The sample is constructed using the stratified sampling method, grouping the population of NPIs by field of activity (11 main fields, 70 sub fields) and size of NPI (having labour cost as the size sampling variable). Sample size comprises 15 per cent of the NPIs population.

7.4.16 **Corporations:** a survey based on a statistical representative sample of 20,000 non-financial corporations, comprising 4 per cent of the population and classified according to ISIC Rev.4. The financial corporation sector data is extracted from financial annual reports.

7.4.17 **Households:** The Household expenditure survey offers data on household's purchases from the corporation sector, classified according to COICOP. Purchases of households from the rest of the sectors are compiled based on these sectors' data on sales to households.

7.4.4 Main tables of the SAET

7.4.18 The pilot of the Israeli satellite account was compiled on the basis of the collection, processing and analysis of the data on the education and training services for the year 2015. The total expenditure on education and training in current prices amounted to Israeli new shekel (NIS) 104 billion in 2015 and was 8.9 per cent of Israel's gross domestic product (GDP).

7.4.19 The main tables below describe the findings of the Israeli SAET:

- Education and training output, by provider and education and training purpose (Table 7.4.1);
- Education and training expenditure, by consumer and education and training purpose (Table 7.4.2);
- Financing, by sector and education and training purpose (Table 7.4.3);
- Cost structure, by education and training purpose (Table 7.4.4).

7.4.5 Supplementary tables of the SAET

7.4.20 The supplementary tables below provide non-monetary information as part of the Israeli SAET:

- Population aged 15 and over by educational attainment, sex and age group (Table 7.4.5);
- Employed persons aged 15 and over by educational attainment, sex and age group (Table 7.4.6).

7.4.6 Conclusion

7.4.21 In conclusion, we would like to note the following challenges we faced in the compilation of the Israeli SAET:

- For estimation of the expenditure on employees training in corporations and NPIs, we used the existing surveys for these sectors which were not initially designed to collect data on training. These surveys are based on the analysis of production unit's financial reports. The data on training is listed in the applicable financial report sections which sometimes include non-training related data as well, such as trips, presents etc. Such aggregated presentation affected the accuracy of the data for our purpose;
- The expenditure on training in the general government sector was calculated based on the expenditure in the training departments of the central and local government units as presented in the financial statements. These include: in-house training,

training outsourcing, financing individual's external training, professional literature etc. The analysis of the expenses for the purpose of extracting the training related expenditure was made on the basis of additional information from administrative sources. However, such information was incomplete and affected the quality of the data;

- The currently available information does not allow for a qualitative assessment of the expenditure on cultural, sports and recreation education, which should include solely the training portion of these activities. Therefore, expert assessments were used to calculate such expenditure;
- We recognize the importance of including internship expenditure data in the SAET as a major part of human resource training. Currently we are unable to isolate the data related to expenditure on interns' supervision. In the future, we plan to search for additional sources of information and develop a method in order to estimate the expenditure on internships;
- The structure of expenditure by education and training purpose was calculated for the producing industries on the basis of the supply and use tables. In some cases, the calculation was made for a higher industry hierarchy than desired. This is reflected in the quality of the structure of expenditure data.

Table 7.4.1

Education and training output, by provider and education and training purpose. Current prices, 2015.

(NIS millions)

		Supply								Total
		Central government	Local government	Governmental NPIs	NPISH	Market producers in education industry	Other market producers	Imports	Taxes less subsidies on products	
Education and training purpose	EP0 - Pre-primary education	3 876	4 244	877	2 033	1 258				12 288
	EP1 - Primary education	15 220	6 753	710	514	2 100				25 296
	EP2 - Secondary education	6 973	4 781	6 306	1 463	1 540				21 063
	EP3 - Higher education	184	48	14 042	1 989	70		1 149		17 483
	EP4 - Cultural, sport and recreation education	147	1 548	2 708	2 596	6 952			49	14 001
	EP5 - Other education and vocational training	890	23	1 484	2 069	4 787			43	9 296
	EP6 - In-house training	511	99	70	241		160			1 082
	Associated products and administrative expenditures, not allocated	1 507	832				839		35	3 214
Total output = Total current expenditure		29 309	18 329	26 197	10 904	16 707	999	1 149	127	103 722
Research and development (own account and production for sales)				5 877	495					6 373
Capital formation (Excl. R&D)							6 161			6 161
Total gross fixed capital formation				5 877	495		6 161			12 534

Table 7.4.2

Education and training expenditure, by consumer and education and training purpose.**Current prices, 2015.**

(NIS millions)

		Use							
		Final consumption expenditures					Intermediate consumption – market producers	Exports	Total
		Central government	Local government	Governmental NPIs	NPISH	Households			
Education and training purpose	EPO - Pre-primary education	3 876	3 777	748	554	3 333			12 288
	EP1 - Primary education	15 157	6 440	502	197	3 001			25 296
	EP2 - Secondary education	6 899	4 608	5 362	53	4 141			21 063
	EP3 - Higher education	184	47	9 777	400	6 690		386	17 483
	EP4 - Cultural, sport and recreation education	143	1 372	1 587	1 120	9 702	77		14 001
	EP5 - Other education and vocational training	878	15	1 439	1 470	4 525	968		9 296
	EP6 - In-house training	511	99	70	241		160		1 082
	Associated products and administrative expenditures, not allocated	1 507	832			874			3 214
Total output (intermediate and final consumption) = Total current expenditure		29 156	17 191	19 485	4 033	32 266	1 205	386	103 722
Research and development				5 877	495				6 373
Capital formation (Excl. R&D)		43	4 221	1 416	446	35			6 161
Total gross fixed capital formation		43	4 221	7 293	941	35			12 534

Table 7.4.3

Financing, by sector and education and training purpose. Current prices, 2015.

(NIS millions)

		Education and training purposes								Total
		Formal education				Non-formal education			Associated products and administrative expenditures, not allocated	
		EP0 Pre-primary education	EP1 Primary education	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation	EP5 Other educ. and voc. training	EP6 In-house training		
Resources										
Central government	Final consumption expenditure of central government	3 876	15 157	6 899	184	143	878	511	1 507	29 156
	Plus – transfers / subsidies to other sectors	4 524	5 630	12 374	10 211	116	162			33 016
	Less – transfers / subsidies from other sectors	-1 255	-185	-658						-2 097
	Central government financing	7 145	20 602	18 616	10 395	259	1 040	511	1 507	60 075
Local government	Final consumption expenditure of local government	3 777	6 440	4 608	47	1 372	15	99	832	17 191
	Plus – transfers / subsidies to other sectors	1 517	374	854	18	572	113			3 448
	Less – transfers / subsidies from other sectors	-3 071	-3 461	-4 472		-21	-55			-11 080
	Local government financing	2 224	3 353	990	65	1 923	73	99	832	9 559
Governmental NPIs	Final consumption expenditure of governmental NPIs	748	502	5 362	9 777	1 587	1 439	70		19 485
	Plus – transfers / subsidies to other sectors	6	5	58	780					849
	Less – transfers / subsidies from other sectors	-820	-516	-6 151	-11 595	-471	-720			-20 273
	Governmental NPI's financing	-65	-9	-732	-1 038	1 116	719	70		61
NPISH	Final consumption expenditure of NPISH	554	197	53	400	1 120	1 470	241		4 033
	Plus – transfers / subsidies to other sectors	5	8	274	141		18			446
	Less – transfers / subsidies from other sectors	-556	-183	-1 256	-462	-187	-374			-3 017
	NPISH financing	3	22	-929	79	933	1 115	241		1 463
Households	Final consumption expenditure of households	3 333	3 001	4 141	6 690	9 702	4 525		874	32 266
	Transfers / subsidies to/from other sectors, net	-352	-1 672	-1 023	907	-9	855			-1 293
	Households financing	2 982	1 329	3 119	7 597	9 692	5 381		874	30 973

Other sectors	Intermediate consumption					77	968	160		1 205
	Plus – transfers / subsidies to other sectors									
	Less – transfers / subsidies from other sectors									
	Other sector financing					77	968	160		1 205
Rest of the world (exports)					386					386
Total resources		12 288	25 296	21 063	17 483	14 001	9 296	1 082	3 214	103 722

Table 7.4.4

Cost structure, by education and training purpose. Current prices, 2015.

(NIS millions)

		Education and training purposes								Total
		Formal education				Non-formal education			Associated goods and services, not allocated	
		EP0 Pre- primary educa- tion	EP1 Primary educa- tion	EP2 Secondary education	EP3 Higher education	EP4 Cultural, sports and recreation	EP5 Other education and vocational training	EP6 In- house training		
Uses										
All sectors	Compensation of employees	8 179	18 902	14 625	10 833	4 905	6 107	696	2 316	66 563
	Intermediate consumption	2 873	4 039	4 638	4 022	7 234	2 328	201	585	25 922
	Consumption of fixed capital	712	1 116	878	847	778	409	125	72	4 938
	Taxes on production and imports, less subsidies	523	1 239	921	632	453	346	45	152	4 312
	Operating surplus					630	105	15	89	838
Total current domestic expenditure		12 288	25 296	21 063	16 334	14 001	9 296	1 082	3 214	102 573
Rest of the world (imports)					1 149					1 149
Total current expenditure		12 288	25 296	21 063	17 483	14 001	9 296	1 082	3 214	103 722

Table 7.4.5

Population aged 15 and over by educational attainment, sex and age group. Per cent, 2015.

Population	Age group	Educational attainment						
		EPO – EP1	EP2	EP3				Total
		ISCED 0-1	ISCED 2-4	ISCED 5	ISCED 6	ISCED 7	ISCED 8	
	Total	9.0	52.8	11.6	16.6	8.9	1.1	100.0
Total	15-17	2.1	97.9					100.0
	18-24	2.1	90.4	4.6	2.8	0.1		100.0
	25-34	3.2	50.9	11.4	27.2	6.9	0.4	100.0
	35-44	5.6	40.7	13.8	24.7	13.7	1.4	100.0
	45-54	8.4	43.6	15.2	17.8	13.3	1.6	100.0
	55-64	12.2	40.6	15.8	16.5	13.1	1.8	100.0
	65 and over	27.4	32.9	14.1	12.9	10.5	2.2	100.0
Male	Total	7.9	57.1	10.7	14.7	8.1	1.4	100.0
	15-17	2.1	97.9					100.0
	18-24	2.7	92.7	3.1	1.4			100.0
	25-34	3.3	60.5	9.7	21.1	5.0	0.4	100.0
	35-44	5.6	43.8	14.2	22.9	12.0	1.5	100.0
	45-54	7.7	45.9	15.2	16.6	12.6	1.9	100.0
	55-64	10.9	42.8	15.0	16.3	12.6	2.3	100.0
	65 and over	23.3	35.3	12.7	13.7	11.7	3.3	100.0
Female	Total	10.0	48.6	12.5	18.3	9.7	0.9	100.0
	15-17	2.0	98.0					100.0
	18-24	1.4	88.0	6.1	4.2	0.2		100.0
	25-34	3.0	41.4	13.1	33.3	8.7	0.5	100.0
	35-44	5.7	37.7	13.4	26.6	15.4	1.3	100.0
	45-54	9.2	41.4	15.2	18.9	14.0	1.4	100.0
	55-64	13.3	38.5	16.6	16.6	13.6	1.4	100.0
	65 and over	30.6	31.0	15.2	12.3	9.6	1.4	100.0

Table 7.4.6

Employed persons aged 15 and over by educational attainment, sex and age group.
Per cent, 2015.

Employed persons	Age group	Educational attainment						
		EP0 – EP1	EP2	EP3				Total
		ISCED 0-1	ISCED 2-4	ISCED 5	ISCED 6	ISCED 7	ISCED 8	
	Total	3.5	48.4	13.5	21.5	11.7	1.5	100.0
Total	15-17		100.0					100.0
	18-24	1.5	89.6	5.7	3.0	0.1		100.0
	25-34	2.2	46.6	12.1	30.6	7.9	0.5	100.0
	35-44	2.9	36.9	14.8	27.8	16.1	1.6	100.0
	45-54	4.3	40.7	16.6	20.5	15.9	2.0	100.0
	55-64	5.7	39.4	17.7	18.3	16.4	2.5	100.0
	65 and over	9.0	36.0	16.0	17.5	16.5	5.0	100.0
Male	Total	4.2	53.0	12.6	18.5	10.1	1.6	100.0
	15-17		100.0					100.0
	18-24	2.3	91.9	4.0	1.8			100.0
	25-34	2.6	57.1	10.5	23.7	5.6	0.4	100.0
	35-44	3.6	41.3	15.1	24.9	13.4	1.6	100.0
	45-54	5.0	43.6	16.5	18.3	14.3	2.2	100.0
	55-64	6.6	41.3	16.2	17.8	15.1	3.0	100.0
	65 and over	9.3	38.0	14.1	16.7	16.2	5.7	100.0
Female	Total	2.6	43.2	14.5	24.9	13.6	1.3	100.0
	15-17		100.0					100.0
	18-24	0.6	87.1	7.7	4.4	0.2		100.0
	25-34	1.7	35.0	13.9	38.2	10.5	0.6	100.0
	35-44	2.2	32.0	14.4	30.9	19.0	1.5	100.0
	45-54	3.5	37.6	16.7	22.9	17.6	1.7	100.0
	55-64	4.6	37.3	19.4	18.9	17.9	1.9	100.0
	65 and over	8.4	32.7	19.1	18.9	17.1	3.8	100.0

Annex 7.5

Compilation of a Satellite Account for Education and Training in Republic of Belarus

7.5.1 Introduction

- 7.5.1 This report presents the preliminary results for the development of a satellite account for education and training for the Republic of Belarus. The base year for the SAET compilation is 2016. This choice was made because the "input-output" tables for 2016, which were one of the data sources for the SAET, are the latest available.
- 7.5.2 The main goal of the SAET compilation was to obtain detailed information and to identify the links between producers of education and the entities that provide funding, presenting data for each by educational products. For the compilation of the SAET, the Task Force on Satellite Accounts for Education and Training agreed to primarily use the principles and production boundaries of national accounts.
- 7.5.3 Compilation of the SAET in the Republic of Belarus was carried out by the National Accounts Department in cooperation with the sectoral departments of the National Statistical Committee of the Republic of Belarus and with the assistance of the Ministry of Education of the Republic of Belarus.
- 7.5.4 The legislative basis for education is provided by several legal acts, the most important being the Education Code of the Republic of Belarus, adopted in 2011. It regulates the institutional framework and relationships in the field of education, establishes a separate branch of law - educational law. The Code defines the structure of the national educational system; areas of international cooperation in education; as well as, the financing and technical support for different levels of education.
- 7.5.5 The SAET reflects the expenditures on both formal and non-formal education in the Republic of Belarus, as well as the expenditures on in-house training incurred by employers (which extends the production boundary of the SNA).

7.5.2 Classifications and data sources used for SAET

- 7.5.6 Various data sources were used for the SAET development, the basis of the account was provided by the data used in the national accounts and additional information from administrative sources (Ministry of Education). The process of integrating the information revealed several differences in the available sources. Compilation of national accounts is carried out for a calendar year, while the education system reports the education expenditures for an academic year. The coverage of education in national accounts is wider. Besides formal education they also include other types of education; i.e. so-called non-formal education (training centers vocational rehabilitation courses, foreign language and communication skills,

computer courses, survival courses, religious education, etc.), as well as the activities of driving schools. There are differences in the classification by level for education in the national accounts and the classifications in the educational system of the Republic of Belarus.

7.5.7 The lack of sufficient detail for the classifications currently used in the national accounts for coding by education level caused some difficulties while compiling the SAET.

7.5.8 A number of classifications are used for the compilation of the national accounts and the recording of different transactions related to education. For the development of the SAET the following key classifications were used (Table 7.5.1): ISCED classification, developed by UNESCO, National Classification of Products by Economic Activity of the Republic of Belarus (harmonized with the Classification of Products by Activity (CPA) 2008), National Classification of Economic Activities (OKED, harmonized with NACE Rev. 2).

Table 7.5.1

Classifications used in the SAET of Republic of Belarus.

Education and training purpose (EP)	ISCED	National Classification of Products	National Classification of Economic Activities (OKED, based on NACE Rev. 2)
EP0 - Early childhood education	01 Early childhood education	851 Pre-primary education services	851 Pre-primary education
	02 Pre-primary education		
EP1 - Primary education	1 Primary education	852 Primary education services	852 Primary education
EP2 - Secondary education	2 Lower-secondary Education (basic education-1 stage of secondary education)	8531 General secondary education services 853211, 853212 Vocational technical education (based on general basic and vocational education)	853 Secondary education including
	3 Upper-secondary education	853213, 853214 Secondary vocational education (based on general basic education - 1 and 2 years)	8532 Technical and vocational secondary education (at the level of secondary education; excluding 85321)
	4 Post-secondary non-tertiary education	853211 Vocational technical education (excluding those who study on the basis of general basic and vocational education)	85321 Vocational technical education
EP3 - Higher education	5 Short-term higher education	8541 Post-secondary education	8541 Post-secondary education
	6 Bachelor's or equivalent	8532 Secondary vocational education (excluding students with 1 and 2 years of general basic education)	85322 Secondary vocational education (higher education level)
	7 Master's or equivalent	854211, 854212 Higher education of the first degree	854 Higher education , except for 8541
	8 Doctoral or equivalent	854213, 854214 Higher education of the second degree	
		854216 Postgraduate education services	85422 Postgraduate education

EP4 - Cultural, sports and recreation education	Non ISCED	8551 Sports and recreation education services	8551 Sports and recreation education
		8552 Cultural education services	8552 Cultural education
EP5 - Other education and vocational training	Non ISCED	853219 Services in the field of vocational and special secondary education, not elsewhere classified	85329 Other technical and vocational secondary education, n.e.c.
		8553 Services of driving schools	8553 Activities of driving schools
		8559 Other types of education that are not included in other groups	8559 Other types of education that are not included in other groups
		856 Ancillary education services	856 Ancillary education services
		861013 Services of rehabilitation centres (activities of sanatory schools)	
		88100 (CCEA partially) Vocational rehabilitation and/or preparation for a certain type of activity for persons with disabilities, provided that training is not the main (predominant) component	
		88990 (CCEA partially) Vocational rehabilitation and (or) preparation for a certain type of activity for the unemployed, provided that training is not the main (predominant) component-budget financing	
EP6 - In-house training	Non ISCED		
Associated goods and services not allocated by educational level	Non ISCED	1413 School clothing (the purchase of school uniforms by households) 17230 Production of paper office accessories (the purchases of notebooks and other office supplies for school by households) 58110 Publishing of books (the purchase of school textbooks by households)	

7.5.9 Currently, the education system in the Republic of Belarus includes a pre-primary education system, a general secondary education system (which includes primary, basic and secondary education), a vocational-technical education system, a system of secondary vocational

- education, a higher education system, a post-graduate education system, an additional education system for children and youth, an adult education system, and special-needs education system.
- 7.5.10 Special-needs education includes the provision of special conditions for obtaining special-needs education at the levels of pre-primary and general secondary education by persons with disabilities taking into account their psychophysical development and needs.
- 7.5.11 The classification of educational levels in the Republic of Belarus has some specific features.
- 7.5.12 Pre-primary education (EP0) is carried out by pre-primary education institutions, social and pedagogical institutions, nurseries and kindergartens - primary school, nursery-kindergarten - basic school, nursery-kindergarten - secondary school, kindergarten - primary school, kindergarten - basic school, kindergarten - secondary school, boarding schools for orphans and children left without parental care, and can also be implemented by other organizations or individual entrepreneurs. The age of children is from 2 months to 7 years. The stay of children in pre-primary institutions can be organized in groups for short-terms (from 2 to 7 hours) and/or daily stays (up to 24 hours).
- 7.5.13 Primary education (EP1) is included in the system of general secondary education. This is the first stage of general secondary education (Grades I - IV). However, it should be noted that some pre-school institutions may provide services of primary education. Such expenditures cannot be separated from pre-primary education.
- 7.5.14 General secondary education (EP2). The duration of general basic education is nine years, of general secondary education - eleven years (if in evening schools, evening classes - twelve years). This includes the financing of training programs in recreation camps and medical institutions with round-the-clock stays.
- 7.5.15 The education system of the Republic of Belarus also includes a system of vocational-technical education and a system of secondary specialized education.
- 7.5.16 Vocational and technical education aims at personal development of the student, his/her professional development, obtaining special theoretical and practical training, terminating by obtaining a qualification of a worker with vocational technical education, or employee with vocational and technical education (vocational technical colleges, lyceums).
- 7.5.17 Secondary specialized education aims at the personal development of a student, or trainee, obtaining special theoretical and practical training, terminating by obtaining a qualification of a specialist with secondary specialized education, or a worker with secondary specialized education (colleges or other institutions implementing secondary specialized education programmes).
- 7.5.18 These two levels (vocational and technical and secondary specialized education) are borderline between secondary and higher education, as there are separate training programs at both levels, on the basis of which students can continue in-depth study of the subjects according to the higher education programs. After completion of these separate programs, they can immediately move to the level of higher education.

7.5.19 The allocation of expenditures by EPs when compiling SAET was done on the basis of the data on the number of students in different educational programs.

7.5.20 Higher education (EP3) includes higher educational and postgraduate educational programs. Educational programs of higher education are divided into:

- stage I educational program of higher education, providing the qualification of a specialist with higher education;
- stage I educational program of higher education, providing the qualification of a specialist with higher education and integrated with the educational programs of vocational secondary education;
- stage II educational program of higher education, providing knowledge, skills and abilities of scientific-pedagogical and research work and providing a Master's degree;
- stage II educational program of higher education with in-depth specialist training, providing a Master's degree.

7.5.21 Postgraduate education includes two stages:

- postgraduate education (aspirant) - stage I of postgraduate education, aimed at training specialists with the skills of planning and independent research, deep theoretical knowledge, allowing one to prepare a qualifying scientific work (thesis) for the degree of Candidate of Sciences;
- doctorate - stage II of postgraduate education, aimed at training specialists with the skills of organizing research work in a new research line or developing existing relevant research lines, analytic summarizing of the results of scientific activity, allowing one to prepare a qualifying scientific work (thesis) for the degree of Doctor of Science.

Postgraduate, doctoral (ISCED 8) are parts of education, performed within research and development activities. Therefore, the costs will be included only for full-time postgraduate education.

7.5.22 The educational product (EP4) "Cultural, sports and recreation education" includes educational services in the field of physical culture and sports (activities of children and youth sports schools, schools of the Olympic Reserve, sports sections), as well as educational services in the field of culture (activities of cultural centers, arts palaces and others).

7.5.23 Other education and vocational training (EP5) includes public administration expenditures for organizing training programs (not distributed by education levels), activities of schools for training and retraining drivers and other types of education, as well as additional adult education, including an educational training program for executive officers and specialists with higher education.

7.5.24 Currently, there are some peculiarities in the classification of EP5 "Other education and vocational training" in the Republic of Belarus in connection with the specifics of the organization of the education process. In this regard, EP5 is subdivided into 3 groups:

- group EP51 "Expenditures on education not distributed by levels of education" include: state administration services relating to education, expenses for activities of educational institutions, including the work of educational and methodological centers and other institutions that provide for the implementation of training, educational and other programs;
- group EP52 "Other Education" includes other types of education that are not related to vocational training and are mainly related to the education and training of the adult population. For example, driving schools, foreign languages, computer courses, survival courses, speed reading and other educational programs;
- group EP53 "Vocational training" includes the costs of training and rehabilitation of the disabled, training and re-qualification of the unemployed and the costs of training and re-qualification of employees outside the enterprise, etc.

7.5.25 Educational product (EP6) "In-house training" includes the costs of enterprises and institutions for training of employees within the enterprise (including disabled people and persons with disabilities). This EP extends the production boundary of education.

7.5.26 It is also necessary to pay attention to some issues in allocating to EPs, which are due to the specific organization of the education process in the republic.

7.5.27 Budget expenditures for training and rehabilitation of children with disabilities (social education) are reflected in ISCED 0 – ISCED 4 products. Budget expenditures by education level are done taking into account the costs of the institutions carrying out work with students with special needs (for example, costs of special-needs education centers for the development and rehabilitation of disabled children and the costs of special-needs educational institutions are included).

7.5.28 Taking into account that the national accounts of Belarus are compiled for so called "net products" (the data refers to local kind of activity units), educational services do not include government expenditures on separate programs for the social protection of students (clothing, meals, etc.). Such expenditures are classified in the Republic of Belarus under OKED economic activity 88 "Provision of social services without accommodation".

7.5.29 However, some social payments of the government could not be separated from the total expenditures on education, and these are therefore included in educational products (for example, additional meals for orphaned children in primary school).

7.5.3 Main tables of the SAET

7.5.30 In order to compile the SAET, within the national accounts a supply table was developed (for industry x product), which helped to identify the producers of different education and training purposes.

Table 7.5.2

Supply table in purchasers' prices by sector – producers of education and training services in the Republic of Belarus. Current prices, 2016.

(Thousands of Belarusian rubles)

Code	Education and training purpose	Production					Total supply – domestic sectors at basic prices	Imports (f.o.b.)	Net taxes on products	Total supply purchasers' prices
		Financial/Non-financial corporations (\$11)	General government (\$13)		Households (\$14)	NPISH (\$15)				
			Central government(\$131)	Local government(\$133)						
EP0	Early childhood education	1 148	681	179 184	174	1 709	182 896			182 896
		5 474	3 470	853 640	829	8 148	871 561			871 561
EP1	Primary education	633	16 093	835 204	190		852 120			852 120
EP2	Secondary education	2 977	18 585	843 667	36 433		901 662			901 662
		1 693	29 765	735 071	9 624		776 153			776 153
		434	1 712	57 027	2		59 175			59 175
EP3	Higher education	12 265	45 629	144 844	29		202 767			202 767
		40 027	693 736	12 866	6		746 635	109 616		856 251
		661	7 338				7 999	1 810		9 809
		173	5 009		3		5 185			5 185
EP4	Cultural, sports and recreation education	9 296	50 889	269 777	49	312	330 323	5 235	1 673	337 231
EP5	Other education and vocational training	160 051	46 130	140 993	12 518	3 007	362 699	26 137	38 542	427 378
EP51	Education expenses not allocated to EP1-EP4	8 472	13 421	106 469	72	0	128 434		1 021	129 455
EP511	of them educational support services	8 472	3 487	23 759	72		35 790		1 021	36 811
EP52	Other education	139 441	2 220	18 947	12 446	3 007	176 061	3 945	36 783	216 789
EP53	Professional training	12 138	30 489	15 577			58 204	22 192	738	81 134
EP6	In-house training of employees by their employers	14 160	4 527	2 549	13 257		34 493			34 493
	Associated goods and services, not allocated				36 807		36 807		4 793	41 600
	Total	248 992	923 564	4 074 822	109 921	13 176	5 370 475	142 798	45 008	5 558 281

- 7.5.31 As reflected in Table 7.5.2, about 90 per cent of the costs of providing education services are in the general government sector, the majority of the costs are in secondary education — 33.7, in early childhood education — 20.7, and in higher and primary education - 18.2 and 17 per cent, respectively.
- 7.5.32 The non-financial sector provided 4.5 per cent of the total education services, most of which are services of other education – 64 per cent.
- 7.5.33 The household sector covers producers of education services such as: individual entrepreneurs, individuals (tutors).
- 7.5.34 At the same time, based on the data presented in Table 7.5.3, it is possible to determine the funding by sources (in basic prices).

Table 7.5.3

Financing of education and training in the Republic of Belarus. Current prices, 2016.

Financing Sector	Code	Financing, thousands of Belarusian rubles	Per cent (of total)
Central government	S131	704 223	12.8
Local government	S133	3 689 827	66.9
Financial/Non-financial corporations	S11 S12	49 263	0.9
NPISH	S15	92 764	1.7
Households	S14	837 759	15.2
Rest of the world	S2	139 437	2.5
Total		5 513 273	100.0

- 7.5.35 According to Table 7.5.3, the main source of funding for education was local government, which accounted for about 67 per cent of all expenditures recorded in the SAET in 2016. Of these funds, 43.1 per cent went for the provision of secondary education, 24.2 - for early childhood education, and 22.1 - for primary education. At the same time, financing from the budget of the republic amounted to 12.8 per cent and was directed mainly to higher education – 81 per cent. The high value of these costs is due to the focus of the state on education, especially for children aged 0 to 7 years, including the cost for children with disabilities.
- 7.5.36 It should also be noted that the next most important source of education financing in 2016 is households. They spent 2.4 percentage points more than central government units. Household expenditures were directed to early childhood education - 19.1, higher education – 28.2 and secondary education – 15.3 per cents respectively.
- 7.5.37 Most of the export of education services represented higher education services – 94.1 per cent.
- 7.5.38 Table 7.5.4 below presents costs according to education and training purposes and the economy sectors consuming them (in basic prices).

7.5.39 Based on the data on the use of educational products, the following can be noted: in 2016, secondary education services (EP2) accounted for 31.4 per cent of total education expenditures, higher education (EP3) and early childhood development (EP0) accounted for 19.2 and 19 per cent, respectively, while expenditure on primary education (EP1) accounted for 15.4 per cent.

Table 7.5.4

Use table by education and training purpose and consuming sector in basic prices, in the Republic of Belarus. Current prices, 2016.

(Thousands of Belarusian rubles)

Code	Education and training purpose	Intermediate consumption	Final consumption expenditure					Exports of education products	Total use in purchasers' prices
			Households	General government		Non-profit organizations serving households			
				for individual goods and services	for collective services				
EP0	Early development of children		160 289	891 665		10	217	1 052 181	
EP1	Primary education		19 672	832 387			61	852 120	
EP2	Secondary education		128 413	1 606 821		1 445	311	1 736 990	
EP3	Higher education		342 947	563 588	10 994	10 453	131 220	1 059 202	
EP4	Cultural, sports and recreation education		35 525	283 548		7 189	41	326 303	
EP5	Other education and vocational training	35 103	100 849	197 971		73 667	7 587	415 177	
EP6	In-house training	14 160	13 257	7 076				34 493	
	Associated goods and services not distributed by educational level		36 807					36 807	
	Total used	49 263	837 759	4 383 056	10 994	92 764	139 437	5 513 273	
	Gross fixed capital formation							210 541	
	Research and development (accumulation)							6 151	
	Total gross fixed capital formation							216 692	

7.5.40 On the other hand, intermediate consumption of education services in Belarus amounted to 0.9 per cent, of which 71.3 per cent is for purchased services and 28.7 per cent is for in-house training.

7.5.41 The estimate of in-house training was based on two components: remuneration of employees during their absence from work for training and the data from the survey of economically active population on the training at the workplace without instructors (internships).

7.5.4 Supplementary tables of the SAET

7.5.42 The following tables (tables 7.5.5-7.5.7) reflect supplementary information on pupils/students enrolled and teachers in accordance with international standards; on graduates by gender and field of education; on the economically active population of the Republic of Belarus by sex, occupation and level of education for 2016.

Table 7.5.5

Information on pupils/students enrolled and teachers in the Republic of Belarus, 2016.

	Level of education										
	ISCED 0			ISCED 1	ISCED 2	ISCED 3	ISCED 4	ISCED 5	ISCED 6	ISCED 7	ISCED 8
	Total	Early childhood education	Pre-primary education								
Number of students	399 914	69 347	330 567	410 487	441 877	202 467	15 695	92 113	336 373	10 227	5 284
male	209 595	36 171	173 424	210 806	226 689	106 803	10 275	45 253	146 259	5 983	2 536
female	190 319	33 176	157 143	199 681	215 188	95 664	5 420	46 860	190 114	4 244	2 748
Average costs (Belarusian rubles per pupil/student)	2 637	2 637	2 637	2 076	2 041	3 833	3 770	2 201	2 546	959	981
Number of teachers	49 545	6 222	43 323	22 385	53 987	23 667	6 524	29 436			

Table 7.5.6
Information on graduates by sex and field of education in the Republic of Belarus, 2016.

ISCED-F 2013 ⁶⁴	ISCED 5			ISCED 6			ISCED 7			ISCED 8			ISCED 5-8		
	Short-cycle tertiary education			Bachelor's or equivalent level			Master's or equivalent level			Doctoral or equivalent level			Total tertiary programmes (ISCED 5-8)		
	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F
	total	male	female	total	male	female	total	male	female	total	male	female	total	male	female
Education	2 017	354	1 663	9 341	2 629	6 712	322	90	232	78	24	54	11 758	3 097	8 661
Arts and humanities	1 469	334	1 135	3 953	840	3 113	550	198	352	156	51	105	6 128	1 423	4 705
Social sciences, journalism and information	243	23	220	3 545	688	2 857	305	116	189	42	12	30	4 135	839	3 296
Business, management and law	10 146	1 834	8 312	29 552	7 998	21 554	1 618	711	907	142	71	71	41 458	10 614	30 844
Natural sciences, mathematics and statistics	89	47	42	2 681	912	1 769	395	209	186	154	80	74	3 319	1 248	2 071
Information and communication technologies	2 153	1 661	492	2 630	2 035	595	265	231	34				5 048	3 927	1 121
Engineering, manufacturing and construction industries	14 785	11 917	2 868	16 470	11 862	4 608	757	544	213	230	158	72	32 242	24 481	7 761
Agriculture, forestry, fishery and veterinary	2 472	1 198	1 274	2 676	1 225	1 451	122	73	49	52	25	27	5 322	2 521	2 801
Health care and social security	3 501	303	3 198	4 355	960	3 395	32	13	19	118	50	68	8 006	1 326	6 680
Services	2 142	536	1 606	2 770	1 591	1 179	150	132	18	27	26	1	5 089	2 285	2 804
TOTAL	39 017	18 207	20 810	77 973	30 740	47 233	4 516	2 317	2 199	999	497	502	122 505	51 761	70 744

⁶⁴ISCED Fields of Education and Training 2013 (ISCED-F 2013), Manual to accompany the International Standard Classification of Education 2011.

Table 7.5.7

Employment by sex, occupation and educational attainment level in the Republic of Belarus, 2016.

		Employed persons			
		ISCED 2011 level of education			
		All levels	Levels 5-8	Levels 3-4	Levels 0-2
Total	Total	4 861 788	2 647 031	2 155 054	59 537
	<i>of which:</i>				
	legislators, managers of government and public organizations	463 834	410 404	53 430	0
	professionals	899 474	878 843	20 197	434
	specialists	552 335	461 756	88 391	2 189
	employees engaged in the preparation and processing of information, accounting and provision of services to consumers	228 253	138 524	89 271	457
	service and sales workers and related occupations	694 682	257 333	428 765	8 584
	skilled agricultural, forestry and fishery workers	134 594	19 328	100 437	14 830
	skilled industry, construction workers and related occupations	782 569	207 049	568 862	6 658
	plant and machine operators and assemblers	643 447	152 022	483 082	8 342
Male	Total	2 399 193	1 070 878	1 293 853	34 462
	<i>of which:</i>				
	legislators, managers of government and public organizations	250 515	220 080	30 434	0
	professionals	275 484	265 353	9 871	260
	specialists	139 301	102 223	36 369	709
	employees engaged in the preparation and processing of information, accounting and provision of services to consumers	29 514	18 000	11 514	0
	service and sales workers and related occupations	200 280	90 080	106 475	3 726
	skilled agricultural, forestry and fishery workers	65 175	9 528	48 106	7 542
	skilled industry, construction workers and related occupations	642 263	169 584	467 251	5 428
	plant and machine operators and assemblers	564 843	126 119	431 060	7 663
Female	Total	2 462 595	1 576 153	861 201	25 075
	<i>of which:</i>				
	legislators, managers of government and public organizations	213 319	190 323	22 996	0
	professionals	623 990	613 490	10 326	174
	specialists	413 035	359 533	52 022	1 480
	employees engaged in the preparation and processing of information, accounting and provision of services to consumers	198 739	120 524	77 758	457
	service and sales workers and related occupations	494 402	167 254	322 290	4 858
	skilled agricultural, forestry and fishery workers	69 419	9 800	52 331	7 288
	skilled industry, construction workers and related occupations	140 306	37 464	101 611	1 230
	plant and machine operators and assemblers	78 604	25 903	52 022	679

- 7.5.43 Finally, it should be noted that in 2012, the National Statistical Committee of the Republic of Belarus conducted a multiple-indicator cluster survey to assess the situation of children and women (MICS 4). One of the goals of MICS 4 was to obtain objective information on child development, basic methods of raising children in the family, and various activities that promote early childhood education. Within MICS 4 a special module was developed, which included 10 questions that allowed the calculation of an index of early childhood development (IECED).
- 7.5.44 In the Republic of Belarus, 93.9 per cent of children under 5 develop in accordance with age, while the IECED in cities and urban-type settlements amounted to 95.1 per cent, in rural settlements – 90.9 per cent. The highest IECED value is recorded among those children who attend children's educational programs – 95 per cent, while the index value for children who did not attend such programs was 86.6 per cent. However, the IECED at the age of 36-47 months is 91.9 per cent, and at 48-59 months – 96.1 per cent.
- 7.5.45 School readiness of children (5 years old) is 96.7 per cent. The competence rate among young people at the age of 15-24 among males and females is 100 per cent.

7.5.5 Conclusions

- 7.5.46 SAET is a good tool allowing the analysis of the structure of the financing and the distribution of resources by users and by education and training purposes. Nevertheless, the breakdown of expenditure by education levels presented the biggest challenge for the compilation of the SAET for Belarus. The currently available national accounts data do not allow the distribution of all expenditures by education level, as national accounts use a full range of classifications covering the different transitions in education and these classifications do not include sufficient level of detail. Therefore, additional information from the Ministry of Education of the Republic of Belarus on the number of pupils and students engaged in different education programmes was used. This was, for example, data on the number of students in orphanage institutions or specialized boarding schools, etc. by age and level of education.
- 7.5.47 Another challenge was that the experimental estimates could not cover all in-house training of enterprises due to the lack of sufficient data. For example, at the moment there is not enough information on the remuneration for the supervision of interns (e.g. internships of medical personnel).
- 7.5.48 One of the main directions for further work is the analysis of the internal expenditures on training of enterprises and public entities. For this purpose, the employment survey of households will include additional questions that will enable the estimation of enterprise expenditure on in-house training. The questionnaire will allow the estimation of the time spent on the supervision of interns and apprentices.

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