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Satellite account for education and training**Satellite Account for Education and Training: Compilation Guide****Note by the Task Force on satellite accounts for education and training***Summary*

This document contains an overview and main recommendations of the Satellite Account for Education and Training: Compilation Guide as presented in Chapter 1 of the Guide. The purpose of the Guide is to facilitate the international comparability of these accounts and, thus, lead to improved cost-based measurement of human capital. It was prepared by a Task Force composed of Belarus, Canada, Germany, Israel, Italy, Norway (Chair), the United Kingdom, Eurostat, UNECE, UNESCO and UNSD. France, Russian Federation, Wittgenstein Centre for Demography and Global Human Capital, and representatives of the academia also took part in the early stages of the project.

The Task Force took as a starting point the principles of the System of National Accounts (SNA) and the framework presented in chapter 5 of the *Guide on Measuring Human Capital*. This foundation was further elaborated to propose classifications, methodology, sources and how these can be developed and incorporated into a satellite account for education and training (SAET). An important step in the work was the testing of the proposed framework in several countries: Belarus, Canada, Israel, Norway and the United Kingdom.

The full text of the Guide (including the country case studies) has been sent to all members of the Conference of European Statisticians (CES) for electronic consultation. In view of the importance of the work and its link to the SNA research agenda, UNSD has extended the consultation to all non-CES countries. Subject to a positive outcome of the consultation, the CES plenary session will be invited to endorse the Guide.



I. Why is this guide needed?

1. 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.”
2. 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 UNECE 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).
3. 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.
4. 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.
5. 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 estimate of the total expenditure on education and training, the objective of such a satellite account is also to distinguish and provide breakdowns of the various expenditures, including the identification of the financing arrangements for these expenditures.
6. 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).
7. The Advisory Expert Group on National Accounts has identified wellbeing 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 wellbeing, including for example distributional measures, and broader issues of wellbeing 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 satellite account for education and training (SAET) can provide an important tool in this context.

II. Importance and policy relevance

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 GDP¹" 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.

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.

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 individuals.

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.

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.

13. A central aim of the proposed SAET is the elaboration of classifications, methodology and data sources that are used to produce international comparable statistics on education and training.

III. Overview of the Guide

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 to be used, methodology, sources and how they can be processed and incorporated into a satellite account. 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 IV). 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

¹ Gross domestic product (GDP)

to a discussion and comparison of the different international initiatives for collecting data on education expenditure.

A. Chapter 2: Principles and definitions of the Satellite Account for Education and Training

15. The chapter discusses the principles and definitions of the Satellite Accounts 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.

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 (NEA), 2016 and the UNESCO-OECD-Eurostat (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.

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.

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 and sport 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.

19. The goal of the SAET is to compile the total expenditure on education and training consistent with the national accounts framework. 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).

B. Chapter 3: Classifications and tables for the Satellite Accounts for Education and Training

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 7 Education and Training purposes, where the first 4 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.

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 education and training purpose (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.

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.

23. Finally, the chapter discusses the setup of the SAET in tables. The first two tables are based on Supply and Use Tables (SUT) 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 a SUT, highlighting the supply of education and training by purpose (EPs) 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.

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.

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

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 investments using the cost-based approach (UNECE, 2016).

D. Chapter 5: Data sources

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.

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 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.

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).

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 other government ministries and internationally, to find good data sources.

E. Chapter 6: Comparison of international guidelines on education data collection

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.

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 National Education Accounts (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 students' consumption of domestic production (exports).

32. Regarding the definition of expenditure there is 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 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.

F. Chapter 7: Country case studies

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.

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 SUT 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 SUT.

35. A general experience is that the compilation of SAET brings together data related to education and training from various statistical programs including the SUT, education statistics programs, government finance statistics programs, Classification of the Functions

of Government (COFOG) statistics on government expenditures, Classification of Individual Consumption by 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.

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.

37. The greatest challenge, reported in the case studies, is the availability of source data 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 NPISH surveys and financial statements of government units, while the UK has not yet estimated in-house training.

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.

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, followed the recommendation 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.

IV. Summary of recommendations and proposals for future work

40. This section provides a brief summary of the main recommendations of the Guide's and suggests several areas for future work.

41. Recommendations on principle and definitions:

(a) SAET framework builds on the definitions and principles in 2008 SNA/ESA 2010;

(b) 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;

(c) 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;

(d) 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 including as part of the SAET the gross fixed capital formation related to education activities;

(e) 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 to close collaboration with a wide range of teams within the national statistical institutions, and also across other government ministries and internationally, to identify good data sources;

(f) SAET at this stage is calculated at current prices, future development of the account could lead to calculations in volume terms.

(g) The current expenditures should be allocated to education and training purposes, seven 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;

(h) The EP0 which covers pre-primary education, it includes early childhood educational development and pre-primary education. Child care expenditures of kindergartens should be excluded;

(i) Associated goods and services related to the delivery of education and training services includes those goods and services that are required solely 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;

(j) 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;

(k) 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 R&D for the education industry as a memorandum item;

(l) 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 allocating the output to final consumption expenditure;

(m) 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.

42. The recommendations for further work include:

(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 (of the Guide) 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 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) 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;

(d) Extend the SAET to provide expenditure on education and training in volume terms (or previous years' prices). A demand for analysing the volume growth of education and training purposes is recognized;

(e) 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 process and, if needed, provide input to ensure better links to UOE education statistics;

(f) As 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;

(g) 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. This will facilitate improvements to the guide.
