

Department of Economic and Social Affairs
Statistics Division

Studies in Methods

Series F No. 108

Guidelines on Integrated Economic Statistics



United Nations
New York, 2013

Department of Economic and Social Affairs

The Department of Economic and Social Affairs of the United Nations Secretariat is a vital interface between global policies in the economic, social and environmental spheres and national action. The Department works in three main interlinked areas: (i) it compiles, generates and analyses a wide range of economic, social and environmental data and information on which States Members of the United Nations draw to review common problems and to take stock of policy options; (ii) it facilitates the negotiations of Member States in many intergovernmental bodies on joint courses of action to address ongoing or emerging global challenges; and (iii) it advises interested Governments on the ways and means of translating policy frameworks developed in United Nations conferences and summits into programmes at the country level and, through technical assistance, helps build national capacities.

Note

The designations used and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The term “country” as used in this publication also refers, as appropriate, to territories or areas.

The designations “developed regions” and “developing regions” are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the development process.

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

ST/ESA/STAT/SER.F/108

UNITED NATIONS PUBLICATION

Sales No. E.12.XVII.7

ISBN-13 978-92-1-161559-3

e-ISBN-13 978-92-1-055297-4

Copyright © United Nations, 2013

All rights reserved

Printed at the United Nations, New York

Preface

The development of the *Guidelines on Integrated Economic Statistics* was initiated by the Statistical Commission, as it recognized the significance of an integrated approach for increasing the consistency and coherence of economic statistics in order to enhance the quality and analytical value of the information the statistics contain for short-term, annual and benchmark economic statistics and macroeconomic statistics. At its thirty-seventh session in 2006, the Commission recommended the operational use of an integrated approach to economic statistics in national economic statistics programmes, on the basis of the report of the Secretary-General on integrated economic statistics (E/CN.3/2006/5). Subsequently, at its forty-second session in 2011, the Statistical Commission endorsed the draft guidelines (E/CN.3/2011/37).

The present publication has been developed as a collaborative effort of two Friends of the Chair groups created by the Statistical Commission. For the purpose of preparing a concept paper on the modalities of the integrated approach to economic statistics, the thirty-seventh session of the Commission established the first Friends of the Chair group on integrated economic statistics (see E/CN.3/2006/32), under the leadership of Adelheid Bürgi-Schmelz, Director General of the Swiss Federal Statistical Office at the time. The group discussed its findings at a workshop on integrated economic statistics, co-organized by the Swiss Federal Statistical Office and the United Nations Statistics Division, from 6 to 8 June 2007 in Bern. The Friends of the Chair presented its final report containing the concept paper on integrated economic statistics at the thirty-ninth session of the Statistical Commission in 2008 (E/CN.3/2008/6). The members of the first Friends of the Chair group and participants of the workshop in Bern included Denis Farrell (Australia); Marie Brodeur and Michel Girard (Canada); Zhang Weimin (China); Swaraj K. Nath (India); Irena Tvarijonaviciute (Lithuania); Jaime Andres de la Llata Flores and Yuriko Yabuta (Mexico); Marleen Verbruggen and Kees Zeelenberg (Netherlands); Ron McKenzie (New Zealand); Asad Elahi (Pakistan); Rashad Cassim (South Africa); Adelheid Bürgi-Schmelz, Ruth Meier, Michel Di Pietro and Philippe Stauffer (Switzerland); J. Steven Landefeld (United States of America); Werner Bier and Richard Walton (European Central Bank); Peter Bekx (Statistical Office of the European Communities (Eurostat)); Robert Edwards (International Monetary Fund (IMF)); Enrico Giovannini (Organization for Economic Cooperation and Development (OECD)) and Magdolna Csizmadia and Ivo Havinga (United Nations Statistics Division).

The present publication builds on and extends the concept paper prepared by the first Friends of the Chair group and includes case studies based on papers presented at the Bern workshop.

At the request of the Statistical Commission at its thirty-ninth session (see E/CN.3/2008/34), a second Friends of the Chair group was formed in 2009 under the leadership of J. Steven Landefeld, Director of the Bureau of Economic Analysis, Department of Commerce, United States, with the purpose of preparing more extensive and operational guidelines, including case studies and material on practical knowledge, to guide countries in the process of implementing an integrated approach in their national statistical systems. The initial draft chapters submitted by members of the group were discussed at

a meeting, co-organized by the Bureau of Economic Analysis of the United States and the United Nations Statistics Division, from 7 to 9 December 2009 in Washington, D.C. The members of the second Friends of the Chair group, participants of the Washington, D.C., meeting and additional staff of the participating organizations providing written contributions included Michel Girard (Canada); Ramón Bravo Zepeda (Mexico); Peter van de Ven, Ronald Janssen, Arnout van Delden and Alex Lammertsma (Netherlands); Ron McKenzie (New Zealand); Rashad Cassim (South Africa); J. Steven Landefeld, Shaunda Villones, Ruth Bramblet, Dennis Fixler, Bruce Grimm, Kristy Howell, Brent Moulton and Erich Strassner (United States of America); Richard Walton (European Central Bank); Peter Bekx (Eurostat); Adelheid Bürgi-Schmelz, Manik Shrestha, Mick Silver, Andrew Kitili and Ethan Weisman (IMF); Carsten Boldsen (Economic Commission for Europe); and Paul Cheung, Magdolna Csizmadia and Ivo Havinga (United Nations Statistics Division).

Members of the second Friends of the Chair group on integrated economic statistics contributed draft chapters and case studies for the publication and have been engaged in the review of subsequent versions of the guidelines. A full working draft was circulated for global consultation from December 2010 to January 2011 and 54 countries and organizations provided comments. The forty-second session of the Statistical Commission in 2011 endorsed the draft guidelines and made suggestions for their finalization (see E/CN.3/2011/37). In response to the call by the Commission for additional case studies, the contributions of Brazil, Finland and the United Kingdom of Great Britain and Northern Ireland, including text by Sanjiv Mahajan (Office for National Statistics, United Kingdom), are gratefully acknowledged. The incorporation of comments, additional contributions, substantive editing, revision and preparation of the final version was jointly undertaken by J. Steven Landefeld and Shaunda Villones (Bureau of Economic Analysis, Department of Commerce, United States), Richard Walton (European Central Bank) and Magdolna Csizmadia, Ivo Havinga and Gulab Singh (United Nations Statistics Division).

The guidelines are published for use as a methodological tool and a compendium of case studies on the integrated approach to economic statistics in order to assist countries in producing macroeconomic statistics that are consistent and coherent with short-term, annual and benchmark economic statistics. The guidelines present the integration framework of economic statistics based on current best practices for the entire spectrum of statistical agencies, including countries with centralized and decentralized statistical systems and countries at different stages of economic and statistical development.

Contents

	<i>page</i>
Preface	iii
List of abbreviations and acronyms.....	viii
I Introduction	1
A. Purpose of the guidelines.....	1
B. Content and structure of the guidelines.....	1
C. Online access to additional information.....	4
II Policy needs, benefits and challenges of integrated economic statistics	5
A. Needs for integrated economic statistics.....	5
B. Policy needs.....	6
C. Benefits of integrated economic statistics.....	8
D. Challenges of integrated economic statistics.....	11
III General framework for integrated economic statistics	13
A. Introduction.....	13
B. Scope of integration.....	13
C. Building blocks of integration.....	15
1. System of National Accounts as conceptual organizing framework.....	17
2. Institutional arrangements.....	19
3. Statistical production process.....	21
IV Institutional arrangements for managing integrated economic statistics	27
A. Introduction.....	27
B. Legislative, operational, strategic planning and process management frameworks.....	28
1. Legislative framework.....	28
2. Codes of practice.....	29
3. Strategic planning.....	31
4. Process management.....	33
C. Coordination and governance arrangements.....	37
1. Advisory committees.....	39
2. Relationship management.....	41
3. Memorandums of understanding.....	41
4. Service-level agreements.....	42
5. Cross-agency teams.....	43
D. Human and financial resources.....	43
1. Human resources.....	43
2. Financial resources.....	44
E. International arrangements for the integration of economic statistics.....	44

	<i>page</i>
V Statistical production process of integrated economic statistics	49
A. Introduction	49
B. Standards and methods.....	53
1. Common concepts, definitions and classifications	53
2. Data processing, data editing, metadata and data warehousing	61
3. Data quality frameworks	62
C. Business registers and frames.....	63
D. Surveys and administrative data sources.....	67
1. Statistical collection and common language.....	67
2. Questionnaire design	69
3. Use of administrative data sources.....	73
E. Dissemination and communication	77
1. Dissemination.....	77
2. Communication.....	80
3. Practices of international dissemination and communication	82
VI Implementation of integrated economic statistics	83
A. Introduction	83
B. Reconciliation of source data.....	84
C. Industry accounts.....	87
1. Agriculture	88
2. Industry and services	89
D. Input-output accounts.....	90
E. Sector accounts.....	96
F. International accounts.....	99
G. Labour accounts.....	103
H. System of price and volume measures	104
I. Regional accounts	107
J. Satellite accounts	108
1. Tourism satellite accounts	108
2. Health satellite accounts.....	111
K. Environmental accounts.....	111
List of domains for integrated economic statistics	113
References	115

List of case studies

	<i>page</i>
2.1 Mapping economic statistics to user needs in South Africa	8
2.2 A core set of consistent and timely economic statistics: integrated economic accounts for the euro area	10
2.3 Impetus for integrated national accounts in the United States: the Great Depression	10
3.1 Integrating agriculture into the national statistical system.	15
3.2 Integration of monetary and financial statistics in the euro-area financial accounts	15
4.1 United Kingdom Code of Practice.	29
4.2 Statistics Netherlands: chain management.	35
4.3 Statistics New Zealand: using business process modelling to enhance integration	36
4.4 Roles of the Office for National Statistics and the United Kingdom Statistics Authority	38
4.5 Intersecretariat Working Group on National Accounts.	45
4.6 Task Force on Finance Statistics.	46
4.7 International Comparison Programme	46
4.8 Harmonized Index of Consumer Prices	47
4.9 Institutional environment in the creation of euro-area accounts.	47
5.1 Statistics Netherlands: a centralized integration system for national accounts	50
5.2 Statistics for the harmonized revenue allocation formula in Canada	51
5.3 New Zealand economy-wide economic survey	52
5.4 Good practices in the development of international statistical standards	55
5.5 Statistics New Zealand: a tax-based business register.	66
5.6 Integrated economic surveys system: the approach of Mexico	69
5.7 Use of administrative sources to produce structural business statistics: the case of Brazil	74
5.8 Origins and purpose of the SDMX initiative	80
6.1 Measures of compensation in the United States	86
6.2 Adjustments to industry source data to improve consistency: the United States enterprise-establishment adjustment process	87
6.3 Overview of the compilation schematic integrating supply and use tables and symmetric input-output tables: the United Kingdom	91
6.4 Using the input-output accounts to benchmark United States GDP statistics.	93
6.5 Development of quarterly national accounts in the Netherlands.	94
6.6 Input-output framework as a data-harmonization and integration tool: the integration of the annual industry accounts in the United States	94
6.7 Integration of industry statistics: KLEMS statistics for the United States	96
6.8 Sector accounts in the Netherlands	98
6.9 United States–Canadian current-account reconciliation and data exchange.	100
6.10 Development of labour accounts in the Netherlands	104
6.11 Towards integrated price and volume system: the practical experience of Statistics Finland	106
6.12 Price indices in the United States national accounts	106
6.13 Tourism satellite accounts in the Netherlands.	109
6.14 United States travel and tourism satellite accounts.	109
6.15 Health Satellite Account, Brazil, 2005-2007.	110
6.16 Environmental accounting in the Netherlands.	112

List of abbreviations and acronyms

2008 SNA	System of National Accounts 2008
AMNE	Activities of multinational enterprises
ANZSIC	Australian and New Zealand Standard Industrial Classification
BANFF	Generalized Edit and Imputation System
BPM6	Balance of Payments Manual, Sixth Edition
CANCEIS	Canadian Census Edit and Imputation System
CPI	Consumer price index
Eurostat	Statistical Office of the European Communities
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GDP	Gross domestic product
HICP	Harmonized Index of Consumer Prices
IBGE	Instituto Brasileiro de Geografia e Estatística
ILO	International Labour Organization
IMF	International Monetary Fund
INEGI Mexico	Instituto Nacional de Estadística y Geografía
IPP	International price project
ISIC	International Standard Industrial Classification of All Economic Activities
JEDH	Joint External Debt Hub
KLEMS	Capital (K), labour (L), energy (E), materials (M) and service (S) inputs
NAMEA	National accounting matrix including the environmental accounts
NAMWA	National accounting matrix including water accounts
NPISH	Non-profit institutions serving households
OECD	Organization for Economic Cooperation and Development
PPI	Producer price index
SDMX	Statistical Data and Metadata eXchange
SEEA	System of Environmental-Economic Accounts
SNA	System of National Accounts
XBRL	Extensible Business Reporting Language
XML	Extensible Markup Language

Chapter I

Introduction

A. Purpose of the guidelines

1.1 The purpose of the *Guidelines on Integrated Economic Statistics* is to aid countries in preparing a set of integrated economic statistics in response to the need for a consistent framework for measuring a country's economic activity in an increasingly interconnected global economy. Integrated economic statistics provide a consistent and reliable assessment of a country's economic activity for policy and analytical uses.

1.2 The guidelines are based on internationally adopted standards, including the *System of National Accounts 2008* (2008 SNA),¹ the *Balance of Payments Manual*, sixth edition (BPM6)² and more specialized technical manuals, such as those on the measurement of prices, sectoral and business statistics and foreign direct investment (FDI). The guidelines use the methodological standards, the recommendations and the emphasis on policy-relevant data in those manuals as the basis for the organizing principles and detailed practices for preparing integrated economic statistics.

1.3 The principles include the design of strategic plans for the integration of micro- and macrodata that are based on consistent economic data within countries, over time and across countries worldwide.

1.4 The recommended practices for countries vary. For countries with centralized statistical systems, “bottom-up” practices, such as the development of plans to collect data, may ensure consistent microdata that are used as inputs into national accounts and other macrodata. For countries with more decentralized statistical systems, “top-down” practices may be needed; those practices include procedures to adjust input data to the concepts and definitions used in the national accounts and the use of common standards and consistent estimation methods, including reconciliation techniques.

B. Content and structure of the guidelines

1.5 Chapter II describes the needs of policymakers and other users for integrated economic statistics, the benefits of the availability of integrated statistics and the challenges of an integrated approach to preparing economic statistics.

1.6 Policymakers and other users need integrated economic statistics that are consistent with other economic statistics and indicators provided by the national statistical system. Their needs should be the basis for a country's plans for developing better integrated economic accounts that are designed to be consistent with macroeconomic concepts and theories for accounting for growth and productivity.

1.7 The guidelines summarize the benefits of integrated economic statistics as follows:

1 *System of National Accounts 2008* (United Nations publication, Sales No. E.08.XVII.29).

2 IMF, *Balance of Payments and International Investment Position Manual*, Sixth Edition (Washington, D.C., 2009).

- (a) Consistency between short-term indicators and macroeconomic data on the state (of the economy for monetary and fiscal authorities, businesses and other users at critical turning points in the economy);
- (b) Consistency across sectors in depicting trends in, and the distribution of, economic activity across products, industries and regions for tax and spending projections, business planning, the allocation of funds and economic coordination and assistance;
- (c) Consistency across countries for key measures such as real gross domestic product (GDP), inflation, balance sheets and international trade for the purposes of assessing cross-country effects and policy coordination;
- (d) Transparency and consistency in concepts and definitions so that decision makers are using common metrics for trade, financial and other policies;
- (e) Greater accuracy in the economic data through the reconciliation of discrepancies across data from different sources as part of the integration process;
- (f) Reduction in the reporting burden for business respondents, increased efficiency in the production of data and greater accuracy through the use of common definitions; common or reconciled business registers; common or integrated questionnaires; common and integrated electronic data collection, editing and processing, estimation and dissemination systems; the use of administrative records; and other strategies for integration;
- (g) More relevant statistics that more quickly address user needs through the development of integrated links to advisory committees, new management and legal structures and more accessible data dissemination systems.

1.8 The challenges of integrating economic statistics include the need for resources to be invested in adopting statistical standards, re-engineering statistical production processes and changing institutional arrangements to receive long-term benefits.

1.9 Three case studies are presented: mapping economic statistics to user needs in South Africa, integrated economic accounts for the euro area and the impetus for integrated national accounts in the United States.

1.10 Chapter III describes the general framework of integrated economic statistics, which is determined by the scope of the integration of selected statistical domains and by the three building blocks of the statistical infrastructure for economic statistics.

1.11 The scope and the statistical domains for integration need to be outlined and selected in order to respond to users' demands for integrated economic statistics and to treat the selected domains as interrelated statistics in a consistent statistical system.

1.12 Three interlinked building blocks support the integrated approach to economic statistics. First, the System of National Accounts (SNA) provides the common conceptual framework. Second, institutional arrangements (including legislative, organizational, budgetary, managerial and customer arrangements) further support the environment for integration in both centralized and decentralized statistical systems. Third, an integrated statistical production process provides a production chain from the collection of basic data to the dissemination of the resulting statistics. Chapter III focuses on the first building block and provides an overview of the other two building blocks;

details on the institutional arrangements are presented in chapter IV and details on the integrated statistical production process are presented in chapter V.

1.13 Two case studies are presented in chapter III: integrating agricultural statistics into the national statistical system; and integrating monetary and financial statistics into the euro area financial accounts.

1.14 Chapter IV describes the institutional arrangements that are essential for developing and managing a system of integrated economic statistics. It details the legislative and operational frameworks, strategic planning, process management, the coordination and governance arrangements and the human and financial resources. It also highlights the need for flexibility in developing integration plans in countries with different types of statistical systems.

1.15 The coordination and governance arrangements for achieving the integration of statistics include forming advisory committees, practicing relationship management, signing memorandums of understanding between the users of the statistics and the producers of the statistics and having cross-agency teams and service-level agreements between suppliers and users.

1.16 Human and financial resources are two essential elements of a successfully integrated statistical system. Guidelines for the best use of those elements are presented.

1.17 International arrangements for the integration of economic statistics include a key list of activities that must be well coordinated, supported and, if possible, fully formalized to develop integrated economic statistics.

1.18 Nine case studies are presented in chapter IV. Four illustrate the national experiences of the Netherlands, New Zealand and the United Kingdom, and five provide information about institutional arrangements that support the integration of economic statistics.

1.19 Chapter V describes the four major components of the integrated statistical production process in the following sections: standards and methods; business registers and frames; surveys and administrative sources; and dissemination and communication.

1.20 Standards and methods are the common concepts, definitions and classifications that are the basis for improving the quality of data so that the resulting economic statistics can be successfully integrated into a consistent statistical system.

1.21 The section on business registers and frames presents information on the importance of a common universe, or frame, of statistical units to be regularly collected in surveys so that the data are consistent.

1.22 The section on surveys and administrative sources presents information on the requirements for conducting surveys to collect data, including the design of the questionnaires, and the use of administrative records data.

1.23 The dissemination and communication section presents information on providing accessibility to the statistics in various formats and media to a broad range of users.

1.24 Eight case studies provide information about the practices of national statistical organizations in Brazil, Canada, Mexico, the Netherlands and New Zealand, and each focuses on a different component of the statistical production process to achieve integration.

1.25 Chapter VI introduces the implementation framework for integrated economic statistics. It presents practical case studies related to a range of topics for the implementation of integrated economic statistics. It demonstrates the use of specific accounts such as industry accounts, input-output accounts, sector accounts and labour accounts.

1.26 Satellite accounts—which may be linked to the core accounts but incorporate alternative definitions and conventions—are also included. The discussion focuses on practical compilation problems that might arise during implementation and on potential solutions for both centralized and decentralized systems.

1.27 Sixteen case studies supplement the information that is presented in chapter VI, including studies on the uses of the various accounts in Brazil, Finland, the Netherlands, the United Kingdom and the United States.

C. Online access to additional information

1.28 Documents and reference material with information about integrated economic statistics—such as country practices, case studies and other sources on statistical innovations—are available from the Knowledge Base on Economic Statistics at <http://unstats.un.org/unsd/EconStatKB/Knowledgebase.aspx>, which is maintained by the United Nations Statistics Division.

1.29 The documents on the website are organized by the components of the integrated statistical production process framework and by statistical domain. The website also provides links to statistical standards that are relevant to the integration of economic statistics. Further case studies, in addition to those presented in the guidelines, are posted on the website and provide access to a broader range of country practices and diverse information material. The website will be continuously updated with contributions from national and international institutions about their experiences and practices on topics related to the integration of economic statistics.

Chapter II

Policy needs, benefits and challenges of integrated economic statistics

A. Needs for integrated economic statistics

2.1 Integrated economic statistics are a set of economic statistics that depict a consistent and coherent picture of economic activities for policy, business and other analytical uses. The integration of economic statistics is about the use of common concepts, definitions, estimation methods and data sources for statistical reconciliation. In today's global context, the users of the statistical services ask for more and better statistics, and the statistical services need to be proactive in satisfying the increasing user needs for integrated economic data.

2.2 In addition, a number of recent emerging initiatives on the measurement of sustainability, social progress and well-being have raised the need for integrated and coherent official statistics to shed light on those complex issues, and therefore pose challenges to statistical offices to produce integrated economic, environmental and sociodemographic statistics. The development of such integrated and multidimensional statistics requires developing the capacity to integrate the production of relevant statistics.

2.3 The motivation for integrated economic statistics comes from the benefits such data sets provide for coordinated national and global policy initiatives in an increasingly interconnected world. The motivation is relevant for all countries, independent of their level of development of statistical systems and national economies. The integration is achievable for small and comprehensive national economic data sets and can be progressively introduced into the national statistical system.

2.4 The practices to achieve the integration of economic statistics may vary depending on the degree of centralization or decentralization of the national statistical system. National statistical systems that are less advanced and complex should incorporate, at an early stage, the principles of the integration of economic statistics into the design of their statistical production process. More advanced statistical systems should incorporate the principles of integration into the re-engineering of their statistical production process and institutional arrangements.

2.5 It should be recognized that one single and detailed implementation approach towards integrated economic statistics is neither possible nor desirable, because national statistical systems are different. There are, however, general guiding principles and good practices that are presented in the guidelines. Integration requires a broad and comprehensive system-wide approach encompassing: (a) the adoption of the conceptual framework of the SNA as the umbrella framework for organizing economic statistics, (b) the alignment of the interdependencies of the components of the statistical production process and (c) the establishment of enabling institutional arrangements for statistical integration.

2.6 Historically, many national statistical organizations have organized their production processes according to a “stovepipe” model. In that model, a unit within a statistical agency is responsible for producing statistics related to a specific segment of the economy, such as manufacturing, retail trade or investment. The unit is responsible for conducting all the steps required to produce the statistics for that specific segment of the economy, from collection to dissemination. Under that model, each unit has its own set of data suppliers. The information collected from each unit is integrated into the national accounts framework according to a consistent set of concepts, definitions and classifications of the SNA. The integration work closely studies and harmonizes the surveys and estimation methods that take place in the other units in order to achieve the highest level of consistency and coherence of the statistics compiled by each of the units.

2.7 From an operational point of view, the stovepipe model has its merits, but it falls short in addressing the real needs of the data users. In addition, under this model, data collection through separate industry samples runs the risk of omission and duplication of statistical units. Clients find it useful to have access to data for a specific segment of the economy, but that is not all the information they need. The reality is that the world is complex and economic activities are interrelated. Users need statistics that will allow them to make links quickly among various segments of the economy. They need to evaluate those linkages to assess the impact of exogenous shocks and to formulate appropriate policy responses in order to achieve specified goals such as stability or growth. Users need to be able to establish linkages between real economy activities and the related financing activities. They need comprehensive and consistent statistics on emerging issues related to global phenomena such as the sustainability of trends in debt, housing, financial markets, innovation, globalization and environmental conditions. Users need a comprehensive and consistent macroeconomic statistical framework for analysing economic relationships and changes in production, consumption and accumulation. They need consistent data sets for output, income and productivity in the real sector and the functioning of the financial sector.

B. Policy needs

2.8 Comprehensive integration begins with the adoption of the SNA as the organizing conceptual framework. Moreover, integration must recognize the interlinkages of macroeconomic accounts: national accounts statistics, external sector statistics, balance-of-payments accounts, government finance statistics and monetary and financial statistics. The macroeconomic accounts, along with associated macro price and employment data, are the cornerstones of economic policy and business strategy, and of business and household expectations.

2.9 Users prefer to assess “signals” of economic, financial and monetary phenomena, which are first given by short-term statistics at monthly and quarterly frequency and subsequently in trends and details provided with the release of quarterly and annual national accounts. Those short-term statistics relate to production, retail sales, employment, prices and the like, and are important in their own right and used for many policy decisions. Moreover, the component data should be appropriately integrated through data aggregation as statistical inputs for macro statistics.

2.10 Global financial crises are important reminders of the need for integration, in particular between the real and financial sectors of the economy. Financial crises have prompted many statistical agencies to react quickly to collect new or updated short-term information about their economies on a regular basis. Financial crises have highlighted

the importance of information on the balance-sheet behaviour of banks in funding and financing, acquisition of assets and liabilities, together with movement in prices in relation to the real sector developments.

2.11 Mutually reinforcing interpretation of data through the use of the SNA as an organizing conceptual framework allows policymakers to focus on the appropriate policy, rather than trying to determine the “true” state of the economy, including the sources of growth or weaknesses in the economy, in order to best target their interventions.

2.12 Transparent institutional arrangements based on consultations with users and the coordination of producers should be in compliance with the criteria of accuracy, data quality and comparability across countries. The consultations with users should be formalized through advisory committees and service agreements and the coordination of producers should be formalized through legal mandates. Coordination among data producers should address users’ main preferences for consistent information during a business cycle, from the release of component data on segments of the economy to macroeconomic aggregates. Any shortcomings in providing the consistent and coherent information users require may lead to misinterpretations and policy mistakes that could be costly for the economy in terms of output, employment and price stability, as well as financial and monetary objectives.

2.13 The framework within which statistics are aggregated, adjusted, revised and released allows users to assess production, income and financial flows and productivity measures as major inputs to their economic and monetary analyses. Policymakers require such a framework because it allows for a disaggregation of macroeconomic aggregates by institutional sectors and for a detailed analysis of the interactions among institutional sectors and between them and the rest of the world.

2.14 The SNA as the organizing framework of integrated economic statistics offers a comprehensive policy perspective of the economy for detailing financial and non-financial transactions by sectors of the economy. Integrated statistics can enhance policy analysis, enrich economic analysis and provide a framework to analyse macroprudential issues such as risks and exposures. The benefits lie, moreover, in a comprehensive set of data and indicators that are available, at a higher frequency, in a single framework.

2.15 Integrated economic statistics are of key importance for ensuring that the correct monetary, fiscal and other policy decisions are taken. In monetary policy, for example, the framework covers a bank-based system of financial intermediation and provides information on the financial structure of the economy, as well as providing monetary variables (the financial investment of the money-holding sectors and the liquidity of the non-financial sectors and their sources of funds) and a summary view of financial markets, including credit conditions and prices.

2.16 Even though the specific policy needs of each user differ, they require a link to a more coordinated set of microeconomic and macroeconomic statistics. That is certainly the case for economic policy or decision-making at all levels of government, but it is also the case within public and private corporations. For example, large corporations such as multinationals have an interest in macroeconomic models tailored to their own requirements. Moreover, financial institutions have to provide forecasts for individual clients, all of which require detailed macroeconomic statistics that are consistent with other more detailed sector and industrial statistics. The harmonization of concepts for macro- and microdata can reduce duplicate requests for similar information, reduce confusion and misreporting, reduce respondent burden, reduce survey costs and improve the accuracy and consistency of information presented to users.

2.17 User needs for integrated and consistent economic data should remain the foundation for developing integrated economic accounts and associated component data. The central role of users also underlines the importance of engaging users in setting priorities for statistical integration. Case study 2.1 provides an example of systematic engagement with user groups in South Africa for mapping economic statistics to user needs.

Case study 2.1

Mapping economic statistics to user needs in South Africa

1. In the area of economic statistics in South Africa, systematic engagement with users represents a major challenge. In deciding how to prioritize competing demands from different users, great emphasis is given to the production of essential data, such as production, turnover, producer price index, consumer price index (CPI) and employment that feed into the national accounts. The domain of economic statistics faces continuous challenges for improving the quality of GDP, its timeliness and the proper allocation by components of GDP. That poses difficulties as the demand for microdata increases for use in analysis at the

level of detailed industry. As the economic statistics programme is developed beyond national accounts, a very important area for further development is the focus on other aspects of the statistical production cycle, such as questionnaire design.

2. In defining broader priorities of economic statistics, there are three sets of issues that need to be taken on board in balancing user needs with available resources: (a) the status of existing collections, continuously assessing the data collections in terms of the detail and frequency; (b) the need for new data collections and publications; and (c) the implications of discontinuing publications that are no longer considered useful.

3. A complex mechanism is in place to respond to user needs based on formalized engagement with organizations within the broader government and state architecture, including the Parliament Committee, ministries, the Statistics Council and advisory committees. Moreover, user groups, as shown below, are a key vehicle through which to improve statistical priorities.

User groups	Form of engagement
Economics subcommittee	Ongoing engagement (average of three meetings a year)
User groups in progress	Consultations on CPI, agriculture and government accounts
User groups planned	Consultations on GDP, labour market statistics
Economists	Joint venture with universities (annual forum)
Reserve bank	Scheduled biannual workshops

Source: Statistics South Africa, "Mapping economic statistics to user needs: aligning statistical production with South Africa's economic policy priorities", paper presented at the workshop of the Friends of the Chair group on integrated economic statistics, Bern, 6-8 June 2007.

C. Benefits of integrated economic statistics

2.18 The benefits of integration not only accrue to the users of the data, but also to data producers and data providers. In countries able to redesign data collection systems from the bottom up, the use of common concepts, definitions, business registers and frames, estimation methods and data sources improves consistency and reduces respondent burden, and may reduce statistical agency costs, at least in the longer term. That allows agencies to direct their scarce resources better to answering demands by users for updating and extending their statistical programmes. Such integration in data collection also facilitates the introduction of consistent, automated edits and other best practices that reduce the likelihood of errors and improve accuracy and at the same time increase consistency. Even in countries more reliant on top-down procedures, the ability

to share microdata and reconcile major differences in business lists, and the use of common concepts, definitions, classifications, data sources and estimation methods, such as seasonal adjustments, balancing techniques and extrapolation, can produce large gains in consistency, accuracy and efficiency.

2.19 The harmonization of sample frames, collections and estimating methods helps produce consistency between macrodata and the input data collected at the micro level. The micro statistics are of importance in their own right, and are used for many policy and business decisions, in addition to their use as inputs for macro statistics. Their consistency is important for integrated micro and macro business decisions and related economic policy.

2.20 Effective integration exploits the role of macroeconomic accounts for reconciliation, using them as a double-entry accounting system for identifying discrepancies, providing a statistical framework for their resolution in a manner that both increases accuracy and consistency. Basic statistics that can be reconciled in the accounting framework include a vast array of economic statistics, such as employment, prices, production, consumption and accumulation, which feed into national accounts.

2.21 The integration of economic statistics throughout the stages of the statistical production process from collection through dissemination can produce many benefits. The included case studies 2.2 and 2.3 for the euro area and the United States, respectively, provide illustrative examples. The main benefits of integrated economic statistics for data producers, users and providers alike can be summarized as follows:

- Consistency between such data as monthly and other short-term indicators and quarterly and annual macroeconomic data on the state of the economy for monetary and fiscal authorities, businesses and other users at critical turning points in the economy;
- Consistency across sectors in depicting trends in, and the distribution of, economic activity across products, industries and regions for national and regional tax and spending projections, business planning, the allocation of funds and economic coordination and assistance;
- Consistency across countries for key measures such as real GDP, inflation, balance sheets and international trade for the purposes of assessing cross-country effects and policy coordination in today's interdependent global economy;
- Transparency and consistency in concepts and definitions so that decision makers are using common metrics for trade, financial and other policies;
- Greater accuracy in the economic data through the reconciliation of discrepancies across data from different sources as part of the integration process;
- Reduction in the reporting burden for business respondents and increased efficiency in the production of data through the use of common definitions; common or reconciled business registers; common or integrated questionnaires; common and integrated electronic data collection, processing, and dissemination systems; the use of administrative records; and other strategies for integration;
- More relevant statistics that more quickly address user needs through the development of integrated links to advisory committees, new management and legal structures and new data dissemination systems.

Case study 2.2

A core set of consistent and timely economic statistics: integrated economic accounts for the euro area

1. The euro-area accounts are based on, but are not the simple sum of, the national accounts of the concerned European Union member States, and the data conform to accounting conventions, international standards and integration techniques. The euro-area accounts are integrated in three dimensions. First, total uses equal total resources, or total financial assets equal total liabilities, for each (non-financial or financial) transaction category and each financial balance sheet category, when summed over all institutional sectors and the rest of the world (horizontal consistency). Second, for each sector and the rest of the world, the balance of all current and capital transactions is equal to the balance of all financial transactions (vertical consistency). Third, the change in financial balance sheets is, for each financial asset category, equal to the financial flows (stock-flow consistency).
2. The integrated accounting framework in the compilation and the integration of “building blocks” and national source data offers valuable opportunities for: (a) identifying weaknesses and inconsistencies in the source data; (b) improving their quality over time; and (c) improving user understanding for their analytical purposes. The euro-area accounts present and reconcile in one consistent framework different data sources of euro-area statistics.
3. Euro-area accounts can be considered “national accounts” for the euro area; the process involved is consistent with the derivation of one GDP estimate and its breakdowns from the underlying source data. The result is the most reliable and consistent representation of the development of the economy as a whole. They link financial and non-financial statistics, thereby allowing for an integrated analysis of non-financial economic activities (such as gross fixed capital formation) and financial transactions (such as the issuance of debt). The euro-area accounts also contain consistent financial balance sheets, with the result that quarterly changes in the financial wealth of each euro-area sector can now be integrated into business-cycle analysis. By recording all “transactions” between economic agents grouped by sector, they allow for a comprehensive analysis of the interrelationships among the different sectors of the economy (households, non-financial corporations, financial corporations and government) and between those sectors and the rest of the world. They thus provide a coherent description of economic developments at the sector level, provide structural information on the European economy and give a better insight into the business cycle.

Case study 2.3

Impetus for integrated national accounts in the United States: the Great Depression

1. By 1932, the Great Depression in the United States had been deepening for more than two years. The crisis, which is commonly dated from the 1929 stock market collapse in the United States, quickly spread overseas and resulted in banking failures and financial crises followed by the collapse of production and international trade around the world. The economy was collapsing, but policymakers had no comprehensive or consistent view of what was happening to total output and employment in the economy and what was happening in specific sectors outside of manufacturing, mining and agriculture, or to the overall stock of assets and credit. Policymakers at the time found themselves in the middle of an economic crisis with few consistent or comprehensive tools to guide their policy: “One reads with dismay of Presidents Hoover and then Roosevelt designing policies to combat the Great Depression of the 1930s on the basis of such sketchy data as stock price indices, and incomplete indices of industrial production. The fact was that comprehensive measures of national income and output did not exist at the time”.^a The Depression, and with it the growing role of government in the economy, emphasized the need for such measures and led to the development of a set of comprehensive national income accounts.
2. To address the issue of incomplete economic indicators during this time, a resolution was introduced in the United States Senate that stipulated that the Secretary of Commerce report statistics on

^a Richard Froyen, *Macroeconomics: Theories and Policies*, 8th ed. (New York, Prentice Hall, 2005).

the economy-wide income of the United States from 1929 to 1931. In 1934, the Commerce Department, under the direction of Simon Kuznets, delivered a report entitled “National income, 1929-1932” to Congress. The report marked the first official federal report on national income.^b From then on, more integrated and comprehensive measures of economic activity continued to be developed.

3. Parallel development of national accounts took place in the United Kingdom by John Maynard Keynes and Richard Stone as planning needs for the Second World War intensified. As a staff member of the Central Economic Information Service of the offices of the War Cabinet and under the advisory of Mr. Keynes, Mr. Stone and James Meade completed a set of national income and expenditure estimates. While Canada and the United States had for some time been producing detailed estimates of national income and expenditures, they were not yet in the balanced framework presented in the work of Mr. Stone. At the core of the balanced framework was the goal of the full integration of economic statistics. In his speech presenting Mr. Stone with the Prize in Economic Sciences in Memory of Alfred Nobel, Erik Lundberg said, “Stone’s ideas on the design of national accounts were from the beginning aimed at full integration of national accounts for the various subsectors, which between them represented the entire national management of resources”.^c Mr. Stone expanded his notion of integrated and balanced accounts to an international level as he went on to father the development of the most recognized and implemented tool in harmonizing economic statistics, the SNA.

4. Today, GDP and a host of other economic indicators are key inputs into the nation’s economic decision-making. From a great economic crisis grew a need to create, expand and integrate economic statistics to provide a comprehensive picture of the economy and its actors. Further integration of the real and financial economy and the interrelationship between the economy and the environment will only continue to add focus and detail to that picture of economic relationships.

^b Joseph W. Duncan, *Revolution in United States Government Statistics, 1926-1976* (Washington, D.C., United States Department of Commerce Office of Federal Statistical Policy and Standards, 1978).

^c See K. G. Mäler, ed., *Nobel Lectures, Economics 1981-1990* (Singapore, World Scientific Publishing Company, 1992).

D. Challenges of integrated economic statistics

2.22 Moving towards the integration of economic statistics is likely to affect many, if not all, economic data collections owing to changes in statistical design and the production process. The traditional approach to the collection of economic statistics has been to cover different topics and economic activities in a rolling programme of surveys and censuses spread over several years. The resulting inconsistencies in survey and questionnaire designs can make the integration of economic statistics difficult. A major cause of incoherence among economic statistics is that the collection of basic data is accomplished through the use of surveys and administrative sources for different industries or activities that are designed independently of each other. The objective of accurately measuring a particular industry or sector remains, but an equally important objective is to design ways to produce statistics that are consistent across industries and sectors. When designing a data collection for a particular industry, the statistician should consider how it will be integrated with other statistical outputs. For example, data collections for a particular segment of the economy cannot be designed in isolation, but must use concepts, definitions and estimation methods that are used in other economic surveys and administrative collections. The application of consistent classifications to appropriately defined statistical units is essential for the coherence of economic statistics and for avoiding the omission and/or duplication of units. The challenge lies in ensuring that statistical units and their classifications are applied consistently across all statistical measures.

2.23 The inconsistencies and incoherence of data can also be caused by not adopting common concepts, definitions and classifications of internationally accepted standards. Such statistical deficiency is mainly caused by the separate and independent operations used by departments responsible for a particular subset of national data. At the early stages of statistical development, it is common to produce uncoordinated sets

of national and subnational data. Progressively over time, the users will demand a consistent and coherent set of national accounts and component data on the diverse aspects and segments of the economy. In response to user demand, an alignment with the internationally adopted standards for the different domains of economic statistics and the integration of the interdependent components of the statistical production process have to be implemented.

2.24 The integration of economic statistics also comes at a cost. Resources have to be invested in harmonizing the concepts, definitions of data items to be collected and classifications with the internationally agreed statistical standards; in re-engineering statistical production processes; and in changing the institutional arrangements and management culture. A strategic analysis of the costs and benefits is paramount before embarking on an integration programme. This cost-benefit analysis should take into account the interests of data users, data providers and data producers. A vision should be formulated to govern the reform programme in which the objectives and outcomes of integration are defined and prioritized. The implementation programme should be appropriately phased and take into account the country's institutional arrangements and human and financial resources. Critical to the integration of economic statistics are the main building blocks of the SNA as the common conceptual framework, the statistical production process and the institutional arrangements and management culture.

2.25 The agency leading the integration programme might need to develop a case for additional funding to support the programme. The objective should be to introduce integration incrementally and preferably take into account a system-wide assessment of the national statistical production process. Sufficient resources need to be allocated to the programme of integration in order to build constituencies and generate support to overcome the challenges of integration.

2.26 Users with specific data needs that are being met by existing statistical outputs may not always be supportive of efforts to integrate those outputs with other statistics, if the changes being implemented in the integration process disrupt existing time series. For example, changing the definition of a data item in a survey to make it consistent with other collections might make it less appropriate for some users, even though it might be a necessary step for the sake of integration. Full user consultation on the implications of the integration programme may overcome initial resistance by explaining the overall benefits and taking into account the specific needs of particular statistical outputs.

Chapter III

General framework for integrated economic statistics

A. Introduction

3.1 The general framework for integrated economic statistics as set out in the present guidelines is based on the fundamentals of the statistical infrastructure of a national statistical system and applies the best practices of modern business architecture. The general framework is applicable to statistical systems at different stages of statistical development that may have centralized or decentralized models of operation.

3.2 The general framework for integrated economic statistics is determined by its scope of integration for selected statistical domains and by the three building blocks of the statistical infrastructure for economic statistics: (a) the SNA as a conceptual organizing framework for economic statistics, (b) the institutional arrangements and management culture as an enabling environment for integration and (c) the statistical production process as an integrated production chain from the collection of basic data to the dissemination of statistics. The scope of integration and the three building blocks, along with their components, are introduced in the subsequent sections of the present chapter.

B. Scope of integration

3.3 For the purposes of the guidelines, the scope and the statistical domains targeted for integration need to be outlined and selected in order to address user demand for an integrated statistics, and to treat the selected domains of economic statistics as interrelated statistics in a consistent and coherent statistical information system.

3.4 Integration of economic statistics is about statistical reconciliation of the various primary and secondary statistics, such as those related to production, income, consumption, employment and prices, with macroeconomic accounts such as national accounts. While countries will take the ultimate decision as to which of the various domains of statistics they wish to consider as primary targets for integration, it is desirable that the selection should be done on a broad basis of economic and related statistics. The targeted domains might include the economic source data used in the national accounts, for example, income, consumption, business, sector, prices and employment statistics, and extend to domain areas such as statistics of the environment (for further details, see annex).

3.5 The guidelines present the scope of the statistical domains of integrated economic statistics based on the Classification of Statistical Activities.³ The classification includes a listing of statistical domains that provides a structured presentation of broad types of statistical activities and subject areas. It classifies statistical activities in order to

³ Conference of European Statisticians, document ECE/CES/BUR/2009/OCT/19. Available from <http://www1.unece.org/stat/platform/download/attachments/58492889/Classification+of+statistical+activities.pdf?version=1>.

help organizations collect, process and disseminate data, develop standards and cover strategic and management issues in official statistics.

3.6 The Classification of Statistical Activities organizes the broad types of statistical activities into five statistical domains. Domains 1 to 3 constitute subject-matter areas that deal with the outputs of the statistical process and their conceptual basis, comprising demographic and social statistics (domain 1), economic statistics (domain 2) and environment and multi-domain statistics (domain 3). Domains 4 and 5 cover substantive issues that are more process- and organization-oriented and also deal with the strategic, institutional, governance and managerial aspects of official statistics.

3.7 Regarding the scope of integration, selected from the full list of the subject areas of statistical activities of the Classification of Statistical Activities, the guidelines primarily cover the following statistical domains:

- Domain 1. Demographic and social statistics
 - 1.2 Labour
 - 1.5 Income and consumption
- Domain 2. Economic statistics
 - 2.1 Macroeconomic statistics
 - 2.2 Economic accounts
 - 2.3 Business statistics
 - 2.4 Sectoral statistics
 - 2.4.1 Agriculture, forestry, fisheries
 - 2.4.2 Energy
 - 2.4.3 Mining, manufacturing, construction
 - 2.4.4 Transport
 - 2.4.5 Tourism
 - 2.4.6 Banking, insurance, financial statistics
 - 2.5 Government finance, fiscal and public sector statistics
 - 2.6 International trade and balance of payments
 - 2.7 Prices
 - 2.8 Labour costs
 - 2.9 Science, technology and innovation
- Domain 3. Environment and multi-domain statistics
 - 3.1 Environment
- Domain 4. Methodology of data collection, processing, dissemination and analysis
- Domain 5. Strategic and managerial issues of official statistics

3.8 Domain 4 covers activities that focus on the various processes that lead to statistical outputs. It covers cross-functional methodology and activities that are used for producing official statistics by domains 1 to 3. The activities under domain 4 include the components of the integrated statistical production process, such as common concepts and metadata, classifications, business registers and frames, surveys, the use of administrative sources, dissemination and communication.

3.9 Domain 5 covers areas that address institutional and management concerns, dealing with the organizational side of national and international statistical agencies. It includes the governance and coordination of the statistical system, including relationships with users; organizing the statistical office; promoting official statistics; setting up national statistical programmes; dealing with capacity-building, human resources management and training; and managing information and communications technology for statistical offices.

3.10 The list of selected statistical domains considered to be primary targets for integrated economic statistics is presented in the annex based on the Classification of Statistical Activities. Case study 3.1 underlines the selection of agriculture among the domains of economic statistics to be considered among the primary targets for integration. Case study 3.2 provides a regional example of the integrated production process.

Case study 3.1

Integrating agriculture into the national statistical system

1. The present case study underlines the selection of agriculture among the domains of economic statistics to be considered as a primary target for integration.^a It presents as an example the views and recommendations made by the Statistical Commission at its fortieth session in 2009 on ways to integrate agriculture into the national statistical system.

2. The basis for the integration starts by defining the sampling frame(s). Each country should determine the subset of steps below and implement them in an order best suited to its needs:

Population censuses can obtain sufficient information about agriculture to create a register of agricultural and rural households. All households, urban and rural/agricultural, could be geo-referenced, for example, by village.

Remote-sensing products could be used to create an area frame consisting of a digitized data layer divided into land-cover or land-use data layers, such as cropland, pastureland, forests, built-up areas, villages and other agreed classifications.

The information could be used to create an area frame sample of the country, identifying the different types of agricultural and meteorological conditions to ensure that the sample survey provides an overall picture of agricultural and rural conditions. The first stage sampling unit could be the village, in which the population census could be used to establish the linkage between the farm household and the agricultural holding, which are then also geo-referenced.

Some countries may be able to extend the village-level population data to a master household register, classifying households as urban, urban with agriculture, rural, rural with household plot or rural with agricultural holdings.

The geo-referenced area frame could serve as the basis for all household surveys and small-farm surveys required by the national statistical system.

A register of farms that are above a certain size threshold and which produce mainly for the markets needs to be established. Farms of that type are generally specialty farms or those so large that it is difficult to establish a linkage with households.

The area frame containing the geo-referenced master household register and the commercial farm register would be the basis for all data collections for use in estimating agricultural production.

A business register would be established and geo-referenced. The commercial farm register would be one subset of the register, while another subset of the register would be enterprises involved in servicing agriculture, such as storage facilities and firms that process meat, poultry, milk, eggs, cotton, wool and other products.

3. The vision for the data collection starts with a goal that is sustainable and provides an annual work programme that is consistent from year to year so that the statistical staff is fully utilized over time. While an agricultural census is traditionally considered essential for agricultural statistics to provide both periodic benchmarks and a sampling frame, more and more countries are having difficulties conducting such a census because of the funding and workload required on an infrequent basis. In addition to an agricultural census, agriculture will be increasingly embedded in the sampling frames and survey programme conducted as part of the national statistical system, as follows:

^a See the note by the Secretary-General transmitting a report on global initiatives to improve agricultural and rural statistics (E/CN.3/2009/3).

Case study 3.2

Integration of monetary and financial statistics in the euro-area financial accounts

1. Integration is built on data which are sufficiently homogenous to permit aggregation in the euro-area monetary and financial statistics and balance-of-payments statistics and within the framework of the euro-area economic and financial accounts. Integration is further built on the consistency between financial and non-financial statistics. Financial statistics, balance of payments and interna

Case study 3.2

Integration of monetary and financial statistics in the euro-area financial accounts

(Continued)

tional investment position balance sheets—and interest rates—of monetary financial institutions and non-monetary financial corporations and securities issues are integrated and reconciled into integrated economic and financial accounts by institutional sectors of the economy.

2. The foundations of euro-area financial statistics were built on: (a) the definition of the money issuing sector and consistency with the European System of Accounts/System of National Accounts, (b) the financial corporations sector split into monetary financial institutions (banks), insurance corporations and pension funds and “other”, (c) the counterparties to monetary financial institutions (banks), (d) the application of the European System of Accounts/System of National Accounts financial asset categories, (e) valuation rules and time of recording following business accounting for timely monthly data and (f) transactions derived from stocks or by collecting transactions.

3. The balance sheets and securities issues statistics of the euro-area monetary financial institutions and other financial institutions (including insurance companies and pension funds) are important building blocks for the financial accounts. The process facilitates the analysis of the financial transactions of households and non-financial corporations and—using the non-financial accounts—their property income outlays and receipts can be related to their financial assets and liabilities and also to their disposable income. Furthermore, it enables estimates to be made of the holdings by the money-holding sectors of the money supply aggregate. The information sets are relevant to the estimation of the underlying rate of monetary expansion, which provides policy-relevant signals for risks to price stability.

4. The financial accounts of general government also provide information on counterpart sectors in national financial accounts. The euro-area balance of payments and international investment position statistics are integrated into the rest of the world account for the financial accounts of the euro area.

5. Combining the data from the balance sheet of monetary financial institutions and the euro-area financial statistics with national financial accounts and with the data on non-financial transactions of institutional sectors, the European Central Bank compiles quarterly integrated economic and financial institutional sector accounts for the euro area, which include financial balance sheets and reconciliations between cumulative transactions and balance sheet changes.

6. Furthermore, the integration of euro-area financial statistics has been achieved in the monetary presentation of the balance of payments and in the presentation of holdings of money across various holding sectors. Monetary union financial accounts and now European institutional sector accounts have provided a powerful instrument for financial statistics as building blocks in the integration of and consistency with the non-financial statistics.

C. Building blocks of integration

3.11 The integrated approach to economic statistics is supported by three main building blocks: the SNA as the conceptual framework, supporting institutional arrangements and an integrated statistical production process. The building blocks are inter-linked and mutually reinforcing structures for setting up integrated statistical systems.

3.12 The implementation of integrated economic statistics relies on the application of statistical integration frameworks and techniques for the compilation of consistent and coherent basic, sectoral and macroeconomic statistics. Central to the integration of economic statistics is the SNA, which is a conceptual framework that ensures the consistency of concepts, definitions and classifications across the various data sets.

3.13 Institutional arrangements encompass the components of: (a) legislative and operational frameworks, strategic planning and process management; (b) coordi-

nation and governance among data producers, users and providers; and (c) human and financial resources. Each component contributes to a system-wide integration for the statistical system.

3.14 The integration of economic statistics covers all aspects of an integrated statistical production process based on the fundamentals of business architecture and an up-to-date information technology environment for national statistical systems. The statistical production process includes the use of recommended methods for data collection, processing and dissemination through the components of: (a) standards and methods to adopt common concepts, definitions, classifications and metadata and common methods of data processing and editing and common data quality; (b) business registers and frames; (c) data sources, including surveys and the use of administrative data; (d) the integration of statistics and accounts; and (e) dissemination and communication, including data exchange.

1. System of National Accounts as conceptual organizing framework

3.15 The starting point for integrated economic statistics is the use of the internationally accepted standard for macroeconomic accounts, the SNA (preferably its latest edition, the 2008 SNA) as the conceptual organizing framework. The important role of the SNA is ensuring that economic statistics are conceptually consistent with economic theory. First, it serves as a conceptual framework for assuring the consistency of the concepts, definitions and classifications used in different, but related, fields of statistics. Second, it serves as an accounting framework for ensuring the numerical consistency of data drawn from different sources, such as business and household surveys, merchandise trade, tax and other administrative data. The double-entry framework of the SNA is a powerful tool for integration, identifying gaps and inconsistencies, harmonizing concepts and setting priorities for integration.

3.16 As a result of years of work in harmonizing macroeconomic statistical standards, the use of the 2008 SNA as the conceptual framework provides consistency and coherence with other internationally accepted standards and international recommendations, such as the BPM6 and other specialized manuals, ranging from international classifications and the measurement of industries (e.g., industry, distributive trade and construction statistics) and prices to the measurement of FDI. The mutual consistency and coherence between the internationally accepted standards and international recommendations are the outcome of the harmonization efforts by the international statistical community. Building upon international standards manuals renders policy-relevant and integrated micro- and macrodata that are consistent and coherent within and across countries and over time.

3.17 Using the 2008 SNA as the organizing statistical framework allows for statistical reconciliation through the confrontation of source data in the accounting identities. The statistical reconciliation covers basic statistics from primary and secondary sources, short-term and structural statistics and national and international statistics. Using national accounts concepts and methods produces a coherent and consistent description of the economic activity at different levels of aggregation. In national accounts, the task of statistical reconciliation is fundamental to ensuring that the macroeconomic data set is comprehensive, consistent and coherent. Moreover, reconciling primary and secondary data sources will allow the short-term and structural component data of the national accounts to provide complementary economic information based on accurate, consistent and timely statistics. National accounts statistics compilation is pos-

sible because of the availability of a wide variety of data on economic activities collected from economic surveys, administrative sources and private-sector data.

3.18 The national accounts framework is based on the fundamentals of economic theory and used to support macroeconomic and sectoral policies, including those related to employment, inflation, international trade, money and finance. Among the various theoretical models employed by the users, the national accounts support the understanding and forecasting of the determinants of growth and productivity of the economy by providing a consistent and coherent data set for output, prices, inputs of material and services, energy use, and labour and capital as factors of production. Similarly, national accounts and the properties of their component data support the monitoring and forecasting of turning points of the level, the change and the growth of the aggregate economic activity in the business cycle. Users request information on economic, financial and monetary phenomena presented in a coherent way during the business cycle, first by the release of a coherent set of short-term statistics and subsequently by the release of quarterly and annual national accounts.

3.19 The national accounts framework not only allows for producing consistent and coherent short-term and annual statistics for macroeconomic aggregates, including quarterly and annual national accounts for the real sector, but, as an integration framework of economic statistics, it also provides a presentation of macroeconomic aggregates relating the financial, government, non-financial and household sectors of the economy and their relationship with the external sector. National accounts offer a comprehensive framework for policy analysis by providing consistent information that enables policymakers to examine the impact of changes on all aspects of the economy in a multiple-entry set of accounts. Integrated statistics enable the observation of key variables and their responses to changes in policy and to changes in the structure of the economy. For example, national accounts can help assess the effects of a given policy change on growth by examining its impact on the determinants of growth (labour, capital, energy, materials and natural resources), its effects on specific goods- and services-producing industries, its impact on consumption and accumulation, its effects across regions of the country and its effects on size classes of enterprises and ownership.

3.20 Integrated economic statistics based on the national accounts framework are also useful in financial stability analysis. That allows the identification of risks and vulnerabilities in the various sectors of the economy (for example, the impact of the non-financial, household and financial sector balance sheets on borrowing and lending and the capacity of sectors to produce and spend) and in the linkages (in financial exposures) between economic sectors of the economy. The macroeconomic and sectoral data allow for key macroeconomic indicators to be derived on corporate borrowing, profitability, household wealth and savings, leverage ratios and estimates of debt-service burden.

3.21 The integrated presentation is of key importance for ensuring that the policy decisions are taken by bringing the whole economy into view. The integrated presentation observes the key macroeconomic aggregates from the real and financial economy by the integration of component data on portfolio behaviour in the funding and financing of the real economy.

3.22 In the integrated statistical production process, macro accountants establish partnerships with other key producers of economic, demographic and social and environmental statistics and accounts, introduce common concepts and definitions and develop arrangements for data exchanges between the statistical offices and other government agencies for producing statistics. Data reconciliation and integration support the harmonization of economic and related statistics, facilitate the aggregation and compari-

son among disparate data sets and promote the compilation of coherent macroeconomic statistics such as national accounts, balance-of-payments statistics and environmental-economic accounts.

2. Institutional arrangements

3.23 The institutional setting has an important role to play in the building blocks of the integrated statistical production process. The functions and responsibilities of the lead statistical agency in the country can be carried out more efficiently if it is supported in its role by institutional arrangements such as advisory committees, relationship meetings, memorandums of understanding, service-level agreements, technical cooperation and a legal framework that protects the confidentiality and integrity of the data while allowing for the sharing of data between partner statistical agencies.

3.24. Institutional arrangements are essential for the management of integrated economic statistics. In every statistical system, some statistics are produced outside the national statistical organization by government departments and other administrative agencies. Those statistics have to be integrated with the statistics produced by the national statistical organization. Moreover, as the use of administrative data increases, arrangements are necessary to ensure that data from sources such as administrative data are collected in a way that is consistent with the needs of the statisticians.

3.25 Arrangements are also necessary to assure those providing administrative data that their data will be kept confidential and used only for statistical purposes. Respondents to statistical surveys must be assured that their data will only be used for statistical purposes and will not be shared for tax, investigatory, regulatory and other administrative purposes.

3.26 With such protections, multi-sectoral statistical coordination and strategic planning help to establish formalized institutional arrangements in the national statistical system to delegate responsibility from collection and data exchange to compilation and dissemination for an efficient statistical programme.

3.27 Integration should be consciously introduced in the management culture of the statistical system and consistently implemented from the start of the statistical production process. An organizational culture needs to adapt integration in all phases of the statistical production process, which requires vision and strategic planning on the part of the management for setting up a flexible and adaptable integrated statistical system.

3.28 It is useful to have a multi-year strategic plan for the implementation of the integrated statistical production process to ensure the success and stability of the long-term programme. The funding aspect is also critical for the managers of the integration project. Building constituencies and managing advocacy activities to generate support must be on the agenda.

3.29 High-level management support is crucial for adopting integration as an objective for the statistical system as a whole. It demonstrates the level of commitment and will increase the willingness of management teams at all levels for cooperation and implementation of the changes in accordance with the initiatives related to the integrated economic statistics programme.

3.30 Senior managers need to mobilize agency-wide support for the new and high priority task of integration and ensuring the contributions of the stakeholders. As part of building a strong system of management culture of values, norms and shared beliefs, senior management should manage labour relations, human resources, issues

related to the recruitment of professionals, the provision of training to all classes of staff, the development of training material and a range of related issues.

3.31 The development of information technology resources requires long-term management support and commitment for change. It includes developing information and communications technology infrastructure and strategies for the statistical system that become part of the integrated statistical production process.

3.32 The institutional, organizational and legal conditions of the various countries can be varied, which may be reflected in different legislative frameworks and codes of practice. Owing to their different institutional arrangements, countries with centralized or decentralized statistical systems may face different challenges and, therefore, may develop different approaches and modalities for statistical integration. The legislative framework, coordination and governance and other components of the institutional arrangements are described in more detail in chapter IV of the guidelines.

(a) Centralized statistical systems

3.33 A national statistical system is referred to as centralized if the management and operations of the statistical programmes are predominantly the responsibility of a single autonomous government agency. The advantage of a centralized national statistical service, from the point of view of statistical outputs, is that it usually is better equipped than a decentralized system to plan and to implement the integration of economic statistics. Centralization makes it easier to adopt and implement uniform standards, definitions and classifications, and to set up and maintain the production process framework. Countries with centralized systems have a greater ability to apply consistent designs to all statistical inputs because they have greater control over statistical designs. In view of the growing awareness that policies and programmes of various government departments are interdependent, both macroeconomic analysis and many kinds of sociodemographic analysis require a system of statistics in which concepts and classifications are not only precisely defined and standardized, but harmonized, with relationships established between many of the definitions. As a further advantage, statistical outputs obtained through integration have substantive importance for economic analysis.

3.34 A centralized statistical system, however, offers no automatic guarantee for successful integration. A centralized service may have a disadvantage when appropriate organizational set-up, strong and able leadership and other institutional arrangements are missing for the implementation of integrated economic statistics and can become “stovepiped”. As a result, countries with centralized statistical systems may not have perfectly coherent data, and they will need to use the same analytical and reconciliation tools during the compilation phase to maximize the coherence of their statistics.

(b) Decentralized statistical systems

3.35 A national statistical system is referred to as decentralized if the statistical programmes are managed and operated under the authority of several government departments. Under such an arrangement, a particular agency is usually charged with the responsibility of coordinating the statistical activities of the various departments. One of the advantages that countries with decentralized systems have when implementing integrated economic statistics is that the various organizations responsible at the domains involved where the data are collected have specialized expertise that can facilitate and increase the efficiency of integration. Countries with a decentralized system

may focus more on achieving coherence in the compilation stage because the various organizations have greater control over those processes.

3.36 The outputs of a decentralized statistical system with a strong coordinating agency can be more efficient than that of a centralized system's institution. In a strongly led decentralized system, there may be awareness of the need to maintain contacts designed to influence, coordinate and harmonize the outputs of the various autonomous departments and to exercise leadership to counteract the tendency of departments to go their own way. An institution with a decentralized system may have stronger, better arranged institutional contacts in place with its data suppliers than an institution in a centralized statistical system that may rely on its established network of institutional arrangements.

3.37 Countries with a decentralized system may need to put more effort into the compilation stage to achieve coherence. Coordination among the decentralized institutions is needed to overcome inconsistencies in terminology, definitions and classifications. They also need to detect and eliminate a lack of coherence between concepts. Countries with decentralized statistical systems also need to work with their data suppliers to improve consistency between input series, even if that means they have less ability to control the design process; they must manage what they can control and try to influence what they cannot control.

(c) Centralization versus decentralization of statistical systems

3.38 Centralization and decentralization are subjects of discussion in the statistical community. Some of the characteristics of the two types of statistical systems are relevant in the context of statistical integration. Integration can be successfully achieved in countries with either centralized or with decentralized systems. Certain conditions may help the implementation of integration in some countries with different institutional arrangements. For example, strong powers of coordination support the integration of statistics. If the office in charge of coordination is backed by the legal power to apply the tools of integration, its capacity to coordinate is correspondingly greater than that of an office lacking such powers.

3.39 Whether the statistical systems are centralized or decentralized, policy analysts and decision makers, particularly in the more specialized activities, must feel they can involve statisticians directly in their quest for more relevant and reliable quantitative information. Physical proximity to policy analysts in decentralized systems can be important to statisticians when determining policy needs. Moreover, examples exist of centralized systems that are quite responsive to policy and other user requirements.

3. Statistical production process

(a) Standards and methods

Common concepts, definitions and classifications

3.40 It is crucial for integration to apply uniform concepts, definitions and classifications based on internationally accepted standards and classifications, for which the SNA functions as an umbrella framework. The use of harmonized terminology, concepts, definitions and classifications is necessary in a national statistical system so that the various data collections are comparable and can be related to each other. In all phases of the integrated statistical production process, common concepts are recommended. To ensure

the use of consistent terminology and definitions, statistical agencies should establish a terminology management strategy to reduce, in the different areas in the organization, the use of inconsistent terminology applied in questionnaires and in dissemination. For that purpose, the appropriate tools, including a thesaurus and glossaries of concepts, should be developed and adopted across the organization. The glossaries, at a minimum, should contain a concept label, definition, detailed source information and related terms.

3.41 Inconsistent terminology is a major source of inaccuracies when databases and publications contain different definitions for the same concept, which may cause misunderstandings and misinterpretations. Recognizing the negative impact of having ambiguous and unclear terminology, the national statistical organizations and international agencies have developed common concepts, definitions and classifications based on statistical standards, and have compiled glossaries to promote the collection and dissemination of consistent and comparable statistics.

3.42 Integrated statistics obtained through the use of harmonized classification devices are more powerful than statistics collected without harmonization. Harmonization has been achieved, for example, through the implementation of standards such as the International Standard Industrial Classification of All Economic Activities (ISIC). It should be noted that integration is a broader concept than harmonization, as it goes beyond harmonizing concepts, definitions, classifications or standards. The harmonization of standards is only one dimension of integration.

Data processing and editing

3.43 Data editing is an integral part of the statistical production process and needs to be addressed in all phases of that process, including at the collection phase. Methodological, organizational and legal issues related to data editing, linkage and integration have to be resolved. The transparency and documentation of the editing process are indispensable to ensure that the resulting data will be widely accepted and understood by users. Data editing is a resource-intensive process, but it has a far-reaching impact on data quality, as it affects data accuracy, interpretability, relevance and coherence. The statistical service can learn in the editing process about the data, and the survey processes can be improved in a systematic way.

3.44 The temporal dimension of integration aims at reconciling and harmonizing short-term and structural economic statistics that are produced at different points in time but refer to the same phase in the business cycle. The coherence of subannual and annual statistics has key importance for planners and policymakers and other users of data. Integrated economic statistics comply with the criteria of accuracy and consistency of data quality and provide coherent short-term statistics with the release of annual data.

3.45 The integration of economic statistics supports producing economic data with the required periodicity and timeliness. An integrated economic statistics framework facilitates the conceptual and numerical consistency of subannual and annual data, consistency in summing quarterly data to annual data and a transparent revision policy. The user needs for the timeliness of data can be evaluated by the statistical agency when balancing the trade-off between timeliness with accuracy and consistency.

3.46 Data processing covers the elements of data-processing systems, data management and warehousing. Generic tasks are those to be considered for automated processing, such as those related to editing, validation, imputation and estimation. Those tasks should be appropriately documented in the metadata and should be made available for internal and external users of the data to facilitate their interpretation. Moreover,

this qualitative information generated through the data-processing phase will assist in identifying flaws and areas of improvement at each stage of the statistical production process including at the level of integration of the component data in national accounts.

Metadata

3.47 Metadata in statistics are data that describe statistical data. Statistical metadata describe processes that collect, process and produce statistical data and indicate the data sources and tools that are instrumental in statistical production, such as statistical standards and classifications, business registers and frames, statistical methods, procedures and software. Owing to the range of internal and external users, the metadata should include elements of the management of quality related to the institutional environment, system, statistical production process and statistical outputs. The use of standard terminology for metadata across the various statistical domains will facilitate the international comparison of data.

Data quality framework

3.48 Statistical agencies monitor and improve data quality through the application of quality frameworks, which include the management of the statistical production process by observing the methodological soundness, the cost effectiveness and the response burden. Other elements of quality management pertain to the institutional system in coordinating the data producers, providers and users and using a statistical standard such as the SNA as an umbrella conceptual framework, and to the institutional environment by evaluating aspects of professional conduct, impartiality, objectivity and transparency. When managing statistical output, a quality framework looks at the management of relevance, accuracy and reliability, accessibility, coherence and comparability and metadata. National quality frameworks allow for the assessment of the national statistical system across institutional and statistical spectrums.

(b) Business registers and frames

3.49 A comprehensive and up-to-date business register has a central role in achieving the integration of economic statistics in terms of providing a central sampling frame for all business surveys. The establishment of such a register is essential for the full coordination of source data that use the same basic information about business units. Countries with a high proportion of small and micro enterprises complement the business register with non-overlapping area frames based on agricultural, economic and population censuses. The central frame, consisting of a business register and, where applicable, in combination with area frames, represents the backbone of the collection processes of source data that interface with businesses through direct profiling, surveys, feedback and the use of administrative records. The central frame contains data about the firms, including the name and address, a code identifying activity, variables about size and information about the life cycle of the firm. For operational reasons, a unique identifier should be assigned to each entity in the central register. Ideally, the selection of the identifier should take into consideration the business number used by the administrative authorities to ensure that administrative data are correctly applied to the various entities on the register in its creation and maintenance.

3.50 The creation of a unified, comprehensive statistical register is the medium-term objective. A common universe for sampling and the consistent classification of businesses promote consistency on collected data across surveys. As a result of using a

single business register, accuracy, consistency and timeliness in producing statistics can be improved and respondent burden reduced.

3.51 For decentralized systems with multiple business registers, the objective may be the reconciliation of key differences in classification and the identification of gaps and overlaps across the various registers. Through such reconciliation, decentralized systems may be able to achieve many of the benefits of a single business register. In addition, some business registers are based on comprehensive but relatively dated census data, while others are based on more timely but less comprehensive business register and tax data. Reconciliation can improve the accuracy of both registers.

(c) Surveys and administrative data sources

Surveys

3.52 In designing integrated data collections, it has become an important objective to achieve consistency with statistics of different industries and sectors. The standardization of surveys and questions across the questionnaires of different industries contributes to consistency and facilitates the integrated statistical production process. Integration should be comprehensive and encompass survey design, sample frame and questionnaire design. Survey design may need to compensate for a lack of willingness among data providers of business statistics programmes. Respondents are increasingly reluctant to complete many separate survey requests sent to them each year through traditional survey questionnaires. A coordinated modular approach through annual continuous data collection instruments with infra-annual collection rounds instead of separate specific-purpose surveys can reduce response burden and cost.

3.53 Consultation with business respondents before survey and questionnaire design and updates is essential. The choice of the survey data collection method, such as mail, telephone, electronic or interview, would depend on the country's resources, preferences and characteristics. The use of a modular approach with an annual continuous survey instrument may be preferable to facilitate flexibility for updates and harmonization.

Administrative data sources

3.54 Increased reliance on administrative data requires tools for adapting administrative data for statistical purposes. For integrating administrative source data for statistical purposes, concepts need to be matched with statistical standards. Some of the issues that need to be addressed in integrating the data from administrative sources for compilation of economic statistics include: (a) units used in those sources do not correspond directly to the definition of the required statistical units; (b) data in administrative sources have generally been collected for a specific administrative purpose (for example, turnover for value added tax purposes may not include turnover related to the sales of goods and services that are exempt from value added tax); (c) classification systems used within administrative sources may be different; and (d) the process may operate on a different time schedule than that of the national statistical organization advance release calendar. The advantage of using administrative records and various government data is that it promotes a more efficient use of data collections and reduces the burden on respondents in addition to reducing the cost of data collection.

3.55 Administrative data sources can be used for the production of statistical data, for verifying already compiled data and for filling in missing data in statistical surveys. The use of administrative data for statistical purposes does not necessarily imply

that it should replace traditional statistical techniques, but rather that it should be used to supplement and reinforce them.

3.56 Agreements need to be reached regarding effective and efficient data collections, including the use of administrative records and various government data files to avoid the duplication of data collections and an undue burdening of respondents. Legislation on data-sharing arrangements and access can be set up between the statistical office, other government departments or public bodies. If administrative data sources are used, the confidentiality and integrity of the data sources must be ensured with the utmost care, and adequate methodology needs to be guaranteed.

(d) Dissemination and communication

3.57 Dissemination enhances the accessibility of statistical information and constitutes an indispensable building block of the integrated statistical production process. Dissemination, communication and outreach activities constitute complex areas of the statistical production process that involve building, managing and promoting customer relationships with a broad circle of data users and the media. Integration may facilitate providing user-friendly presentations of data and explanations of concepts and ensure consistent format across publications, electronic sources and websites. The dissemination and communication of statistics aim at explaining data to users in order to improve statistical literacy and make metadata widely available. The development of data warehouses efficiently supports the integration of economic statistics.

3.58 To assure the timeliness and integrity of economic statistics, best practices, such as those contained in the IMF General Data Dissemination System and Special Data Dissemination Standard, specify the public dissemination schedule of the release of data in the form of a release calendar. The release calendar provides prior notice of the release dates on which a statistical agency will release its key economic indicators to the public.

3.59 In the dissemination of statistics, good practices require giving credit to the original source of the statistics and following widely accepted quotation/citation policies when the data used has been originally collected by others. Citations facilitate the assessment of the reliability and verify the authenticity of the original data sources for the users. The source of data always need to be documented and made transparent for the users.

3.60 The dissemination and communication efforts of the statistical organization benefit from collecting and analysing feedback from the customers. Prior to establishing the policy of revisions of data series for statistical domains, it is important to consult the main users of official statistics to identify their needs and priorities.

3.61 The main components of the statistical production process related to standards and methods, business registers and frames, surveys and administrative sources and dissemination and communication are described in more detail in chapter V.

Chapter IV

Institutional arrangements for managing integrated economic statistics

A. Introduction

4.1 Appropriate institutional arrangements are essential for developing and managing an integrated system of economic statistics. The integration of economic statistics depends upon the legal, organizational and planning framework, the coordination and governance arrangements, and human and financial resources, all of which differ widely across countries. There is no “right” institutional setting for integrating economic statistics, in the sense that the goal can be achieved in both centralized and decentralized statistical systems. A range of institutional approaches and arrangements need to be put into place to support the integration of economic statistics, and the approach taken will depend on the way the official statistics system is organized and will take into account the existing legal framework.

4.2 Both technical and organizational changes are required in national statistical systems in order to change the organization of statistics production from stovepipes, or independent production lines, to an integrated system.

4.3 The “bottom-up” approach to integration is easier to apply in a centralized system. A national statistical office with a legally mandated responsibility for the quality of official economic statistics will be in a strong position to influence the design and implementation of the integration of statistics. Responsibility for leading statistical development and for the coordination of government agencies will provide many opportunities to strengthen the integration of the official statistics system.

4.4 The main reasons why institutional arrangements are important in the context of integrated economic statistics include the following:

- In every statistical system, some important statistics are produced outside the national statistical agencies by other government departments and quasi-government organizations. Those data are used by the agency or agencies responsible for the production of official statistics. For example, national accounts will use data from numerous sources. Improving the coherence of input statistics can contribute significantly to the quality of the national accounts.
- Many government agencies collect statistical information to help carry out their administrative functions. The administrative data can be an important input into the production of national economic statistics. For example, international trade data will often be collected by the agency responsible for collecting customs duties. As the use of administrative data increases, the national statistical agency will become more dependent upon data from sources outside its direct control. Arrangements to ensure that administrative data are collected in a way that is consistent

with the needs of statisticians and its timely availability will be important. Even in a centralized statistical system, the national statistics office will have to work with other government agencies to ensure that administrative data can be integrated with data from other collections.

- The national statistics office may have responsibility for the coordination and dissemination of economic statistics, but much of the funding for statistical production may be contestable by other government departments. The national statistical agency will have to work with other agencies that produce statistics to ensure the coherence of all economic statistics by encouraging consistent frameworks, standards, definitions and classifications. In countries with decentralized statistical systems, responsibility and funding for the production of economic statistics may be spread between various government agencies. The agency responsible for producing national accounts and a user of the economic statistics produced by other collection agencies may be a strong advocate for integration.
- In some countries, especially those with a federal structure, the collection and production of statistics occur at regional, district and municipal levels. Economic statistics are compiled at the national level by aggregating statistics produced by district and regional offices. Staff responsible for statistical operations at various levels of government have to receive training regarding the way the data are used at the various levels of aggregations.

B. Legislative, operational, strategic planning and process management frameworks

1. Legislative framework

4.5 Statistical leadership may be more effective if the mandate for integration is established by law or other binding instrument and its role acknowledged in day-to-day business by other producers and users of statistics. A statistics act that applies to all the statistics collected and produced by government departments and agencies is a valuable tool for the integration of economic statistics. The stronger the powers of coordination at the centre of the system, the greater the chance of effectively integrating statistics. If the office in charge of coordination is backed by the legal power to apply the tools of coordination, its capacity to coordinate is correspondingly greater than that of an office lacking those assets.

4.6 A statistics act may provide a national statistical office with the authority to:

- Provide leadership to the national statistical system;
- Advise other government agencies on statistical projects initiated by them;
- Develop approved statistical standards for government agencies;
- Define, adopt and promote standard concepts, procedures, definitions and classifications for the collection, compilation and dissemination of official statistics;
- Provide authority for the compulsory collection of data;

- Ensure the confidentiality and integrity of information provided by respondents, while providing for the sharing of data between official statistical agencies;
- Approve the design of all statistical surveys operated by government agencies.

4.7 The legislative framework can strengthen the external capability of the statistical agencies and their relationship with the suppliers of data. The statistical service should acknowledge and pay attention to the legal aspects of the institutional arrangements of integration and specify how it will be achieved. The need may arise to develop legal provisions or, if they exist, amend them concerning the collection of administrative data that are planned to be used for the integration of economic statistics.

2. Codes of practice

4.8 Codes of practice as an operational framework can play an important role in supporting the drive towards the integration of economic statistics. The advantage of a code of practice or common standards is having a clear set of rulings and high-level endorsement and mechanisms to assess and ensure implementation. If a new general code of practice is adopted for the statistical office as a whole, development and implementation of such a code should be the responsibility of the chief statistician or independent statistical council, but should be based on the authority of the prime minister or president, cabinet or legislature.

4.9 The achievement of common standards across agencies and functional units requires a clear statement or code of practice as to what is to be covered by the integrative process and the means by which that is to be achieved. Such a code may be part of a system of codes for other dimensions of a statistical office's work, including quality, confidentiality, response burden and meeting user needs, or the integrative code may stand alone. If a code of practice exists for the other operating dimensions, then the inclusion of a code relating to the integration of economic statistics can be readily incorporated into the system. If such principles and protocols do not exist, the statistical office may wish to consider whether it should adopt integrative principles and an associated protocol in a piecemeal fashion, or whether its needs would be better served by a major policy initiative that adopts several principles and protocols that include integration.

4.10 The limitation of a code of practice is that it may not have a mechanism for evaluating the costs and benefits of integration. For example, the adoption of common geographical codes and industry classifications might not be the highest priority for the national statistical organization. As a set of principles and means of implementation, the code sets the agenda for integration. For the national experience of the United Kingdom, please see case study 4.1.

Case study 4.1 United Kingdom Code of Practice

1. The experience of the United Kingdom provides an example of the detail of a code for the principles and practice of implementation as well as an example of high-level institutional support. The code of practice is set out in multiple parts. The *National Statistics Code of Practice: Statement of Principles*, published in 2002,^a sets out key principles and standards. The code is supported by a

^a National Statistics (London: The Stationery Office, 2002). Available from www.statistics.gov.uk/about_ns/cop/default.asp.

Case study 4.1

United Kingdom Code of Practice (*continued*)

b Available from <http://unstats.un.org/unsd/methods/statorg/FP-English.htm>.

c Available from http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/CoP_October_2011.pdf.

d National Statistics (London: The Stationery Office, 2008). Available from www.statistics.gov.uk/about_ns/cop/default.asp.

e United Kingdom Statistics Authority (London: United Kingdom Statistics Authority, 2009). Available from www.ons.gov.uk/about-statistics/ns-standard/cop/index.html.

series of protocols that provide practical frameworks for the implementation of the principles and standards of the code across all significant areas of activity relevant to national statistics. The code is consistent with the Fundamental Principles of Official Statistics set out by the United Nations in 1994^b and the European Statistics Code of Practice adopted in 2011 by Eurostat^c (with which all producers of European statistics are expected to comply). The code then moved to one supported by an independent authority responsible for such principles and practices.

2. The principle on integration was derived from the compliance guidelines for principle 7 of the *National Statistics Code of Practice: Protocol on Statistical Integration and Classification* published in 2008: "Enhancement through integration, accumulation and innovation."^d Integration was one of several principles within a framework, each of which had attached to it a protocol for implementation.

3. The United Kingdom Statistics Authority, which was established upon adoption of the Statistics and Registration Service Act 2007, was given a statutory duty to prepare, adopt, publish and assess compliance with a code of practice for statistics that set out the professional standards which official statistics were expected to meet. The Statistics Authority's *Code of Practice for Official Statistics of 2009*^e built on, and superseded, the code of practice adopted in 2002.

4.11 Over the past few years, many national statistical organizations have developed principles and protocols for official statistics, often as part of a code of practice. They are designed to provide assurance that official statistics are adequate for the uses that they were intended to meet and to facilitate improvements in the overall coherence of official statistics. The document may encompass fundamental principles to include, such as relevance; integrity; quality; accessibility; confidentiality; meeting the needs of users; reducing the load on providers; enhancement through integration, accumulation and innovation; efficiency in costs; and fairness in dissemination. It should also include the mechanisms for attaining such aims.

4.12 Principles and protocols are useful tools for fostering the integration of economic statistics by promoting national coordination. Official statistics are broad in scope and are produced by many different government agencies in a country. In many countries, there is a central or national statistical office that produces the greater share of official statistics, whereas other countries may have more than one statistical agency handling different areas of statistics. In all cases, many official statistics are produced by government departments. The coordination of statistical activities should be undertaken to avoid duplication of work, to minimize the reporting burden of respondents, to facilitate the integration of data from different sources through the use of statistical standards and to participate in international initiatives.

4.13 The rationale for a coherence principle is that frameworks and classifications used in statistics must be relevant for their use in economic research and decision-making. Data can be interpreted when it is grouped or classified within a structured and understandable picture of the real world. A key aspect of the coherence principle is that the value of statistical data is maximized by using common standards for statistics across the vast pool of data available from administrative and survey databases, and those common standards allow separate data sets to be related and more comprehensive statistics to be produced.

4.14 The adoption of a coherence principle covering integration for all statistical agencies in a decentralized system, and all functional departments in a centralized one,

is an important step for a statistical office, especially if the principle goes hand in hand with a set of guidelines and policies, or protocols, for their implementation. A protocol sets out the procedures that should be followed in order to achieve statistical integration.

4.15 Protocols for the integration of statistics should cover common frameworks, standards and classifications and specify that common statistical frames, definitions and classifications are used in all statistical surveys and data sources to provide consistency over time and between data sets. The protocols should align wherever possible with national and international frameworks and classifications. Principles and protocols should be developed for a range of dimensions.

3. Strategic planning

4.16 A strategic approach to planning that involves multilevel planning activities is an important tool for advancing the integration of economic statistics to better support policy and other decisions. The long-term objectives should be decided first. Once those are clear, plans that move towards the goals can be put into place. Activities for the integration of economic statistics need to be approached on three different time-horizons. The first is the strategic level, where the objectives that the statistical agency wants to achieve are specified. The importance of statistical integration should be established as a key policy for all planning decisions. The second is the tactical level, at which the design of an output for the next production cycle is decided. The objective is to ensure that each statistical design contributes to the coherence of related statistics. The third is the operational level, at which daily production activities emerge and decisions should take into account their impact on the quality and overall consistency of statistics to support integration.

4.17 Strategic planning is the process by which an organization defines its strategy, or direction, and makes decisions that allocate resources to pursue that strategy. To determine its strategic direction towards integration, the national statistical organization needs to know exactly where it stands and then determine where it wants to go in terms of scope and focus and how it will get there. The strategic plan of a national statistical organization will identify and prioritize user needs and describe processes and mechanisms by which those needs will be progressively met given limited resources. To ensure that the integration of economic statistics has a high priority, it should be an integral part of the strategic plan.

4.18 Most national statistics offices will already have a strategic plan in place. If a framework exists for strategic planning, then the objective will be to evaluate how integrative practices can be incorporated into it. A statistical office embarking on the incorporation of the integration of economic statistics into their overall strategic framework needs to first consider the suitability of their existing strategic plan.

4.19 The strategic planning system should be evaluated to determine if it is meeting existing needs and to identify any modifications that would better facilitate the integration of economic statistics. The *Handbook of Statistical Organization*⁴ provides guidance on reviewing the suitability of a statistical office's existing strategic framework. Strategic frameworks take time to evolve to meet the planning needs of individual statistical offices and, indeed, the needs themselves change. Strategic planning systems benefit from stability, so any evaluation exercise should not just incorporate statistical integration as one of the objectives but also include mechanisms for achieving that objective. To pre-empt the need for further changes in the future, the opportunity should be

4 Studies in Methods, Series F, No. 88 (United Nations publication, Sales No. 03.XVII.7).

taken to review the other objectives and decide if they are still appropriate and whether mechanisms for achieving them are effective.

4.20 The strategic plan for the integration of statistics does not have to be fleshed out in great detail, but it must spell out the objectives of integration and how they can be achieved. The contents of the plan should address the following issues:

- Coherence of economic statistics across the entire national statistical system;
- Establishment and maintenance of the statistical infrastructure to support integration of economic statistics;
- Specification of steps necessary to achieve integration;
- Allocation of responsibilities to relevant agencies;
- Provision of legal authority, financial and other resources and the allocation of those resources across agencies.

4.21 The strategic plan provides a road map to guide the organization into the future. It summarizes the organization's role and purpose, operating environment and challenges, and long-term direction. The strategic plan is a key input into the decision-making processes and will guide longer-term workforce planning and annual business planning and budgeting.

4.22 A step-by-step approach may commence, beginning with senior management requesting middle and line managers to identify potential projects for integration, including a brief listing of costs and benefits. A relatively small number of projects that can be undertaken within a fixed time frame should serve the statistical office well as a platform of examples that will build support for funding of new projects promoting integration. As agencies or functional departments put up plans for projects promoting integration, given limited resources and competing projects, there is a need for a mechanism for appraising those projects, not only against themselves but against projects whose core aim is not the integration of economic statistics. For a statistical office to be effective, it needs to be able to ascertain user requirements and ensure that they are met in as effective a manner as possible, given available resources.

4.23 The strategic planning system should be changed so that the integration dimension becomes part of the project appraisal. The implications for integration should always be part of the assessment criteria and, all other things being equal, methods that meet the needs of an integrated system are preferred to those that do not. This more holistic view of project appraisal seeks to identify changes in the statistical system not just in terms of meeting specific needs, but also in terms of their implications and merits for the system as a whole. A broad range of projects can support the integration of statistics. Projects intended to meet specific user or producer need may contribute to the integration of processes, methods or outputs, even if they are not explicitly formulated only in terms of integrating economic statistics. Projects that are proposed specifically to enable compliance with international standards will contribute to integration, if the standards themselves have been devised with the needs of integration in mind. For example, compliance with the SNA serves the needs of integration, as it leads to an integrated, consistent set of macroeconomic statistics.

4.24 Statistical information produced in an integrated process should meet quality standards, consistency, coherence and other technical requirements. It must also be produced in a resource-efficient manner and have internal and external evaluation mechanisms to ensure adaptability and uniformity of the products of the statistical process.

4.25 Annual operational plans should be nested within longer-term timelines, such as five-year frameworks. The plans should include objectives, steps to be taken, requirements and fallback options. The longer-term plans should be open, flexible and participative. The responsibility for their operation should be devolved, subject to review and formal evaluation. There is a need for increasing awareness regarding strategic planning as an important dimension of the institutional arrangement of the integration of economic statistics.

4.26 During the implementation of a strategic plan, there is often a need to make adjustments to compensate for circumstances not visualized during the planning stage. The changes should be made as necessary, if circumstances have changed significantly and deviation from the original plan is essential. A monitoring and control mechanism must be invoked to ensure that actions are taken in accordance with the plan. Change management is a particularly important component for ensuring success when strategic plans are implemented. In the following list, the components of change management during the implementation of a strategic plan are provided:

- Formulate a clear strategic vision: in order to make a cultural change effective, a clear vision of the organization's new strategy, shared values and behaviours are needed. The vision provides the intention and direction for the culture change.
- Display top-management commitment: culture change must be managed from the top of the organization. Senior management must demonstrate support for change.
- Model culture change at the highest level: in order to show that the management team is in favour of the change, the change has to be notable at first at that level. Senior management should model the kinds of values and behaviours that they want to see in the rest of the organization.
- Modify the organization to support organizational change.
- Select and help to adapt newcomers to fit with the new culture.
- Develop ethical and legal sensitivity: changes in culture can lead to tensions between organizational and individual interests, which can result in ethical and legal problems for practitioners.⁵

4. Process management

4.27 The production of a statistical output can be viewed as a series of business processes, beginning with the objective of the data collection, moving on to data source and sample selection and other steps in collecting and processing the data, and ending with the dissemination of outputs. One way to manage the integration of economic statistics is by treating the statistical production process as a sequence of statistical processes using the tools of process management. In the context of economic statistics, the sequence of processes might cover all activities from survey design to dissemination. For example, a production sequence might begin with the identification of an administrative data source or the design of a quarterly business survey and continue right through to the outputs of the survey being included in quarterly GDP estimates, which are subsequently reconciled with the annual national accounts.

4.28 A variety of methodologies and tools are available for statistical agencies attempting to improve the way they manage statistical production processes. The common feature of all those methodologies is an emphasis on managing processes effectively to achieve a desired objective. In contrast to the traditional hierarchical management

5 Thomas Cummings and Christopher Worley, *Organization Development and Change*, Eighth edition (Mason, Ohio, Thomson South-Western, 2005).

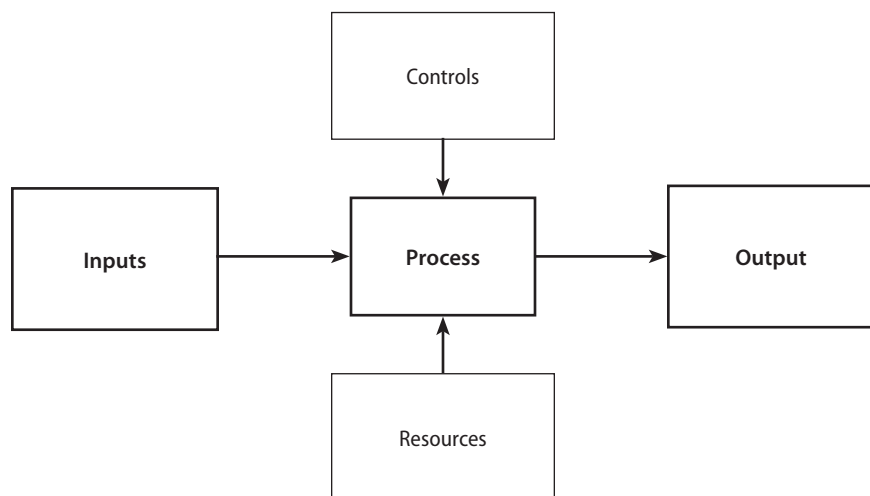
approaches, process management focuses on optimizing each process in the production sequence to ensure that the quality of the final product meets the requirements of users.

4.29 The following aspects of process management are important in the context of the integration of economic statistics:

- Designing the processes in the production sequence to achieve the required standard of quality. Focusing on quality at the design stage is more effective than the mass inspection and repair of the final statistical product. Investment in the design of processes usually brings the greatest return in quality.
- Breaking the production of a complex product into a number of clearly defined processes. That allows a quality standard to be designed for each process, and, if it is done correctly, the quality of the final statistical product can be controlled by ensuring that every process complies with the relevant standard.
- Designing statistical processes to ensure that they work together to contribute to the quality of the final product. A single process should not be optimized in isolation, without the consideration of its impact on the various uses of the final output. For example, a business survey will be designed to meet the needs of the users of business statistics, but the design should also take into account the way that business statistics feed into the compilation of the national accounts.
- Clearly designating the process owner. For the process to be controllable, the accountability for each statistical process must be clearly understood.
- Precisely defining user requirements, taking care not to create unrealistic expectations.

4.30 The implementation of process management involves a number of steps to produce the final statistical output and must be clearly documented. At the most basic level, a process is an activity in which resources and controls are applied to inputs to produce a specified output, as illustrated by figure IV.1.

Figure IV.1.
Components of statistical process management



4.31 A statistical production process is often sequential, wherein the output of one process becomes the input into the next after being modified or refined. In practice, the sequence of statistical processes will be more complicated than just a linear movement from one process to the next, as the output of one process may feed into several statistical processes, and the main input of a statistical process may be used as auxiliary information somewhere during subsequent stages in the production cycle. The interdependencies form a network of statistical production. The terminology used in the description of each process should be standardized across all statistical outputs. All the users of the output from each process should be identified and their quality requirements clearly specified. Every instance in which a statistical output is used in the compilation of another statistic should be identified. All processes should be designed systematically to ensure that the output of the process is of sufficient quality to support the requirements of other processes further along in the production sequence.

4.32 When the sequence of statistical processes requires data to be handed from one unit to another, an appropriate handover mechanism should be developed. If data flows from one agency to another, a service-level agreement might be used to define the standard that must be achieved before a handover is completed. For example, an agreement might specify that administrative data be in a form that is appropriate for compilation into a statistical output. A standard methodology might be adopted for a particular type of process wherein all outputs would be required to use the standard unless there were good reasons for deviating from it. For example, a standard sample selection method might be adopted for industry surveys to increase the coherence between various industry statistics. Standard information technology tools might be developed and used in all production sequences that pass data through a particular process. For example, a generic edit and imputation tool might be used for all administrative and survey data sets. The standardization of systems is easier to achieve if a standard set of methodologies has been agreed for that particular process, such as limiting non-response to three different methods. The management of statistical processes should be reviewed regularly and updated, in particular when external circumstances change or shifts in the availability of data affect user requirements. Process descriptions and the various delivery agreements should be revised frequently to keep them up to date and relevant.

4.33 Statistics Netherlands has developed a process management technique called chain management and applied it to the production of all official statistics. The concept of a “steady state” is used to describe the end of a data processing phase in which value is added to the data, for example, by editing, querying outliers, comparing it with data from other sources or balancing. The business architecture distinguishes 10 different steady states, each with specific quality requirements indicating the data are suitable for reuse in other statistical processes. Each steady state consists of a data set (including metadata) in a state of processing of well-described quality. Defining steady states and specifying the processing stage between each two steady states is a transparent way for providing an overview of the complete statistical chain. The Statistics Netherlands approach is described further in case study 4.2.

Case study 4.2

Statistics Netherlands: chain management

1. The starting point of chain management at Statistics Netherlands is the development of business architecture. Central to business architecture is the use of so called “steady states”. A steady state is a data set in a well-defined state of processing.^a Steady states can be used to structure the outcomes

^a See R. H. Renssen and A. van Delden, “Standardization of design and production of statistics: a service-oriented approach at Statistics Netherlands”, Statistics Netherlands discussion paper 09034, 2009.

Case study 4.2

Statistics Netherlands: chain management (*continued*)

of the statistical process: they may be the starting point, the end point or half-products of the production process. Statistics Netherlands distinguishes four basic types of steady states:

Input base: Data set at record level, which contains the unit types and variables as they are present in the source data

Micro base: Data set at record level that use standardized statistical unit types and variables

Stat base: Data set with parameter values of aggregates of populations of statistical unit types

Output base: Data set with parameter values at the level of the output tables; some values of aggregates may be suppressed because of “disclosure control”

2. The data sets within each base are stored in a central data warehouse in order to make the data available for reuse in other processes. Within the chain of economic statistics they have further refined the four basic types of steady states as part of a large redesign programme on economic statistics.^b

3. For each steady state, the data set and its quality are defined by means of quality indicators; the further towards the end of the process, the more demanding the quality requirements are. The necessary quality requirements are determined by the various users of a specific data set. These steady states, as well as the related metadata, such as quality reports and the data source design, are stored in the central data warehouse. The data source design declares the variables that should be produced

^b See B. Braaksma, “Redesign of the chain of economic statistics in the Netherlands”, paper presented at the Seminar on Registers in Statistics, Helsinki, May 2007.

4.34 Process management can be used as a tool for gradual improvement to the sequence of production processes. Some statistical agencies will start on a small scale and introduce process management for core statistical processes. Quick gains can often be made by identifying the weakest of the processes and strengthening them. At a later stage, additional processes can be integrated in a network of statistical process management. For further details regarding the experience of Statistics New Zealand, see case study 4.3.

Case study 4.3

Statistics New Zealand: using business process modelling to enhance integration

1. Statistics New Zealand began a serious move towards a process-oriented approach to the production of statistics with the gradual introduction of business process modeling methods. The key outcome is the adoption of a disciplined business process approach to describe how the organization functions and how changes to the organization and new projects are planned and managed. Critical business processes are abstracted from existing processing systems and their underlying data structures and database systems. The seven top-level processes identify activities where value can be added. A long-term objective is to devote fewer resources to the design and develop, build and collect phases by adopting standard tools and methodologies. That will allow more resources to be applied to the need, analyse and disseminate phases where value can be added for users of the national statistical system.

2. The business process model influences the way that Statistics New Zealand is organized. For example, an integrated data collection division has been established, with responsibility for all data collections for both economic and social surveys, ensuring that consistent collection processes are applied to all surveys. The business processes that pose the greatest risk to the organization can be identified and decisions about investments to mitigate them are made at the corporate level.

3. Standard methodologies have been adopted for many of the core processes that are common to the production of most statistics. The samples for all business surveys are selected from a com-

prehensive business register using an approved set of sampling methods, which ensures that all business data is classified consistently. All administrative data records for businesses are matched to the business register to obtain their classifications, which ensures that data from survey and administrative sources are classified consistently. Editing and imputation standards and guidelines have been adopted, which ensures that editing and imputation processes are undertaken consistently for all economic statistics.

4. The appropriate statistical methods are applied consistently across each subject area, whether the data is collected through a collection instrument or from an administrative data source. A business process model facilitates the identification of opportunities to standardize common processes for the benefit of the organization. Standard, generic tools have been acquired or developed for some of the critical processes. The aim is for all non-response imputation to be done using the Canadian Census Edit and Imputation System (CANCEIS) or the Generalized Edit and Imputation System (BANFF), tools produced by Statistics Canada, which ensures that a standard set of imputation methods is used across all surveys and that decisions about which method to use are made consistently.

5. A new platform has been developed internally that will be used to store and edit all business surveys and administrative unit record data, which means that consistent parameter-driven automated edits can be applied to all records regardless of their source. All statistical outputs are published using the same dissemination tools. In addition to reducing costs and minimizing risk, standardizing processes across the organization supports the integration of economics statistics. Standardization also simplifies the data integration and analysis that is necessary for meeting the increasingly complex policy and research needs of government and the wider research community. Using standard processes, methods and systems facilitates the rotation of staff by allowing them to adapt more quickly to new subject matter areas. Statistics New Zealand has adopted a process-oriented approach to the production of statistics. A focus on the standardization of business processes should gradually become part of the organizational culture.

C. Coordination and governance arrangements

4.35 Statistical coordination and governance arrangements are essential for the development of an integrated national statistical system. The coordination role of the statistical service and the relationship with data providers will be particularly important in a decentralized statistical system. Institutional arrangements should foster structured communication and coordination between all statistics producers and suppliers of data at the national level.

4.36 The integration of economic statistics in a decentralized statistical system will be more effective if one agency has responsibility for leading the national statistical system. The lead agency in the statistical system will need to evaluate the processes for coordinating activities. If there is a strong tradition of informal mechanisms or a separate formal structure for coordinating activity that works sufficiently well, then the integrative responsibility can be built into those mechanisms. If existing mechanisms are deemed to be inadequate, however, new mechanisms for statistical coordination may need to be developed. The lead agency or coordinating body would work with other departments and organizations to map out a long-term strategic plan and programme of work that will achieve the desired objectives. Responsibility for specific tasks and activities could then be negotiated with the different agencies that have a role in the statistical system. Once responsibilities have been delegated, the timetable for key deliverables can be negotiated and agreed by all participants in the programme.

4.37 The coordinating agency should monitor the progress of the integration programme and, when participating agencies are unable to meet the agreed timetables due to other pressures of work, adjustments to the programme might be required. In a

highly decentralized statistical system, responsibilities for various economic statistics may be spread among several government agencies, with no single agency having responsibility for leadership of the statistics system. In that situation, the agency responsible for the compilation of the national accounts might need to take the lead, as it will have the greatest interest in achieving integration. In other situations, the agency responsible for budgetary allocations may have a role in leading coordination activities.

4.38 In some countries, the central bank is responsible for the production of some economic statistics, the national accounts, balance of payments or price indices. In such cases, the central bank will have an important role in supporting the integration of statistical collections, and informal arrangements have to be established to ensure the necessary consistency in economic statistics for effective cooperation between the central bank, as a producer of statistics, and other statistical authorities. The specific arrangements should aim to optimize the quality, cost-effectiveness and availability of official statistics.

4.39 Governance arrangements for official statistics are necessary conditions to develop trust and confidence in the statistical system and can effectively support the integration of the statistical production process. Through governance arrangements, statistical offices obtain appropriate guidance on a range of matters from advisory boards and councils. Governance-related issues in place support the statistics framework in dealing with the independence and impartiality of economic statistics. Governance arrangements include important elements to protect the autonomy of the statistical offices. As the coverage of governance arrangements is the whole national statistical system, it can provide cohesion across the statistical system nationwide, facilitating participation in the integration process. An example of governance arrangements in the United Kingdom is provided in case study 4.4.

Case study 4.4

Roles of the Office for National Statistics and the United Kingdom Statistics Authority

Office for National Statistics

1. The Office for National Statistics is the executive office of the United Kingdom Statistics Authority, and is therefore a separate but closely related body to the Authority. The Director General for the Office for National Statistics, supported by the Director General's Office, is responsible for the day-to-day management of the Office, including all statistical production, corporate services and general management. The Director General is line-managed by the National Statistician and is a member of the United Kingdom Statistics Authority Board.

United Kingdom Statistics Authority

2. The Authority was established on 1 April 2008 by the Statistics and Registration Service Act 2007 as a non-ministerial department directly accountable to Parliament. On that date, the Office for National Statistics became the Statistics Authority's executive office.

3. The United Kingdom Statistics Authority Board is the top-level decision-making body of the organization. It oversees the Office and undertakes the independent scrutiny of all official statistics produced by different bodies across the United Kingdom.

4. The Authority Board is directly supported by staff in the Authority's Central Office, which consists of the Monitoring and Assessment team and the Authority Secretariat.

5. The Monitoring and Assessment team monitors the production and publication of official statistics across the United Kingdom by a process of independent assessment of official statistics against the *Code of Practice for Official Statistics*.^a The Head of Assessment is a member of the Authority Board and is directly accountable to its non-executive members. The Authority Secretariat supports the Board in its oversight and regulatory functions.

^a United Kingdom Statistics Authority (London: United Kingdom Statistics Authority, 2009). Available from www.statisticsauthority.gov.uk/assessment/code-of-practice.

6. The National Statistician is the Authority's Chief Executive and Accounting Officer (whose budget includes that of the Office for National Statistics). She is a member of the Board and accountable to it for the operation of the Office for National Statistics. She is the principal adviser on official statistics to the Authority and the Government. She is also:

- Permanent Secretary (head Civil Servant) for all staff in the Authority and the Office for National Statistics;
- Head of the Government Statistical Service.

7. The National Statistician therefore provides the link between the Office for National Statistics and the Authority Board, and with top layers of wider government, including ministers and Parliament. Her team in the National Statistician's Office also:

- Supports the development of Government Statistical Service policy and planning;
- Provides advice to producers of official statistics;
- Manages relations with international statistical organizations;
- Provides recruitment and communications services for the Government Statistician Group.

8. The Government Statistical Service is made up of all civil servants involved in producing official statistics across United Kingdom government departments, including the Office for National Statistics, and the devolved administrations of Scotland and Wales.

9. The Government Statistician Group is a professional community of statisticians within the Government Statistical Service, who operates within a personnel framework administered by the National Statistician's Office.

4.40 Statistical offices implementing an integrated production process of economic statistics need to move away from an organizational structure in which each statistical output is managed from beginning to end within a separate division, with its own sampling frame, classifications, survey design and collection system. That kind of structure can be a serious obstacle to integrated and coherent information and makes consistent sampling frames, population boundaries and classifications difficult to achieve. Resolving the difficulty requires redesigning the entire statistical programme into an integrated system using common classifications and methodologies, harmonized surveys and questionnaires and instituting an organizational structure that serves that purpose.

4.41 One practical approach is a reorganization of the statistical agency towards a more functional structure. A separate division with responsibility for developing and maintaining classifications and standards can lead a programme to apply consistent definitions and classifications to all statistical outputs. Creating a division that has responsibility for developing a business register to be used for the production of all economic statistics is an effective way to ensure that units are selected and classified consistently across all statistical outputs. Establishing an independent statistical methods division can help to ensure that all surveys are designed in a coherent way.

4.42 Countries can rely on a variety of mechanisms for coordination, as described below. What is important in this context is to develop a workable system of coordination that incorporates all mechanisms and dimensions that support the national plan for integration.

1. Advisory committees

4.43 A strong system of advisory committees is important for the integration of economic statistics. The committees will support sound decision-making by ensuring that the interests of all stakeholders are taken into account in the development of official

statistics system. Users of statistics represented on advisory committees are more likely to be strong advocates for integration of economic statistics. Advisory committees should represent a broad range of economic and statistical interests, including users, producers and suppliers of official statistics. Members should be selected for their knowledge of economic and statistical issues, their interest in the development of economic statistics as a coherent system and their standing in the statistical/economic community. Advisory committees can contribute to the integration of economic statistics by:

- Advocating the integration of economic statistics;
- Advising on relevance and quality of economic statistics to ensure that they meet the needs of users;
- Countering sectional interest groups advocating statistical outputs that are inconsistent with other economic statistics;
- Supporting the implementation of international statistical frameworks;
- Encouraging other producers of economic statistics to implement standard frameworks and classifications;
- Improving the coherence and integration of economic statistics;
- Identifying shortcomings in concepts, definitions, sources and methods used in official economic statistics;
- Promoting the coordination of survey activities to achieve efficient and effective data collection.

4.44 Advisory committees on statistical standards can play an important role in the development, promotion and implementation of statistical standards. Users and producers of statistics can ensure that their needs have been addressed by participating in the process for developing national statistical standards. For example, if consultation makes the redeveloped classifications more relevant to the producers of statistics, they are more likely to be adopted widely. The role of an advisory committee on statistical standards can include:

- Promoting the use of common standards for official statistics;
- Advising on the development of standards, protocols and policies for development and production;
- Ensuring that all producers of statistics participate in the development and review of classifications and standards;
- Encouraging, vetting and endorsing the development, implementation and promulgation of statistical frameworks and standards;
- Ensuring that the standards and classifications used are sound, well documented and accessible;
- Ensuring that code files and dictionaries are made available to assist producers of statistics in the use of standard classifications;
- Advising on training about the use of standard frameworks and classifications;
- Guiding the monitoring of official statistics and reporting on the implementation of standards, policies and protocols;
- Identifying shortcomings in the application of the concepts, definitions and methods of adopted international standards.

4.45 Committees on statistical standards support the coherence of economic statistics by promoting the use of national and international statistical frameworks. They

can encourage the development, promotion and implementation of standard concepts, definitions, classifications and terminology.

2. Relationship management

4.46 The institutional arrangements that support the integration of economic statistics work on two levels. At the lower level are the working groups and practical relationships where statistical work is done and practical problems are resolved. That must be supported by higher-level contacts to build a widespread commitment to integrating the statistics system and dealing with strategic problems. Both types of contact are essential for the integration of economic statistics.

4.47 Regular relationship meetings with government departments and organizations that use and produce statistics should have a number of objectives, including:

- Coordinating between the producers and users of statistics;
- Monitoring progress on bilateral projects;
- Coordinating the planning of joint work between organizations;
- Discussing new ideas and resolution of problems;
- Resolving data issues relevant to participating organizations.

4.48 The integration of economic statistics relies on information about user needs. One formal mechanism for identifying such needs is a system of user committees. The membership of user committees should be drawn from major users, including the central bank and other government departments, the private sector, education groups, the media, emerging interest groups and those with specialized knowledge. There should also be facilities on the statistical office's website for feedback from users and surveys of users of the websites to identify deficiencies in the information available. There should be regular relationship meetings with major users, such as central banks, other producers of statistics and data providers, such as the tax and customs authorities, whose administrative data are used by the statistical office.

4.49 National statistical agencies are making increasing use of administrative data. Relationships with data supplier organizations are very important, because disruptions in supply can seriously affect the quality of economic statistics. An important benefit of memorandums of understanding and service-level agreements is that they can consolidate work with data supplier organizations and make cooperation with them more predictable.

4.50 Relationship managers can support the integration of economic statistics by fostering interaction between government departments and agencies that use and produce statistics. Having a person in each agency with an awareness of the importance of official statistics will contribute to the increasing coherence of statistics.

4.51 The role of the relationship manager includes:

- Meeting regularly with relevant staff in other agencies;
- Identifying issues that need to be resolved;
- Ensuring that the appropriate staff are involved in finding a solution.

3. Memorandums of understanding

4.52 Increasing the use of administrative data supplied by other government departments increases the importance of the relationships between supplier organiza-

tions and the producers of statistics to ensure timely and consistent supply of data. In decentralized statistical systems, the statistical aggregates that feed into the national accounts may be supplied by several government agencies. The greatest risk in the short term is that data might not be delivered on time to meet the timetable for production of regular statistical outputs. In the longer term, the greater risks relate to the quality of the data being supplied. The ideal is that definitions and classifications be consistent with those used in other economic statistics. Agreeing to a memorandum of understanding with each supplying organization is an excellent tool for managing these risks.

4.53 A memorandum of understanding is a legal document that outlines the terms and details of an agreement between agencies, including the requirements and responsibilities of each party. An important benefit of these memorandums of understanding is the early warning of changes to administrative procedures or statistical processes that could affect the quality of data used for the production of statistics. The agreements make cooperation with supplier organizations more predictable by consolidating all information about all decisions and processes in one document. In particular, they can deal with the following issues:

- Conditions for the supply of administrative data;
- Timetable for the supply of data;
- Confidentiality, integrity, and security of data;
- Consultation about new uses of administrative data;
- Resolution of disputes;
- Consultation before making changes that will affect the variables supplied;
- Understanding statistical needs before making changes;
- Consultation before changing administrative forms.

4. Service-level agreements

4.54 The compilation of statistics often requires exchanges of data between different units or departments within a government agency. A service-level agreement covering the conditions for exchange of data between the administrative unit and the business statistics unit or the national accounts unit can be extremely important for ensuring a smooth data exchange.

4.55 A service-level agreement is a contractual agreement between a supplier and a customer specifying the timing and quality of the service that will be provided. They are usually negotiated by operational staff who have an understanding of the production process and the way the data will be used. If the supplier and the customer business units belong to different agencies, a service-level agreement may need to be backed by a more general memorandum of understanding developed by the corporate staff in the cooperating agencies. Service-level agreements describe the responsibilities of the supplier and customer by precisely defining the nature of the product to be delivered, the relevant quality standards and the frequency, format and timing of delivery. A process for dealing with data problems should be specified. The agreement may include various fallback options that will apply if the supplier is unable to comply with quality or timeliness owing to factors beyond its control.

4.56 Each service-level agreement should be reviewed periodically to ensure that quality standards and timetables are appropriate. Most will include a formal change management procedure to ensure that both parties agree with any proposed changes before

they are implemented. Special consideration should be given to suppliers of administrative data, such as the tax authorities and central banks. More formal agreements or enabling legislation may be needed to formalize data delivery to the statistical office.

5. Cross-agency teams

4.57 In a decentralized statistical system, communication between the staff of the different agencies responsible for producing statistics is important for the integration of statistics. If the staff do not understand how their statistics are used by other agencies, they will tend to pursue the needs of their own agency at the expense of the requirements of other agencies. Any activities that can get staff out of their stovepipes will facilitate the overall coherence of the statistical system. Cross-agency teams are a useful tool for building understanding of the way that the entire statistical system comes together. By participating in a cross-agency project team, agency staff will develop a better understanding of how staff in other agencies produce or use their statistics. Forming a cross-agency team to develop a new classification may be a good way to begin that type of cooperation.

4.58 The success of a cross-agency team will depend on a number of factors. Leadership “buy-in” is essential. The senior management of each of the participating agencies must be strongly committed to the project. The scope and objectives of the project must be clearly defined and agreed upon at the beginning of the process. The resources needed to complete the project must be clearly specified. The participating agencies will need to reach agreement on the source of funding and which agencies will be providing the necessary resources. An experienced project leader should be appointed. The project leader will need a clearly defined role and authority, because project leaders often have to deal with a number of competing constituencies. Regular meetings of the project team will be essential for good communication and resolving issues. A steering group with representation from all the participating agencies should exercise oversight over the projects. That group should act quickly to remove any bottlenecks that may delay the process. A clearly defined set of deliverables should be agreed upon at the beginning of the project.

4.59 Data needs will need to be prioritized, and the importance of the project should be communicated to other staff in the participating agencies who may need to contribute data or expertise from time to time. Groups of relevant experts who understand data linkages and quality may need to be called together on an ad hoc basis to sort out differences in source data and classifications. Statistical agencies should ensure that contributions to cross-cutting projects are recognized through awards, performance assessments and salary reviews. A key benefit of successful joint projects is that they demonstrate the possibility of integration projects.

D. Human and financial resources

1. Human resources

4.60 The integration of economic statistics will change the roles and responsibilities of many of the people involved in the production of economic statistics. Adaptation to the integrated statistical process can be systematically fostered and supported by a variety of activities related to human resources.

4.61 The development of an understanding of the importance of statistical integration should be built into all relevant training activities. Staff responsible for compiling

national accounts will need a sound understanding of issues regarding classifications, population coverage and business registers that affect their ability to integrate statistics from different sources. Staff responsible for the operation of statistical surveys will need an understanding of how their data are used in the compilation of national accounts. Training courses should provide an understanding of how data issues affect the use of statistical outputs in the SNA. For example, staff responsible for producing retail trade statistics should know how their statistics feed into estimates of household consumption expenditure. They should be able to give advice about changes to their time series that would affect the use of retail trade information for this purpose.

4.62 One way to foster an understanding of the way that results of statistical surveys are used in the compilation of national accounts is to encourage staff rotations between relevant divisions and departments. In a centralized system, rotations of staff between survey divisions and the national accounts division will foster an understanding of the way that decisions about the design and production of statistics can influence their use for SNA purposes. If staff in those divisions understand each other's roles, they will be better placed to take actions that will enhance the integration of their statistics. In a decentralized statistical system, staff rotations between different agencies will provide support for the integration of statistics. For example, staff from the agency responsible for the production of the national accounts might be seconded to an agency responsible for conducting economic surveys to work on the development and implementation of a new industrial classification or redevelop a business survey.

4.63 Another way to foster the integration of statistics is to specify a contribution to the integration of statistics as part of the performance criteria or standards for relevant staff. Rewarding staff for their contribution to activities that improve the integration of statistics will help foster those activities. Staff with responsibility for coordinating activities between various agencies or divisions should have clearly defined roles and responsibilities. Senior management can recognize the importance of integration by acknowledging achievements in that direction through existing reward and recognition schemes. Such actions reinforce the message that integration activities are important for the organization.

2. Financial resources

4.64 The funding arrangements for an integration programme will vary depending on the institutional arrangements in each country. The agency responsible for leading the programme for the integration of statistics should work with other agencies to assist them to obtain sufficient funding. That could range from the national statistics office making funding available to be another government agency by fiscal transfer to supporting the other agency to go through the existing budgeting channels to obtain the funding needed. In some situations, funding may be available from international agencies.

4.65 The aim is to develop an agreed work programme, with funding established for each aspect of the programme. Long-term funding streams are important. Ensuring that funding is available would strengthen the commitment of participants in the programme for the integration of economic statistics.

E. International arrangements for the integration of economic statistics

4.66 International institutional frameworks emphasize comparability and consistency of data sets across countries. Strong institutional coordination at the inter-

national level is essential to developing integrated economic statistics. Integration of economic statistics encompasses a key set of activities that must be well coordinated, supported and, if possible, fully formalized to achieve the desired goal. They include the development of: (a) international statistical standards (methodologies), namely, the concepts, definitions, classifications and interrelated tables or accounts that integrate a broad set of statistics; (b) compilation guidelines and implementation programmes; (c) integrated economic databases; (d) universal quality assurance frameworks to assess the quality of output produced; and (e) technical assistance and capacity-building.

4.67 Some countries participate in a regional organization with a responsibility for coordinating the production of the statistics of member countries. Implementing the standards and practices agreed upon by the regional organization will play an important role in the integration of economic statistics within each country and between countries.

4.68 Strong international coordination and the international statistical framework provide support for the integration of economic statistics at the national level. The statistical work in international organizations resembles the work in national statistical organizations. It consists of the same work phases, but an important characteristic is that the data collection most frequently features the national organizations as respondents. The data collected are aggregate data on a national or regional level, as distinct from microdata on individual persons, households or corporations. International organizations have a leading role in the development and harmonization of statistical standards.

4.69 The development of international statistical standards or recommendations is the necessary first step and requires wide international consultation to ensure universality in terms of relevance, applicability and feasibility of implementation. Given the goal to realize international comparability for a broad set of statistical domains, there is an expectation that national authorities will implement the standards in the process of developing comparable and accessible data sets. Similarly, there is an expectation that international stakeholders will endeavour to promulgate the standards through various supporting systems. Examples of international arrangements for the integration of economic statistics are provided in case studies 4.5-4.9.

Case study 4.5

Intersecretariat Working Group on National Accounts

1. The SNA is the recognized international standard and is therefore the basis for national and international reporting on national accounts for both developing and developed countries. It also provides the overarching framework for the macro and sectoral standards in other domains of economic statistics, facilitating the integration of those statistical systems to achieve consistency with national accounts.
2. The planning, organization and coordination of the SNA review and revision process is overseen by the Intersecretariat Working Group on National Accounts, which was created in 1983 through a mandate of the United Nations Statistical Commission. The Working Group is composed of five member organizations (Eurostat, IMF, OECD, the United Nations and the World Bank).
3. The five agencies coordinated the development of the conceptual framework of the 1993 version of the SNA and its update, the 2008 SNA, through a programme of international cooperation and governance. Following the adoption of the 1993 SNA and the 2008 SNA, the Working Group was tasked with monitoring and assisting countries to implement the system through an internationally agreed implementation strategy. To facilitate its work, it was agreed to develop a joint programme of work including training, the drafting of supporting manuals and compilation guidelines, research and extending technical cooperation.

Case study 4.5

Intersecretariat Working Group on National Accounts *(continued)*

4. The governance structure of the Working Group includes a rotating annual chairmanship with a permanent secretariat assigned to the United Nations Statistics Division. The mandate of the Working Group, however, does not extend to other equally important aspects of integrated economic statistics, in particular the development of integrated economic databases and supporting quality assurance frameworks.

Case study 4.6

Task Force on Finance Statistics

1. The Task Force on Finance Statistics was created in 1992 under the auspices of the United Nations Statistical Commission to take stock of the activities of the international organizations involved in the collection and dissemination of finance statistics and to make recommendations aimed at avoiding duplication. Its mandate was broadened in 1998 and currently involves the development of methodological standards for statistics on debt; the promotion of data availability on financial stocks, including international reserves; the encouragement of internationally accepted statistical practices to enhance data quality; and the fostering of inter-agency collaboration in statistical capacity-building. Its key outputs include the production of *External Debt Statistics: Guide for Compilers and Users*,^a the External Debt Data Quality Assessment Framework and the Joint External Debt Hub (JEDH) initiative.

2. Specifically, JEDH disseminates a broad range of creditor/market data series on the external debt and selected foreign assets of developed, developing and transition countries and territories. The creditor/market data are complemented in JEDH by series from the World Bank's Quarterly External Debt Database, which disseminates detailed external debt data that are published individually by countries that subscribe to the IMF Special Data Dissemination Standard or participate in the General Data Dissemination System.

3. JEDH also features creditor/market- and national-based data comparisons of countries' external debt, and provides users with access to metadata. Data are updated by contributing agencies on a quarterly basis and each agency is responsible for the quality of data series they provide. As a pilot project of SDMX, JEDH applies technological innovation to the context and content of information being exchanged, with the aim of generating efficiencies through the convergence of data flows into a common framework.

4. The Task Force is chaired by the Statistics Department of IMF and meets annually to consider its programme of work. It reports every four years to the United Nations Statistical Commission, and annually to the IMF Committee on Balance of Payments Statistics. The Task Force's work on JEDH is fully formalized through a service-level agreement signed by the four data-contributing agencies and coordinated by its secretariat at IMF.

a IMF (Washington, D.C., 2003). Available from <http://www.imf.org/external/pubs/ft/eds/Eng/Guide/index.htm>.

Case study 4.7

International Comparison Programme

1. The International Comparison Programme is a worldwide statistical operation involving some 160 countries. It produces internationally comparable price and volume measures for gross domestic product and its expenditures components.

2. The Programme is organized in six regions, all but one overseen by the Programme's Global Office at the World Bank. The remaining region is covered by the Eurostat-OECD Purchasing Power Parity programme. Eurostat and OECD work closely with the Global Office to ensure that their 46 or

47 countries can be combined in a single comparison with the approximately 110 countries of other regions.

3. The responsibility for the Programme within regions is shared between national and regional agencies. National statistical offices carry out data collection. Regional agencies provide guidance and coordinate data collection and data validation. They also put together and finalize the regional comparison. Responsibility for ensuring that the regional comparison can be integrated into a world comparison rests with the Global Office.
4. The results of regional comparisons are disseminated by regional agencies. The results of world comparisons are disseminated by the Global Office.

Case study 4.8

Harmonized Index of Consumer Prices

1. At the time of the adoption of the Maastricht Treaty in 1992, each European Union member State compiled its own consumer price index (CPI), often using different methods largely with the objective of measuring changes in the cost of living. Simple international comparisons of the national CPIs did not necessarily give accurate international comparisons of consumer price inflation. The Harmonized Index of Consumer Prices (HICP) was developed by the European Union as a response to the need for comparable CPIs to measure the convergence of inflation of European Union member States as a criterion for entry to monetary union, and as the basis for assessing price stability. The European Central Bank has defined price stability as a year-on-year increase in HICP for the euro area of less than 2 per cent. In the pursuit of price stability, the European Central Bank aims at maintaining inflation rates less than, but close to, 2 per cent over the medium term.
2. The development of harmonized standards was in close collaboration with price experts from the European Union national statistical offices. The process has been described as involving a high level of collaboration, with much time spent discussing technical and practical issues to obtain results by consensus, reinforced where necessary by legal acts. The approach taken was, after much discussion, to adopt legislation setting out the broad principles and scope for HICP. The first milestone in the development of HICPs, in October 1995, was the adoption of a regulation by the Council of the European Union that set the legal framework for the harmonized methodology. That has been built upon over the years using a series of legally binding implementation regulations, each addressing one or more specific areas of methodology. Given the importance accorded to the accuracy, reliability and comparability of HICPs in the European Union, Eurostat operates a system of compliance monitoring to ensure that the legal framework is adhered to.

Case study 4.9

Institutional environment in the creation of euro-area accounts

1. The preparation of the integrated quarterly euro-area accounts and non-financial European accounts is the result of the close collaboration at the European level between the European System of Central Banks and the European Statistical System. They have been jointly compiled and published by the European Central Bank and Eurostat in close cooperation with the national statistical organizations and national central banks of the European Union since June 2007.
2. In this unique achievement, the Committee on Monetary, Financial and Balance of Payments Statistics played an instrumental role.^a
3. In June 2001, the Committee discussed a user's vision for an integrated system of quarterly European accounts. Subsequently, a Eurostat-European Central Bank task force was set up in 2002 to

^a See Committee on Monetary, Financial and Balance of Payments Statistics, *Promoting Excellence in European Statistics: CMFB, 20 Years* (Lisbon, CMFB, 2011), pp. 105-108. Available from http://www.cmfb.org/pdf/2011-11-25%20CMFB_Promoting%20Excellence%20in%20European%20Statistics.pdf.

Case study 4.9

Institutional environment in the creation of euro-area accounts *(continued.)*

prepare the methodological and legal grounds for the collection of quarterly non-financial accounts by institutional sector.

4. The integrated quarterly euro-area accounts were developed on the basis of the methodological framework established in the European System of Accounts and of the conversion of national data into meaningful European accounts. Eurostat is mainly responsible for the non-financial part of the accounts and the European Central Bank is responsible for the financial side, including reconciliation with the non-financial accounts. Both institutions ensure full coordination by regular videoconferences.

5. The compilation of the euro-area accounts relies mostly on statistics already collected and compiled for other purposes. They provide an ideal platform for reconciling the two dimensions of the European Central Bank's monetary policy analysis, entailing both financial and non-financial analysis.

6. The European Central Bank, Eurostat and the national statistical organizations and national central banks of the European Union are working under an agreed medium-term development plan. It includes, in particular, the publication of a comprehensive set of accounts at T+90 days fit for monetary policy purposes, who-to-whom detail for securities, the breakdown of other flows into revaluations and other volume changes and additional seasonally adjusted data.

Chapter V

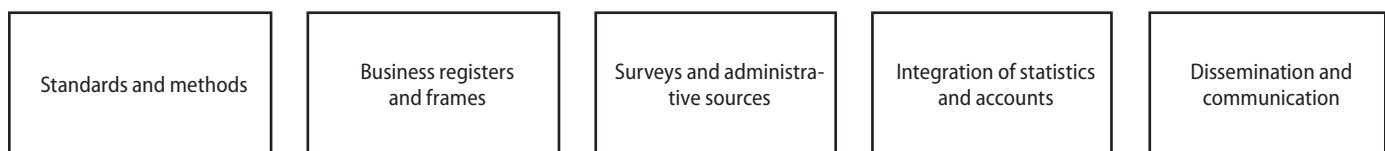
Statistical production process of integrated economic statistics

A. Introduction

5.1 The integration of economic statistics facilitates statistical reconciliation and ensures that the messages that economic statistics deliver are consistent and coherent. Statistical reconciliation in economic statistics is a task that has traditionally been performed within the national accounts and other macro accounting and classification frameworks. Macro-adjustments made within those frameworks provide more consistent and coherent sets of statistics. Adopting a common conceptual framework throughout the statistical production process would undoubtedly reduce the reconciliation measures applied to survey and administrative sources when preparing integrated statistics and accounts. The implementation of those measures requires a significant amount of coordination between staff across the different statistical agencies involved at the various stages of the statistical processes.

5.2 The main components of the statistical production process of statistical systems are illustrated in figure V.1.

Figure V.1.
Components of the statistical production process



5.3 The standards and methods component contains the adoption of common standards, classifications and common estimation methods such as data editing and processing, a common metadata system and common data quality frameworks. Business registers and frames make up the second component of the process, which provides an economy-wide population of the statistical units for which data has to be collected. The surveys and administrative sources component represents the data collections, including the design and operation of a broad range of surveys and censuses and the use of administrative sources. Often those will be undertaken by different agencies for different purposes. Significant amounts of the data collected may come from administrative sources.

5.4 The most effective means of ensuring integration and consistency is through a holistic redesign of data collections (surveys and administrative data) that minimizes inconsistencies through the use of common standards and methods, integrated survey design and a central business register. Under that approach, all economic data collections gradually change their objectives and statistical designs and enhance the coherence of

statistical outputs. When designing a collection for various sets of economic statistics, methodologists will need to think beyond their current work to how those sets will integrate with other statistical outputs. Likewise, questionnaires have to apply concepts and definitions that are consistent with those used in other surveys and administrative collections.

5.5 The integration of statistics and accounts pertains to the stage in the production process in which statistical integration frameworks are applied for the purposes of reconciliation. Such frameworks include the institutional sector accounts and input-output accounts of SNA, which allow for the confrontation and reconciliation of component data through accounting identities.

5.6 The data collected within the economic statistics system are used to produce a wide range of statistics that measure the structure and performance of different parts of the economy, including industries, institutional sectors, transactions and prices. All of them will be disseminated separately and will often have a unique set of users, for which a tailored communication plan has to be developed. Integrated statistics and accounts, such as business and sectoral statistics, prices, national accounts and balance of payments, are the final products of the economic statistics system. They bring statistics together and use data from a broad range of sources to compile an integrated set of statistics and accounts that monitor the performance and position of the entire economy. Case studies 5.1, 5.2 and 5.3, by the Netherlands, Canada and New Zealand, respectively, present national practices regarding the various components of the statistical production process.

Case study 5.1

Statistics Netherlands: a centralized integration system for national accounts

1. The Economic Division of Statistics Netherlands was organized originally on the basis of branches of industry. Departments were in place for agricultural statistics, manufacturing industries, and so on. The National Accounts Department was responsible for the integration of the economic statistics. The automation of information technology and an improvement in the timeliness of statistics led to the reorganization of the Central Bureau of Statistics in 1991. A new organization took place in which the Central Bureau of Statistics was structured into eight divisions. Although some processes became more centralized, such as automation and research and development activities, the basic organizing principle remained the branches of industry.
2. In 2000, the reorganization changed the structure from product-oriented to process-oriented. Separate branches of industry (the stovepipes) were no longer the basic organizing principle. In the Economic Division, departments were established for the successive phases of the statistical production process. A department for the General Business Register was established, followed by departments for questionnaire logistics and for judgement and analysis of data and ending with the department for National Accounts. The process of economic statistics could be characterized as a chain process, starting with the General Business Register and ending with the National Accounts.
3. In the new organization, the National Accounts Department is designed to conform to a process orientation. Before 2000, subdepartments were responsible for products such as the supply and use table and the quarterly accounts. As at 2000, the subdepartments play a role in only a part of the production process, but they play that role for all products of the National Accounts department. Subdepartments are in place for estimates of goods producers, service industries, government activities and financial institutions, and households. One subdepartment is responsible for the integration of the data in all integration frameworks.
4. In the new, chain-orientated organization, the whole process of compiling economic statistics has been redesigned. The project began in 2008 and is still running as at 2010. One of the leading principles of the redesign is to make optimal use of administrative information. Thus, information

from the tax authorities, for example, on value added tax, is used. For necessary information that is not administratively available, additional surveys are possible, but they should be reduced to a minimum. Furthermore, a special subproject has been set up to cover the information from the largest enterprises in the Netherlands. For the 300 largest enterprises, the aim is to get a consistent picture through the micro-integration of data.

5. The programme makes a number of moves in the direction of the “integration by design” approach. For example, the statistical units according to the General Business Register are not always appropriate for linking the information from the different administrative sources. A new statistical unit (apart from the above-mentioned unit for the largest enterprises) was introduced for the linking procedures, although statistical units are less homogeneous than production processes and their organization.

6. One of the main conclusions from the experience is that reorganizations in the statistical processes (and corresponding reorganizations in the organizational structures) are less complicated in a central environment.

Case study 5.2

Statistics for the harmonized revenue allocation formula in Canada

1. In 1996, the Government of Canada and the provincial governments of New Brunswick, Nova Scotia and Newfoundland announced a formal agreement on an arrangement to harmonize sales taxes. The goal was to implement a single harmonized sales tax rate of 15 per cent in the three provinces, instead of three separate sales taxes and a distinct federal goods and services tax. The revenues from the combined tax were to be collected by Revenue Canada and divided among the four governments by means of a specified revenue allocation formula. The formula was to be based on aggregate statistics compiled by Statistics Canada. The Government of Canada undertook to substantially improve the quality of the available provincial economic statistics.

2. The main elements of the plan were towards a more integrated statistical system, in which data collection from businesses would be treated in an enterprise-centric fashion. The data originating from a particular enterprise, whether collected from the headquarters, from one of its establishments or from one of its legal entities, would be kept together and treated as a single interrelated set of information. That enabled a reduction of duplication in questionnaires and an increase in the use of administrative data as an alternative information source, which permitted more varied types of aggregations and analyses, facilitated the enforcement of confidentiality restrictions and the prevention of residual disclosure, and assisted in managing and controlling the response burden on individual enterprises. Instead of collecting data by means of multiple distinct business surveys, there would be an integrated corporate survey of all statistical enterprises.

3. The integrated surveys of enterprises operating in several regions and/or industries or single enterprises would be stratified to realize: (a) equal reliability across provinces and territories and (b) highest relative data quality for those industries with the greatest priority. The priorities would depend particularly on the needs of existing data users (including cost-recovery clients) and the harmonized sales tax revenue allocation formula requirements for this project. Instead of many non-integrated survey questionnaires, there would be a single, consolidated enterprise questionnaire consisting of a main module directed to the enterprise and a number of additional schedules directed at the component establishments of the enterprise. The consolidated questionnaire would be managed within a relational database system to permit customized questionnaires to be generated for individual enterprises. The North American Industrial Classification System would be implemented in the new Unified Enterprise Statistics Program. Revenue Canada’s General Index of Financial Information, an administrative database, would be used instead of survey vehicles to obtain balance sheet and income statement statistics. Other administrative data from the goods

Case study 5.2

Statistics for the harmonized revenue allocation formula in Canada *(continued)*

and services tax and payroll deduction systems would also be incorporated. Using those administrative sources instead of more lengthy surveys would produce reliable data with a lower respondent burden.

4. All data collected from Canadian businesses would be warehoused in a standardized and interconnected set of relational microcomputer databases, where they could be accessed by authorized data compilers or analysts in Statistics Canada and the raw data collected from Canadian businesses could become a corporate resource. That brought increased flexibility in developing new cross-cutting statistical products and in responding to requests for customized tables. All business survey samples would be drawn from the central business register. The company contact database and monitoring system would be enhanced to keep track of the total response burden put upon each Canadian enterprise. Policies and procedures would ensure that all business survey contacts would be recorded in the database. It took 10 years for the system to mature. In 2009, Statistics Canada decided to launch a series of initiatives with the goal of further integrating its statistical system, based on its experience in dealing with enterprise-establishment statistics, administrative data and various survey processes.

Case study 5.3

New Zealand economy-wide economic survey

1. The Annual Enterprise Survey approach has several benefits for the integration of economic statistics:

- Consistent data are collected from across the economy. All Survey questionnaires ask the same core questions and collect a core set of variables. The differences in the questionnaires are intended to capture items that are specific to a particular industry or to obtain relevant commodity breakdowns.
- The Survey was designed as the principal collection vehicle for data used in the compilation of the national accounts of New Zealand. The questionnaires are designed to collect both standard accounting variables and the additional information needed to calculate all core national accounting variables. For example, the questionnaires collect data on wages and salaries paid. They also collect data on the other components of compensation of employees, as defined in the System of National Accounts, which means that the compensation of employees can be derived by aggregating the appropriate line codes for each unit, rather than “adjusting” wages and salaries at the aggregate level to take account of the estimated difference. The approach ensures coherence between the national accounts and other business statistics.
- As much as possible, the information needed for all the annual accounts is collected in one survey: the Annual Enterprise Survey collects information about production, but it also collects information about interest and dividend flows and capital formation, which contributes to coherence in national accounts.
- The Survey line codes are aggregated to national accounts variables prior to data editing. Analysts working on the Survey check and explain unusual movements in both variables and accounting aggregates of the System of National Accounts as a normal part of data checking. This minimizes the need for the compilers of national accounts to check unit record data.
- The Survey data feeds into the calculation of the national accounts through the current-price annual industry accounts, which are compiled within an input-output framework. When compilers are confronting data from supply and demand sides of the economy, differ-

ences should be the result of different survey designs, rather than inconsistencies between sample frames or the classification of units.

- The combination of a comprehensive business register and economy-wide economy surveys eliminate the need for benchmarking to five-year economic censuses. The national aggregates from the Survey are of sufficient quality to be incorporated directly into the national accounts.
- Detailed commodity breakdowns are collected in a survey that covers all industries over a rolling, four-year cycle. The survey asks respondents to provide detailed breakdowns of sales and expenses variables they recorded in the Annual Enterprise Survey. That approach ensures that the commodity breakdowns that feed into the national accounts and the producer price index are consistent with other information from the Annual Enterprise Survey.
- The surveys that feed into the quarterly GDP are also selected from the Business Frame of New Zealand. That ensures that survey coverage and the classification of units is consistent with the Annual Enterprise Survey. Differences still exist owing to sampling and information coming from management accounts, but coverage differences are eliminated. Where appropriate, variables of interest are defined in the same way.

B. Standards and methods

1. Common concepts, definitions and classifications

5.7 The integration of statistics and the improvement of the quality of the data require the application of common concepts, definitions and classifications. The successful implementation of methodological standards usefully contributes to achieving the integration of statistics. Unless internationally recommended standardized concepts and classifications are applied to the various subject-matter areas of statistics within a coherent logical system, statistical data cannot be structured to meet the needs of users for aggregated data or for compatible data from various fields. Standards provide common concepts, definitions and classifications at the national, regional and international levels. Descriptions of agreed definitions are needed for clear and accurate interpretation of the various concepts.

5.8 Compliance with international standards is an important tool to harmonize and strengthen the national statistical systems. There are many challenges in adopting international statistical standards at the national level, among them competing user needs, conflicting statistical priorities, scarce financial and human resources, lack of coordination among data providers, legal restrictions on access to data across statistical agencies and the degree of respondent burden. The degree with which those challenges can be addressed will determine the extent of national compliance with the international standard.

5.9 In order to meet the many challenges of developing, implementing and promoting international statistical standards, the global statistical community has agreed upon principles to facilitate the development of standards and has made significant investment in the development, dissemination, maintenance, harmonization, updating, revision and implementation of standards. The international statistical agencies continue to play a leading role in developing international standards and are committed to providing technical support in the form of training, operational guides, collection and dissemination of best practices and various other tools to assist countries in adopting international standards.

5.10 The usefulness of international standard frameworks as tools for integration depends on the degree to which national agencies preparing primary data adapt their concepts, definitions and classifications to fit into them. Steps need to be taken to involve and motivate all data producers of relevant economic statistics and keep them engaged in the process.

5.11 The main objectives of developing standards are to diminish the major causes of differences in statistics arising from the use of different concepts (such as units and transactions), valuation and time of recording rules, accounting structure, key aggregates and balances. Harmonization of and greater consistency between standards could diminish differences and result in more coherent data outputs.

5.12 Standards should be developed with broad involvement of stakeholders and technical expert groups. Because standards are to enjoy general acceptance, they should be formulated in consultation with specialists in the respective fields. Technical committees are the most appropriate instruments for this kind of work. The development has to take place in a consultation process, maintaining transparency, with attention to consistency with related conceptual frameworks and standards. It is important to reach a consensus on all main outstanding issues before finalization.

5.13 The high significance attributed to the establishment of standards for the integration of statistics is underlined in the Fundamental Principles of Official Statistics of the United Nations, which states under principle 9: “The use by statistical agencies in each country of international concepts, classifications and methods promotes the consistency and efficiency of statistical systems at all official levels”.

5.14 The adoption of the Fundamental Principles of Official Statistics in 1994 was followed by the endorsement of the Declaration of Good Practices in Technical Cooperation in Statistics in 1999, which included relevant principles underlining the role of standards in the integration process.

5.15 Principle 4 of the Declaration states: “Concepts, definitions, classifications, sources, methods and procedures employed in the production of international statistics are chosen to meet professional scientific standards and are made transparent for the users”. Good practices related to this principle include:

- Documenting the concepts, definitions and classifications used, and making the information publicly accessible;
- Documenting how data are collected and how editing mechanisms are applied to country data;
- Making officially agreed standards publicly available.

5.16 Principle 8 of the Declaration states: “Standards for national and international statistics are to be developed on the basis of sound professional criteria, while also meeting the test of practical utility and feasibility”. Good practices related to this principle include:

- Systematically involving national statistical offices and other national organizations for official statistics in the development of international statistical programmes, including the development and promulgation of methods, standards and good practices;
- Ensuring that decisions on such standards are free from conflicts of interest;
- Advising countries on implementation issues concerning international standards;

- Monitoring the implementation of agreed standards.

5.17 Through international cooperation, a large number of standards have been developed in the past decades. Those international standards can be viewed as methodological recommendations that are often accompanied by practical compilation guidelines. Many of the international standards served as the basis for the development of related national standards.

5.18 The adoption of the standard should take place by the respective authoritative body followed by publication and dissemination. The formal adoption of the standard conveys support for the forthcoming implementation process. Publication and broad dissemination of the standards provides accessibility for data providers and users and facilitates understanding as well as any necessary revisions and updates. The implementation phase includes providing technical advice to users, preparing compilation guides, organizing training courses, exchanging best practices, monitoring implementation and undertaking updates based on international research.

5.19 The development of standards is a complex process encompassing various stages of work. Case study 5.4 illustrates the project management approach used in the 2008 SNA update process.

Case study 5.4

Good practices in the development of international statistical standards

1. When the Statistical Commission, at its thirty-seventh session, evaluated the multi-year updating project of the 2008 SNA, in its report^a it attributed the commendable progress "to the adoption of the project management approach and the extensive use of a transparent interactive website, and recommended that approach and technology in similar statistical projects and programmes".^b
2. The update's work programme emphasized the basic approach as a transparent review process that has broad support in the international statistical community. National statistical organizations were engaged and consulted in all phases and at all levels. The work programme called for active involvement of the senior management in national, regional and international organizations. The outreach was not limited to national statistical offices but engaged other producers of statistics, such as central banks that produce national accounts and other macroeconomic statistics.
3. The work programme for the update of the SNA included the following main components:
 - (a) The criteria for the issues to be updated in the standards were defined. The list of issues adopted by the Statistical Commission ensured that the selection of issues was kept feasible and manageable, and that it corresponded to the needs of the community of statisticians that initiated the update;
 - (b) The governance structure was operational and built on continuous collaboration at many levels. The Intersecretariat Working Group on National Accounts, consisting of Eurostat, IMF, OECD, the United Nations and the World Bank, was responsible for managing and coordinating the updating process assisted by a technical editor with expertise on the SNA. A project manager was tasked with ensuring the smooth progress of the overall process. The United Nations Statistics Division, as the secretariat of the Working Group, provided secretarial support, including the creation and maintenance of the project website. The senior management of the five Working Group agencies provided collective oversight and liaised with senior-level representatives of countries and international organizations;
 - (c) To resolve technical issues and reach consensus, a 20-member Advisory Expert Group supported the Working Group in its deliberations on conceptual issues in six meetings and in many electronic forum discussions and papers, producing a substantial body of research. Topical (standing and ad hoc) expert groups carried out additional research;

^a See *Official Records of the Economic and Social Council, 2006, Supplement No. 4 (E/2006/4)*, chap. I.C., decision 27/104, para. (b).

^b See Intersecretariat Working Group on National Accounts, "Work programme for the updating of the 1993 SNA", 21 November 2003. Available from <http://unstats.un.org/unsd/nationalaccount/docs/Workprogram1993SNAupdate.pdf>.

Case study 5.4

Good practices in the development of international statistical standards (*continued*)

(d) To ensure country involvement, all documents intended for discussion and recommendations were publicly accessible for commenting through the update website for 60 days, and the responses were posted. Countries were consulted on every substantive step and decision in the update process. Their replies provide a rich source of information as to why they support or object to certain proposals. The replies also can be useful in the implementation phase of the standard, and can serve as a resource regarding the needs of certain countries in terms of technical assistance.

4. The project's successful and timely completion can be attributed to the efficient collaboration of its many contributors, representing a broad-based group of stakeholders joining their efforts in a closely coordinated undertaking in the framework of the adoption of a project management approach.

(a) **Harmonization of standards with macroeconomic statistics frameworks and classifications**

5.20 Harmonization of standards is the most important instrument for increasing consistency at the international level. A significant degree of harmonization has already been achieved among macroeconomic statistics frameworks such as the SNA, BPM6 and the *Government Finance Statistics Manual 2001*⁶ that has further improved with the development and adoption of the 2008 SNA. Consistency with international classifications, such as ISIC, has been achieved in that the definitions of kinds of activities and statistical units are the same.

5.21 The major harmonization of the systems occurred in the following areas:

- *Residence.* All systems distinguish the domestic economy from the rest of the world on the same basis (*residence of institutional units*) assigning to the rest of the world those institutional units whose main centre of predominant economic interest is outside the geographical territory of the country.
- *Domestic economy and institutional sectors.* All systems define the domestic economy comprising resident institutional units, adopting a common breakdown of the economy into institutional sectors and subsectors.
- *Stocks and flows.* All systems use the same distinction between stocks (economic magnitudes measured at a point in time) and flows (economic magnitudes measured with regard to a period of time). Also, all systems use the same definitions for transactions and other economic flows.
- *Accounting rules.* All systems use the accrual basis for recording transactions. All systems use market prices as the valuation principle.
- *Boundary issues.* For all systems, the production and asset boundaries are the same.
- *Integrated accounts.* In all systems, an integrated set of accounts explains all changes between an opening and a closing balance sheet by transactions, holding gains/losses and other changes in the volume of assets. This fosters the ability of analysts to reconcile stocks and flows within

6 IMF (Washington, D.C., 2001). Available from <http://www.imf.org/external/pubs/ft/gfs/manual/pdf/all.pdf>.

balance sheets. In addition, the systems reflect harmonization in similar accounting frameworks, although substantial differences exist in classification to meet specific needs.

5.22 In recent years there has been important focus on the harmonization of concepts and definitions across sectoral and business statistics of the various domains of economic statistics with the concepts and definitions used in macroeconomic frameworks. Various updating activities in economic statistics have taken place at the same time that several major macroeconomic standards were revised and updated. That allowed the institutions responsible for the development and updating of their standards to conduct the necessary consultations to ensure an increase in methodological consistency and achieve harmonization of concepts and definitions with related structural statistics and the underlying macroeconomic frameworks.

5.23 Since the standard development kept the harmonization across standards of the various domains of economic statistics and classifications as a main focus, a significant degree of harmonization of the recently updated business and sectoral statistics standards with the standards of macroeconomic frameworks has been achieved. Those intermediate output frameworks of business statistics are based on common methodological principles and common definitions of data items that allow for a coordinated compilation of harmonized statistics, with reliability and flexibility to the level of detail required to meet the needs of national, regional and international agencies and business users.

5.24 There has been considerable progress in updating, revising and developing methodology in statistical areas in a number of economic statistics domains, including industry,⁷ distributive trade,⁸ international trade,⁹ foreign direct investment,¹⁰ external debt¹¹ and tourism,¹² at the same time that their harmonization with the standards of macroeconomic frameworks has been kept in focus. The coordinated approach of the revision of the related business and structural statistics standards in the economic statistics domains with macroeconomic frameworks and classifications has resulted in harmonized conceptual systems of those standards, frameworks and classifications. In countries that implement the standards with the harmonized concepts, the possibility might arise for considering the introduction of highly integrated data-collection and estimation programmes.

(b) Definition and classification of statistical units

5.25 The legal and operational structures of economic entities as well as their record-keeping practices are developed to support their sales, profits and other goals and may not be well suited for statistical purposes. Statistical surveys are designed to use those data successfully by providing coherence between national accounting and business accounting standards. For the implementation of integrated economic statistics, it is important to have guidelines on such topics as the statistical units to be used for the purpose of data collection and reporting. If two or more statistical collections cover the same economic activity over time, meaningful comparison between data cannot be made unless the object of comparison applies to the same units. The statistical unit serves as a tool for measuring in an unduplicated and exhaustive manner several aspects of the economy.

5.26 Statistical units may be defined according to many different criteria: legal, accounting or organizational; geographical; and production. The relative degrees of importance of those criteria depend on the purpose, from a statistical perspective, of compilation and dissemination. A legal or institutional criterion helps define units in

7 See *International Recommendations on Industrial Statistics*, Studies in Methods, Series M, No. 90 (United Nations publication, Sales No. E.08.XVII.8). Available from <http://unstats.un.org/unsd/EconStatKB/Attachment387.aspx>.

8 See *International Recommendations for Distributive Trade Statistics*, Studies in Methods, Series M, No. 89 (United Nations publication, Sales No. E.08.XVII.26). Available from <http://unstats.un.org/unsd/EconStatKB/Attachment364.aspx>.

9 See *International Merchandise Trade Statistics: Concepts and Definitions*, Studies in Methods, Series M, No. 52, Rev.2 (United Nations publication, Sales No. E.98.XVII.16).

10 See OECD, *OECD Benchmark Definition of Foreign Direct Investment*, Fourth edition (Paris, 2008). Available from <http://www.oecd.org/dataoecd/26/50/40193734.pdf>.

11 See IMF, *External Debt Statistics: Guide for Compilers and Users* (Washington, D.C., 2003). Available from <http://www.imf.org/external/pubs/ft/eds/Eng/Guide/index.htm>.

12 See *International Recommendations for Tourism Statistics* (United Nations publication, Sales No. E.08.XVII.28). Available from <http://unstats.un.org/unsd/tradeserv/IRTS%202008%20edited%20whitecover.pdf>.

the economy that are identifiable and recognizable. In some cases, legally separate units need to be grouped together if they are not sufficiently autonomous in their behaviour and objectives. In order to define an institutional unit, accounting or organizational criteria also have to be applied. Accounting criteria require that an institutional unit keep a complete set of accounts of its transactions. Organizational criteria state that enterprises are organizational units that have a certain degree of autonomy.

5.27 A *statistical unit* is an entity about which information is sought and for which statistics are ultimately compiled. It is the unit that provides the basis for statistical aggregates and to which tabulated data refer. They can be observable, such as a legal entity, or created by splitting the observed entity, using statistical estimation methods, for the provision of a detailed and homogeneous set of statistics. For operational purposes, a distinction must be made between collection and reporting. The collection unit is the contact unit from which data are obtained for the questionnaire survey forms. A reporting unit is the unit for which data are reported. Reporting units are those entities for which information is collected by means of questionnaires or interviews. Reporting units are the units for which statistics are compiled. In the case of a complex operating structure, the unit at the highest level of the operating structure may make a separate return for units at a lower level of the operating structure.

5.28 For the purposes of data collection, the most convenient way to obtain statistics would be to collect from entities capable of reporting complete sets of required records. That would allow statisticians to take advantage of information available from the accounting records of the producing entities and similar or complementary information those producing entities provide to administrative authorities. In such a context, that would result in statistics that, to a certain degree, best serve the interests of users, since that would make it possible to relate administrative records to statistical surveys. For the respondents, the link with administrative data sources represents a first condition towards the use of administrative information in the compilation of statistics and the potential reduction in response burden.

5.29 For economic statistics, the statistical units can be distinguished between institutional units, enterprise groups, enterprises and establishments as set out in the next sections.

Institutional units

5.30 Institutional units are the core units of the SNA. All subsequent definitions embody the definition of this basic unit. An institutional unit may be defined as an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities.

5.31 An institutional unit has the following main attributes: (a) it is entitled to own goods or assets in its own right and is therefore able to exchange the ownership of goods or assets in transactions with other institutional units; (b) it is able to take economic decisions and engage in economic activities for which it is itself held to be directly responsible and accountable at law; (c) it is able to incur liabilities on its own behalf, to take on other obligations or future commitments and to enter into contracts; and (d) either the institutional unit has a complete set of accounts, including a balance sheet of assets and liabilities, or it would be possible and meaningful, from both an economic and a legal viewpoint, to compile for it a complete set of accounts, if required.

Enterprise group

5.32 Enterprises under the control of the same owner form a group to achieve economic advantages, such as control of a wider market and an increase in productivity through more effective business management. The integration of economies leads to the formation of vertical groups. An enterprise takes control over another enterprise that is producing raw material or semi-manufactured goods (backward integration) or selling its final product (forward integration). An enterprise group is a set of enterprises controlled by a group head.

5.33 For certain analyses, it may be useful to observe links between certain enterprises and group together those that have strong ties with each other and recognize the links of the group head and the controlled enterprise via the network of subsidiaries. The enterprise group unit is particularly useful for financial analyses; however, given its unstable and varied nature, the enterprise still remains the central unit for observation and analysis.

Enterprise

5.34 An institutional unit in its capacity as a producer of goods and services is known as an enterprise. An enterprise is an economic transactor with autonomy in respect of financial and investment decision-making, as well as authority and responsibility for allocating resources for the production of goods and services. It may be engaged in one or more economic activities at one or more locations.

5.35 The enterprise is the basic statistical unit for which all information relating to its production activities and transactions, including financial and balance-sheet accounts, are maintained and from which international transactions, an international investment position (when applicable), a consolidated financial position and the net worth can be derived. It is also used for institutional sector classification in the 2008 SNA. The enterprise or corporate level is the unit best suited for the analysis of profits, research and development, international trade, foreign direct investment, pricing and other decisions made at the headquarters of an enterprise.

Establishment

5.36 An establishment is defined as an enterprise or part of an enterprise that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added. In the case of most small and medium-sized businesses, the enterprise and the establishment will be identical. Some enterprises are large and complex, and undertake different kinds of economic activities at different locations. Such enterprises should be broken down into one or more establishments provided that smaller and more homogeneous production units can be identified for which production data may be meaningfully compiled.

5.37 The establishment is particularly useful as a statistical unit for compilation and dissemination of information related to its production activities which would include: (a) production of goods and services, revenues from sales of goods and services, all associated costs including employee remuneration, taxes on production and imports, subsidies, depreciation and a meaningful operating surplus; (b) employment information such as numbers of employees, types of employees and hours worked; (c) stock of non-financial capital used; and (d) changes in inventories and gross fixed capital formation undertaken.¹³

13 For more details on statistical units, see United Nations Statistics Division, "Statistical units". Available from <http://unstats.un.org/unsd/isdts/docs/StatisticalUnits.pdf>. Further information can also be found in *International Recommendations on Industrial Statistics* (United Nations publication, Sales No. E.08.XVII.28).

Type of legal organization and ownership of statistical units

5.38 The kind of legal organization is an important characteristic of statistical units which may be included in the business register. The kind of legal organization is the legal form of the economic entity (either the enterprise or the establishment). Further breakdowns may be of interest to users, namely incorporated enterprises and unincorporated units by sole proprietors and partnerships not recognized as independent legal entities.

5.39 In addition to taking into account the kind of legal organization, it is considered useful to distinguish between the types of ownership, namely between private ownership and the various forms of public ownership of units and foreign-controlled units. The grouping based on legal organization facilitates the choice of the appropriate types of surveys for data collection from the units in each group. Such surveys would be economical and offer the advantage of ease of implementation for collecting data to compile institutional sector accounts.

(c) Definition and classification of transactions*Coherence between national accounting and business accounting*

5.40 If the definition and classification of transactions is standardized, the integration of statistics will be enhanced. Different standards and classifications can have different definitions for similar variables. For example, variables in the SNA are often defined differently from the variables stored in business accounting systems. Responses to questionnaires will be more accurate, if the data items in survey questions are specified in terms of accounting definitions that are understood by respondents. If the additional information needed for the derivation can also be collected, SNA variables can be derived at the unit record level. That approach ensures coherence between the national accounts and other business statistics. If the additional data needed to derive SNA variables cannot be collected, an adjustment will have to be made at the aggregate level to take account of any differences in definitions.

5.41 The general principle in national and business accounting is that transactions should be recorded as claims and obligations occur, that is, on an accrual basis, not a cash basis. If discrepancies occur in recording, those inconsistencies may be eliminated by ex post adjustments.

Business accounting standards

5.42 National accounting information for companies must be drawn from data compiled and recorded according to relevant local accounting standards. Business survey respondents are usually asked to apply either the relevant International Financial Reporting Standards or national Generally Accepted Accounting Principles. That may cause several problems in the coherence and consistency of accounting information being collected:

- Where accounting standards do not prescribe a particular treatment or allow some latitude, there may still be problems of consistency (between units or over time) for some transactions, if businesses report similar transactions in different ways.
- In most cases, the principles underlying the relevant accounting standard will be consistent with the principles of the SNA. In particular, both standards are based on the principle that economic substance should

take precedence over legal form. Two areas where the IFRS adopts a different approach to the SNA are in the area of the recognition of holding gains and losses as income, and in the recording of provisions and contingent liabilities. Where the accounting standards conflict with SNA principles, survey data have to be adjusted.

- Many countries have adopted the International Financial Reporting Standards. The change from the Generally Accepted Accounting Principles to the International Financial Reporting Standards will result in a change in the definition, valuation and time of recording for some transactions. If adjustments cannot be made, the changes may lead to breaks in time series for the accounting period when the changes occur. The breaks should be identified and explanations provided, without breaching confidentiality rules.
- For multinational enterprises, International Financial Reporting Standards and other accounting standards usually require transactions between enterprises in different countries to be consolidated for the whole group. The non-consolidated data needed for the compilation of the national accounts will have to be obtained from other sources.

Extensible Business Reporting Language reporting

5.43 Extensible Business Reporting Language (XBRL) is a computer language based on Extensible Markup Language (XML) and developed for the electronic transmission of business and financial reports. Some regulatory agencies have established processes for businesses to fulfil their mandatory reporting requirements using XBRL standards. XBRL tools have also been developed for the reporting of financial information to taxation and statistical agencies. The tools reduce the cost of compliance for business by building reporting requirements into standard accounting software packages in a way that automates the process of reporting to government agencies.

5.44 The core methodology is an XBRL taxonomy that defines all the data items that the relevant agencies require from business. An essential step in developing a taxonomy is harmonizing the data items collected by different government agencies. If two agencies require the same definition of a data item, it is given the same name. If the different agencies establish that they need different definitions, then they are specified with different names. The harmonization process simplifies reporting by businesses by standardizing definitions, but it also assists with the integration of statistics, because different collection agencies have consistent and coherent data definitions.

2. Data processing, data editing, metadata and data warehousing

5.45 Data processing represents a very expensive step in data collection. For statistical agencies, the goal may be the development of a generic suite of processing tools that improve data quality and make integration possible while reducing costs. Processing systems should be integrated into all components of the statistical production process in which several centralized tools can be considered for development, including standard sample selection tools, standard editing, imputation and estimation tools and a metadata system for all statistical inputs.

5.46 The processing activities should consist of generic tasks to be performed as soon as the survey and administrative data become available. The tasks include a basic correction process when the data enter the system, an edit and imputation process, an allocation process, an estimation process and micro- and macrodata analysis. During

processing, adjustments and corrections are made to the data and arrangements must be in place to ensure that the adjustments do not affect the coherence of data. Many adjustments and corrections will be made to the basic economic data before they get integrated into macro accounts. A significant amount of qualitative information assembled during the various processing stages should be considered metadata information to be made available to the macro accountants. The information is not only crucial in the final stages of the integration process, but also aids in understanding the quality of data and decisions taken at various stages of processing and could reveal important details and flaws about survey design, survey and administrative data and data estimation methods used.

5.47 Using a data warehousing system of data and metadata contributes to the integration of economic statistics. With well-designed data warehouses, the dissemination of data and metadata becomes integrated with the collection and processing components of the statistical production process. To support the integration of economic statistics, an output data warehouse should establish a simple and efficient process for accessing data to provide:

- Comprehensive metadata to facilitate understanding and analysis;
- Consistent and coherent long-term time series;
- Reliable information about the availability of data;
- Information about the availability of updated versions of published series;
- Contact details for the people who can provide more information about a statistical output.

5.48 Statistical agencies have traditionally developed a separate database for each statistical output. While it simplifies development processes, the practice can be a hindrance to the integration of statistics, especially if there is no effort to standardize variable definitions, labels and formats. As better information technology tools have become available, many statistical agencies are moving towards the development and population of output data warehouses. The data warehouse approach to the storage of statistical data has many advantages, including:

- Efficient search capability;
- Consistency in terminology and the definition of variables;
- Standardized statistical methodologies;
- Easier access with common tools and processes;
- Increased coherence through standard classifications and definitions;
- Relevant metadata available in a standard consistent format;
- Easier data integration.

3. Data quality frameworks

5.49 Many organizations may have an operating standard for quality control. The family of standards for quality management systems, ISO 9000, is maintained by the International Organization for Standardization¹⁴ and is administered by accreditation and certification bodies. The requirements in ISO 9001:2008 (which is one of the standards in the ISO 9000 family) include:

- Adopting a set of procedures for all key business processes;
- Monitoring processes to ensure they are effective;

¹⁴ See <http://www.iso.org/iso/home.htm>.

- Keeping adequate records;
- Checking output for defects, with appropriate and corrective action where necessary;
- Regularly reviewing individual processes and the quality system itself for effectiveness;
- Facilitating continual improvement.¹⁵

5.50 There are commonalities between a quality management system and the process for introducing an integration framework. Where feasible, the statistical agencies should enhance existing, effectively functioning data quality frameworks to incorporate an integration dimension in economic statistics for the institutional arrangements, data input and output aspects of the statistical production process.

5.51 The quality of official statistics is a central concern for all statistical agencies. A number of countries and international organizations have developed detailed concepts and procedures of quality control. Of particular note is the IMF Data Quality Assessment Framework (available from <http://dsbb.imf.org/Applications/web/dqrs/dqrsdqaf>). The Framework was designed to assess the quality of specific types of national data sets, presently covering the national accounts, consumer price index, producer price index, government financial statistics, monetary statistics, balance of payments and external debt. The Framework provides a structure for comparing existing practices against best practices using five dimensions of data quality—methodological soundness, accuracy and reliability, serviceability and accessibility—as well as institutional prerequisites for data quality that may be cross-cutting and have an integration dimension.

5.52 While there are various quality frameworks in use, the Expert Group on National Quality Assurance Frameworks has developed a generic template and established a mapping to existing national quality assurance frameworks (see E/CN.3/2012/13) which can be utilized by countries to introduce the integration of economic statistics as a quality dimension.

15 The non-market orientation of national statistical offices and the essentially public nature of the informational product offered makes ISO 20252:2006 Market, Opinion, Social Research, Vocabulary and Service Requirements, published in 2006, better suited to national statistical offices than the ISO 9000 series. Details of ISO 20252:2006 are available from <http://www.bsigroup.com/en/Assessment-and-certification-services/management-systems/Standards-and-Schemes/ISO-20252/>.

C. Business registers and frames

5.53 Business registers have a central role in integrated economic statistics. They provide a common universe for sampling and a uniform classification of firms, which promote consistency in collected data across surveys. Moreover, they allow the integration of data from administrative sources and surveys. As a result, the timeliness in producing statistics can be improved and respondent burden reduced.

5.54 A business register combines different sources, such as tax records and administrative records. The business register coverage should be as complete as possible. One way to ensure consistency of units and classifications is to use a comprehensive business register as the vehicle for structuring units and assigning their classifications. If all survey populations are drawn from the business register and all administrative data are matched to it, all data records can take the classifications that they have already had assigned to them on the business register. That ensures that information from different data sources is classified consistently and avoids the problem of statistical units being classified differently in different surveys.

5.55 The business register consists of a suite of files, programmes and processes that interface with businesses through direct profiling, survey responses and feedback, as well as indirectly through administrative sources such as tax records. The frame is to support survey sampling and stratification required to measure fully all sectors of the

economy. Consequently, the register needs to contain data about the units, the name and address, a code identifying activity, variables about their size and information about their life cycle. That information is not only to determine an optimum sample for a given survey, but also to study the business demographic of the country.

5.56 In order to prepare business and sectoral statistics, the statistical unit should be the establishment, since it is the most detailed unit for which the range of data required are normally available. For analytical and sampling reasons, information about size of establishments should be available. Information about where the establishment is located is also required for analytical purposes, as well as for producing detailed unduplicated regional sets of accounts. Statistical units should be assigned a unique number in order to facilitate the matching process with administrative sources. Identification code must not change throughout the life of the unit, although some of the unit's other characteristics may change.

5.57 Enterprises and establishments perform various activities, and should be classified to the industry that contributes most to the value added of the unit, or to the activity the value added of which exceeds that of any other activity undertaken by the unit, called its principal activity. The principal activity of producer units may change from one statistical period to the next, either because of seasonal factors or the management decision to vary the pattern of output. That necessitates the change of classification of the unit. Frequent change should be avoided as it may distort the statistics, rendering interpretation difficult. Countries are encouraged to develop a "stability rule" or "resistance rule". Without such rules, changes in the economic demography of the business population might appear that would be no more than statistical artefacts.

5.58 For the purpose of accurate measurement of production, distribution and financing in the economy, it is desirable to have the links between individual establishments and their parent enterprise clearly defined. More importantly, the links are fundamental for efficient sampling design, because one survey might gather information on value added, employment and other production-related statistics usually available at the establishment level, while another might collect data from consolidated financial statements compiled mainly at the enterprise level. One of the attributes attached to a statistical unit should be the period of economic activity of a given unit, which should include the date of commencement and cessation of its activity. That is an important piece of information when establishing the sample for a given survey.

5.59 Data from administrative databases are an important source of statistical information. The units recorded in administrative systems are usually defined to meet administrative and legal objectives, which can be different from those needed for economic statistics, so compromise between conceptual purity and practicality may be necessary. For example, if it is necessary to draw on tax records for required data, or if survey data needs to be supplemented with tax data, statistical agencies will have to decide whether they can map the legal and statistical structure of the enterprise or use the legal structure selectively as a proxy for the statistical structure.¹⁶

5.60 As statistical offices become more dependent on administrative data as a core data source and for updating their business registers, the statistical unit becomes closely linked with the legal/administrative unit. Administrative units are close proxies to the economic concepts that statisticians are trying to measure and the alignment of statistical units to administrative units has not affected the quality of the statistics.

5.61 Where administrative units differ significantly from the enterprises or establishments that are the basis of other statistical collections, a record of the mapping

16 See *International Standard Industrial Classification of All Economic Activities*, Statistical papers, Series M, No. 4, Rev.4 (United Nations publication, Sales No. E.08.XVII.25).

between the two sets of units will assist with the integration of data. A business register is an effective tool for recording those mappings.

5.62 The transactions of multinational corporations do not align well with the economic behaviour measured by national economic statistics of the countries in which they operate. Some multinational global enterprises keep integrated accounting records at the global or regional levels only. To separate and extract complete accounts for all the activities taking place within each domestic economy, data should be obtained from the main or regional head office of the global enterprise.

5.63 Statistical information will be collected for geographical regions. Public organizations that collect statistics may sometimes adopt administrative regions that reflect the nature of their activities. Government departments may often be responsible for administering different sets of geographical regions. For example, a department of agriculture may adopt different regions than a department responsible for unemployment benefits. That presents challenges when integrating statistics from a variety of sources.

5.64 The adoption of standard data definitions and terminology will assist with the integration of data. Organizations that collect data with a regional dimension should map their administrative regions to a standard geographical classification. If records are classified at the lowest level of disaggregation, data from different sources can be aggregated into coherent areas and regions. Each regional area should be defined in a way that is consistent with all other areas.

5.65 The regular updating of business registers to “clean” it for “births” and “deaths” of businesses ensures the reliability of the data collected, especially relating to turning points in the economy. There is a need for a sample frame whether the country uses business registers or economic censuses for the survey sample design. The practice used to derive sample frames raises various issues, such as area samples and updates of list frames. In countries where “snapshots” of business registers serve as a sample frame, one might need to adjust survey results to account for business register lags (post-stratification and probabilistic models).

5.66 A comprehensive business register has many benefits for the integration of economic statistics:

- It serves as a consistent reference point for all adopted classifications (such as industries, geographical location, sources of data, identifier of statistical units), which facilitates the integration of statistical outputs by ensuring that classifications are applied consistently across all surveys and statistical outputs;
- It facilitates a reduction in duplications and inconsistent coverage of administrative data sets when matching administrative data sets to the business register;
- Samples for all economic surveys from the business register ensure coherence between different surveys and reduce the need for coverage adjustments;
- Administrative data and survey data can be combined in a statistical output, with the business register ensuring coherence between data sources. For example, the business register can be partitioned, with tax data used for one partition and survey data used for the rest. A unit that is included on two different data sources can be excluded from the less appropriate source to ensure that the coverage is coherent;

- Information from different sides of the accounts is derived from data sources with consistent coverage and classifications;
- Time series of the business demographic information on the register allows the growth and development of businesses to be analysed. It can be used to ensure that longitudinal microdata analysis is consistent with other economic statistics;
- Operating cost and response burden of data providers can be monitored when all survey activities are channelled through the same register.

5.67 The creation of a unified comprehensive statistical business register is a long-term objective and a challenging task. Countries with decentralized systems may want to begin by developing a system for reconciling the more significant inconsistencies in the data produced by multiple business registers. That may require memorandums of understanding, changes in laws relating to confidentiality and exchange of data, and developing a better integrated statistical production process. Reconciliation of significant differences can improve the accuracy and consistency of the data through more consistent classification of key enterprises and the elimination of overlaps and gaps in coverage. Moreover, because some registers (such as those derived from censuses) are more comprehensive, while others (such as those derived from commercial and administrative records) are more current, a reconciliation of differences may produce better business registers than any one of those types of registers.

5.68 Countries with less advanced statistical systems may need to take intermediate steps to create a more comprehensive coverage of enterprises through a combination of a limited statistical register (e.g., one based on certain types of ownership and legal status) complemented by an area frame. As an option for a survey programme that can be used to efficiently capture comprehensive statistical information from enterprises of all sizes operating in an economy, see the Fully Integrated Rational Survey Technique.¹⁷ Progressively, the coverage of the statistical register could be extended on the basis of the institutional strengthening of the statistical system to maintain a certain scope. In addition, there may be a capacity limit within which developing countries with large informal sectors could attempt to include the small and micro enterprises in their statistical registers, given the sheer number of these businesses. Building a business register involves adopting a strategy for the inclusion of each unit to achieve more comprehensive coverage. For a national example of business register development, see case study 5.5.

17 *Strategies for Measuring Industrial Structure and Growth*, Studies in Methods, Series F, No. 65 (United Nations publication, Sales No. E.94.XVII.11). Available from http://unstats.un.org/unsd/publication/SeriesF/SeriesF_65E.pdf.

Case study 5.5

Statistics New Zealand: a tax-based business register

1. The tax-based business register (called the Business Frame) records a core set of information for all economically significant private and public sector businesses and organizations engaged in the production of goods and services in New Zealand. All units are coded to a range of classifications, including institutional sector and industry (a five-digit Australian and New Zealand Industrial Classification (ANZSIC) code). Information from the tax system is supplemented wherever possible with data from other administrative sources, such as business directories, land registries and government actuaries. Name changes and group structures are kept current with information from the company offices. Several size indicators, including annual turnover and the number of employees, are updated monthly from administrative sources for use in selecting survey populations, stratifying samples and defining imputation groups. The development of a comprehensive business register has several benefits for the integration of economic statistics:

- (a) All business survey populations are drawn from the same register, so their target populations are complete and consistent. Sample selection, stratification, imputation and estimation use the same information, so standard methods can be applied;
- (b) All sample units for surveys are selected from the business register and all administrative data is matched to it, so all business records take the classifications that have already been assigned to them on the register. That contributes to the coherence of economic statistics by ensuring that unit models and classifications are applied consistently to all business data that feed into the macro accounts, regardless of the source.

2. Statistics New Zealand has established a classifications and standards division to take responsibility for developing standard classifications, sometimes jointly with the Australian Bureau of Statistics. A Standards Governance Board was established to ensure that standard classifications are used in as many data collections as possible.

3. While building statistical infrastructure and developing integrated data collections, Statistics New Zealand has continued to apply best-practice principles to the compilation of national accounts and balance-of-payments statistics. Current price annual accounts are compiled within a supply and use framework in which estimates from supply and demand sides of the economy are confronted and reconciled at the product level. The approach improves the coherence of key national accounts measures, such as gross national income, gross national expenditure, national disposable income and their components. The combination of a comprehensive business register and economy-wide economy surveys has eliminated the need for benchmarking to five-year economic censuses, as the aggregates from the Annual Enterprise Survey are of sufficient quality to be incorporated directly into the national accounts. The next challenge is to expand the range of accounts being produced.

D. Surveys and administrative data sources

1. Statistical collection and common language

5.69 The implementation of an effective collection system requires giving particular attention to two essential elements. The first element is related to the frame of statistical units to be measured. The frame is the backbone of the statistical system and represents what must be regularly measured by the statistical system. Its coverage must be as complete as possible and reflect the organizational structure of all statistical units of the economy. Where it is not possible to implement a central frame, efforts must be made to put in place an environment that has the characteristics of a central frame.

5.70 Before the collection stage can begin, there is a need to prioritize, choosing between what is required for users that are only focusing on a segment of the economy and the needs of those focusing on the overall economy. Because of the importance of producing a complete set of integrated sets of statistics for the whole economy, the priority should be to collect, at a minimum, aggregate statistics for the economy. Those statistics would be collected at a high frequency. Many of the statistics would be available from administrative data sources in order to minimize costs and response burden. Because of the need to use administrative data sources in the production of economic statistics, administrative data concepts, definitions and classifications should be incorporated into the statistical system and aligned to those already in place, adding to the common language.

5.71 The frequency would depend on factors such as size or the use of the statistics to administer government programmes. Lower-level data could be collected less frequently. The pace of structural changes in economic activity or the need to understand emerging issues are among the factors that would influence the frequency of collection.

5.72 The second element has to do with concepts, definitions and classifications. It includes mappings between concepts, definitions and classifications used by the statistical system and those commonly used outside of the statistical system. It deals as much with data to be collected as data to be derived. Essentially, the second element ensures the presence of a common language among the various areas that compose the statistical system. The ultimate goal is to ensure consistency in the content of questionnaires of all programmes.

5.73 The content of questionnaires should be integrated across all surveys, but the focus will differ from programme to programme. The focus of some questionnaires could be to collect data from enterprises, while others would focus on establishments. The questions should be metadata-driven to ensure that a specific topic is treated the same way throughout the programmes. Depending on the frequency at which some information is collected, the questionnaires would contain modules that can be added or removed rapidly. The questions would be aligned with accounting records of enterprises and enterprise and the survey results would be easily transformed into the economic variables required by the statistical system.

5.74 The approach for sending questionnaires to respondents should take into account their preferences. Respondents do not like to receive a large number of questionnaires in a staggered manner. They prefer a unique questionnaire, often in an electronic but printable format, which covers all the information they must provide. Since many firms have difficulty providing information for their lowest-level production entities, a survey should be able to get that information directly from the enterprises.

5.75 In order to ensure enough flexibility within the statistical system and a capacity to react quickly in covering new areas, it is crucial to design processes that can be reused. The need pertains to all survey-taking processes, such as sampling and questionnaires design, as well as editing, imputation and reconciliation processes.

5.76 Once a comprehensive business register is in place, an economy-wide annual economic data collection interspersed with infra-annual collections can be developed, which includes the following benefits:

- Comprehensive coverage of the entire economy and the capability of ensuring data for the macro accounts and component data that deliver a consistent and coherent assessment for the various segments of the economy at different points in time;
- Consistent data collected from across the economy with a core set of variables collected from all units in the annual and infra-annual collections;
- Survey questionnaires designed to collect both the general data items and the additional information needed to calculate core national accounts variables;
- Survey and administrative variables aggregated to national accounts variables prior to data editing, which allows analysts to check and explain unusual movements in both general variables and specific national accounting aggregates as a normal part of data checking, and consequently keeping to a minimum the need for the national accountants to check unit record data;
- The combination of a comprehensive business register and an annual economy-wide economic survey, reducing the need to conduct frequent economic censuses required to recalibrate the level of macroeconomic statistics, notably in the national accounts;

- Consistency between the annual and infra-annual collections.

2. Questionnaire design

(a) Principles of questionnaire design

5.77 Integrated questionnaires and questionnaire design play a central role in the data-collection process because they have a major impact on respondent behaviour, interviewer performance, collection cost and respondent relations, and therefore on data quality. Those impacts are critical to ongoing and longitudinal surveys.

5.78 The development of a questionnaire assumes that, in the period leading to its development, a thorough process was followed to evaluate and prioritize the needs for the types of data to be collected. It also assumes that the data to be collected will have an economic significance of their own and, in the context of other data within the statistical system, will also add to the coherence and the completeness of the macroeconomic statistical system.

5.79 Before collection can occur, a sample must first be identified and a series of questions must be established. To the extent the sample is representative and the questions are adapted to the capacity of respondents to answer the questions, assuming a sound methodology, the quality of the survey results should be adequate, particularly regarding response accuracy. That does not necessarily mean, however, that the data will be coherent with other data of the statistical system.

5.80 A questionnaire is a set of questions designed to collect information from a respondent. With the increase of administrative data, questionnaires should be developed keeping in mind the possibility that part of the survey results will be provided by respondents while another part will originate from administrative sources. That way, a new questionnaire may not be required if the data to be collected become available from administrative sources.

5.81 The collection of statistical information needs to be organized by moving from a stovepipe approach towards an integrated approach. In a stovepipe model, where each programme collects information on its own and for its own purposes, an entity surveyed may be asked the same questions with different definitions. For example, a manufacturing survey might ask questions about the number of workers while a labour survey asks similar questions but uses different definitions. That approach not only increases survey burden but also is likely to produce labour statistics that are difficult to align. In contrast, integrated questionnaire design and integrated surveys help to resolve these data-collection issues. Case study 5.6 presents the national practice of integrated surveys system in Mexico.

Case study 5.6

Integrated economic surveys system: the approach of Mexico

1. The general objective of the Instituto Nacional de Estadística y Geografía (INEGI Mexico) national economic surveys is to provide useful, high-quality and timely primary statistics through continuous surveys. The surveys are integrated with economic censuses and administrative registers in order to satisfy national and international data needs for statistical information and to satisfy national accounts requirements. They offer the user data on specific segments of the Mexican economy and are used as data inputs in the compilation of national accounts.

Case study 5.6

Integrated economic surveys system: the approach of Mexico (*continued*)

2. Economic surveys were initially undertaken using different conceptual frames and questionnaires with limited integration between economic censuses and monthly and annual surveys. Being separate collection exercises, the response burden could become significant for those sampled enterprises engaged in more than one industry (manufacturing, commerce, services), when repeatedly included in the selected samples for the different industries. The field operations were not cost effective because of duplications in information collected and the large geographical distances between establishments operating in the same industry. Moreover, the separate survey operations resulted in an irregular workload for the interviewers.

3. In contrast, with the introduction of the INEGI Mexico national economic surveys, common concepts, definitions and classifications were adopted across the surveys based on international standards and recommendations. In addition, the response burden and cost of operations were reduced with the adoption of a common survey system. Common estimation methods for editing, validation and processing were introduced. Moreover, because it was a continuous field operation, the workflow could be better managed across the year.

4. Overall, the benefits of the introduction of an integrated data-collection scheme for economic statistics are the optimization of resources and time, the increased knowledge of field staff in managing and operating field operations, the reduction of the data provider load, increased cost effectiveness and the specialization of staff in the central office in questionnaire and sample design and in the application of data estimation and analysis techniques.

Source: INEGI Mexico, "The integrated approach to economic statistics: the Mexican approach", paper presented at the Workshop of the Friends of the Chair on Integrated Economic Statistics, Bern, 6-8 June 2007.

5.82 It is necessary to use common concepts, terminology and classifications when designing questionnaires. Without uniformity, comparability is not possible. Major differences in statistics come from the use of different basic concepts such as units and transactions. The harmonization of concepts is valuable, as it will reduce those differences and result in a more coherent and consistent set of data outputs.

5.83 The questionnaire can greatly contribute to the overall efficiency of the statistical system. A well-designed questionnaire will affect the statistical system in many ways, including by minimizing response burden and making data collection more efficient by ensuring a minimum number of response and non-response errors. A well-designed questionnaire should facilitate the coding and capture of data and minimize the amount of edits and imputation, as well as minimize costs and time associated with data collection and processing. Preference should be given to electronic data reporting because of the potential cost savings, and an instruction guide should always be provided to respondents. Special arrangements should be put in place for complex enterprises, including dedicated staff assigned to conduct data collection on a wide range of topics. The staff would also be responsible for regularly reviewing the profiles of the enterprise groups.

5.84 Statistical agencies should allocate resources to test questionnaires before they are put in the field in order to provide insights into how respondents react to a questionnaire. The testing can be done via a focus group or one-on-one interviews, with the emphasis on testing and evaluating the wording of the questions, and assessing alternate wording and sequence of questions. Wording and concepts should be aligned to those already in use within the organization. This should be reflected in both the questions and the reporting guide, which should be short and clear.

5.85 Cognitive methods can also be used to examine the thought processes of respondents as they answer the survey questions and to ascertain whether or not respondents understand the meaning of the questions. In countries where there are many

official languages, testing should be conducted in all official languages before implementation. Ideally, a pilot test would be conducted to observe all survey operations working together, including the administration of the questionnaire.

(b) Questionnaire database

5.86 The integrated questionnaire should be viewed as a database containing all questions about production and financial variables or other characteristics that might be asked of the various enterprises and/or establishments. It should be a strategic goal to eliminate duplicate data requests through a strategy centred on enterprises and a series of questionnaires with a common look and feel. Since the business register contains information about enterprises, or enterprises and establishments, or simple units, the database should be constructed so that variables can be associated with those types of entities. The questions need to be grouped in “modules” that cover the major categories of information normally requested on business surveys: revenues, expenses, balance-sheet items, capital expenditures, employment, commodity inputs and outputs, the class of customers, the destination of shipments, turnovers and sales. The questions should contain a flag indicating whether the questions are aimed at the enterprise or the establishment. Ideally, the questions would also indicate whether they are best answered by the comptroller, the payroll manager, the production manager or some other officer because, for example, while the production manager most likely knows about the material inputs in his unit, he may not have all the information about services inputs that are under the responsibility of another unit within that enterprise.

5.87 Information in the questionnaire database can be grouped into four categories. The first category consists of a series of identifiers such as the name of the survey, industry codes, questionnaire identifiers and the dates the publication will eventually be released.

5.88 The second category deals with survey content or rules:

- All questions for all surveys are to be stored using reference numbers;
- Each reference number outlines a single concept;
- Each single concept can be represented by only one reference number;
- Reference numbers are to be shared by surveys to collect and process data;
- Information and coherence analysis are to be shared for large enterprises receiving multiple questionnaires;
- Every reference number receives a generic description defining the concept to be measured;
- Each survey receives specific descriptions if the wording differs from the generic description.

5.89 The third category deals with the values collected. Questionnaire cells should be assigned a domain value when they are created. The cell type can be based on numbers or characters. The expected length of the numbers can be pre-specified, and the cell may indicate an expected range of value.

5.90 The fourth category provides specifications for edit collection, such as:

- The edit number and its description;
- Edit failure formulas;
- Edit messages;

- The severity of the edits;
- The type of edits (*i.e.*, based on historical or collected data);
- Edit action flags indicating that suspicious data have been confirmed by respondents.

(c) Metadata system

5.91 The implementation of a metadata system is an important prerequisite in developing an integrated questionnaire in the statistical system. The metadata will eventually provide the necessary coherence between the various estimates and data collection tools leading to the production of the statistical information. For ultimate users, the importance of metadata is not only about concepts related to units, variables and classifications, but also about quality. The metadata structure covers the following items: statistical description, the unit of reference, reference period, institutional mandate, confidentiality, release policy, the frequency of dissemination, dissemination format, the accessibility of documentation, quality management, relevance, data accuracy and reliability, timeliness, comparability, coherence, cost and response burden, data revision and statistical processing.

5.92 Metadata have a central role in the data production infrastructure that will greatly enhance the efficiency of the statistical system. From the very beginning of the statistical process, the metadata support collection as well as post-collection processing, and support activities in the various collection stages.

(d) Questionnaire grouping

5.93 There are many ways to categorize the questions in the database. For example, they could be grouped according to four categories of questions. The first questionnaire would target enterprises and would include a set of standard questions on consolidated income, expenses (including purchased services), balance-sheet items, investment and employment for the whole enterprise. The second questionnaire would create a portrait of the enterprise, showing the structure of the enterprise as generated by the business register. It would show the legal and operating structures of the enterprise, to be confirmed or updated by the respondent. The third questionnaire would still be enterprise-driven but would only collect information on a few basic variables for each establishment needed to calculate value added. The value of those variables would be reconciled with the statistics obtained from a fourth questionnaire, which would be establishment-based. That questionnaire, in addition to some basic questions on revenue and expenses at a fairly aggregate level, would contain modules to collect more detailed data such as on destination of production or employment.

5.94 In countries where survey data can be substituted by administrative data sources, a strategy focusing on mainly two questionnaires could be envisaged. The first questionnaire would be dedicated to collecting data at the enterprise or establishment level from the very complex businesses for which financial data cannot be obtained from administrative data or for which some key information is not available, such as information by region. It would be a collection vehicle containing all questions on financial as well as characteristics information. The second questionnaire would be a simplified version of the first, dedicated to the collection of industry-specific commodity or characteristics data at the establishment level. That questionnaire would target the majority of businesses that have simple structures, with the financial information coming from administrative tax data and made up of a number of modules, each dedicated to collect-

ing a specific type of characteristic, such as input or output commodities, destination of production and qualitative information.

5.95 For complex businesses, specialists in subject-matter divisions would be able to customize the questionnaire in order to capture data for the entire enterprise. The module dedicated to the capture of characteristic information could be customized by industry or activity. For collecting characteristics information for a simple business, the respondent would only receive the characteristics modules applicable to its industry/activity.

5.96 All the variables need to be aligned to statistical information from administrative sources, to the extent they exist in the administrative database. Administrative data sources may not offer the required detail concerning expenses related to professional business services, but they could provide a value at that level. Despite the potential difficulties of aligning business accounting data and variables required for the statistical programmes, the strategy requires building mappings, often referred to as the “chart of accounts”, between those data. The chart of accounts is a tool that links business accounting statistics with various statistical accounting frameworks supported by the statistical agencies. It greatly facilitates linkages between business accounts (balance sheets and income statements) economic variables and national accounts statistics. Building a chart of accounts would require the assistance of staff who are very knowledgeable about accounting practices.

5.97 Special attention should be given to surveys conducted outside the scope of the statistical agencies. In many countries, even where the statistical system is centralized, many surveys are conducted in departments that specialize in a specific industry field, for example, a country’s department of natural resources could conduct surveys on the mining sector. That type of situation could also occur when the subject matter falls under the jurisdiction of another government agency. Formal agreement should be developed between those organizations and the national statistical organization to ensure the compatibility of the questions. In order to determine questionnaire content, consultations with the various subject-matter areas are required. To ensure that response burden is kept to a minimum, national accounts compilers must be active participants in determining the content and prioritizing the information.

3. Use of administrative data sources

5.98 The use of administrative data has become a cornerstone of many business statistics programmes in many countries. The reliance on administrative sources has increased considerably, to the point where they now play a major role in the production of subannual and annual statistics while representing a reliable source of information to update frame registers. They represent a relatively inexpensive source of information compared to surveys and censuses, which is an important factor for statistical agencies dealing with tightening budgets. Administrative records allow for the reduction of the burden of statistical inquiries and can be adapted and used in the overall survey process for validation purposes by comparing them against data collected by other methods, such as surveys. They can be used to replace survey data and, in the absence of information, such as non-response, administrative data can be useful in the imputation process. Finally, with the increasing demand to produce statistics for small areas where sample surveys may be difficult to implement, administrative records represent a useful alternative. Case study 5.7 presents the national practices of Brazil in the use of administrative sources to produce business statistics.

Case study 5.7

Use of administrative sources to produce structural business statistics: the case of Brazil

1. The first quarter of the 1990s was a period of intense structural changes in the economy of Brazil owing to the increasing opening of the economy, the intensification of the industrial restructuring process, the large dissemination of information and communication technologies and the multiple extension of outsourcing practices. Such an environment increased the demand for updated and diversified economic data. It became clear that the traditional Brazilian economic statistics system was inadequate to respond to this demand. The lack of updated structural data was evident: in the mid-1990s, the 1985 economic census was the sole reference for structural data. The annual survey system turned out to be unable to answer the demand for updated structural business data in the inter-census period. Finally, owing to budget restrictions, the 1990 economic census was postponed for several years.
2. There was a clear need to revise the model and the procedures that were then in use in the production of economic statistics and to look for alternatives that would meet the challenge faced by Instituto Brasileiro de Geografia e Estatística (IBGE): how to produce, at a cost compatible with an environment of scant resources, a set of integrated economic data that could meet the demand for more current, diversified and high-quality economic data.
3. The solution was the rationalization of the system, including the wide use of sampling surveys and articulation using administrative files and data.
4. In the mid-1990s, the size of the business sector (formal sector) of Brazil was already quite large, amounting to about 3 million enterprises representing some 50 per cent of GDP. The largest part was made up of small businesses with relatively small participation in production. That feature of the Brazilian business organization was highlighted by the economic census of 1985: 3.7 per cent of total enterprises accounted for 86.4 per cent of the revenue and 59.4 per cent of the employment in the surveyed business sector. In 1995, business units with fewer than 20 employees represented 96.4 per cent of the 3 million active enterprises registered with the Brazilian internal revenue service, but accounted for only 39.6 per cent of the formal business employment.
5. As the main aim of economic statistics is the measurement of the economic activity, by annual, quarterly and monthly surveys, it became clear that the design of economic surveys should take into account the uneven weighting in the business universe. Census operations surveying all enterprises are inevitably expensive and long lasting, but they are not necessarily the most efficient way to provide updated data on the structure of the economy. The crucial question was, then, how to develop and maintain an updated statistical business register covering the universe of enterprises to serve as a central frame for sample design. Articulation with administrative files covering the universe of enterprises of the country was essential. In the 1970s, the Government of Brazil started the process of computerizing their administrative files and records; one consequence was improved effectiveness in the coverage of the business universe. Since the 1980s, IBGE has had access to individual business information from the administrative files of the Ministry of Labour. A programme of modernization of the economic surveys was then designed and implemented by IBGE, involving a transition to an integrated system of business surveys whose sample design is based in a central business register that encompasses all business units in the country, systematically updated by the merging of data from IBGE surveys and the administrative files of the Ministry of Labour.

(a) Dealings with administrative authorities

5.99 In many countries, the reliance on administrative data has reached such a level that the statistical system would be affected significantly if administrative records were to disappear. With the increasing role of administrative data in the overall statistical system, clear arrangements between statistical offices and administrative authorities must be in place and be reviewed regularly to ensure the continuity of use of these important data sources in the statistical system. Some form of agreement should exist

between the administrative authorities and the national statistical organization that sets out the rights and responsibilities of both parties. The agreements should contain clauses about confidentiality, coding, data transfers and their frequency, and the content of the administrative database. Strict measures should be taken within the statistical agencies to ensure that the administrative data records remain confidential, are treated as survey microdata and are used only for statistical purposes. Access to micro records should only be given to staff involved in survey-taking activities. It is likely that staff in the various programmes of the statistical agencies will demand access to the data because of the great potential of the data for various compilation or analytical purposes. Consequently, staff responsible for the administrative data should be mandated to compile aggregate information, vetted for confidentiality, so the data can be used in a broader context elsewhere in the statistical agencies. There will always be cases where, in order to perform a study, research or record linkages, it will be necessary to give access to the micro administrative data to non-survey staff. A protocol should exist to evaluate those types of requests.

5.100 Statistical agencies should always be in a position to demonstrate to administrative authorities that strict measures are in place to protect the confidentiality of the data. Protocols need to be in place that describe specific processes to transmit the data to the statistical agencies, the storage of the data, their use and reasons for their use, and steps to ensure the confidentiality or any residual disclosure related to the microdata as well as aggregates compiled from administrative sources. There are likely to be legal restrictions on accessing, using and sharing data from administrative sources. In such cases, new legislation could enable bilateral data-sharing arrangements to be set up between the statistical office and other government departments or public bodies.

5.101 Ideally, access to the administrative sources should be guaranteed by legislation, although legislation alone is not a sufficient condition for the productive use of administrative records. A cooperative approach to the development and utilization of administrative records for statistical purposes is likely to be far more effective in obtaining access to administrative records than an approach involving legal arguments. Managers in organizations that gather administrative information must be sensitive to the importance of the data and its contribution to the overall statistical system. The development of a good working relationship with those managers will facilitate the exchange of information about data quality, making it easier to identify and solve problems as they arise.

5.102 The expertise of the statistical agencies in managing data processes may be beneficial to organizations responsible for collecting and maintaining administrative databases. Efforts should be made to share that experience in order to help administrative departments streamline their operations and improve the quality of their data and coding. As for survey data, the statistical agencies should deal cautiously with the confidentiality of administrative records.

5.103 The purpose of statistical information collection is quite different from the purpose of administrative databases. The purpose of statistical information collection is to learn about levels, trends and relationships. In the statistical system, the micro records that compose the aggregates are confidential and are never used to determine any action that would affect an individual or an entity. Since statistical and administrative records should be treated in the same manner, statistical agencies should make it clear to organizations providing administrative data that the statistical agencies will refrain from providing feedback that would translate into administrative actions vis-à-vis an individual or entity.

(b) Advantages and limitations of administrative records

5.104 Administrative data exist in response to legislation and regulation. As for the use of administrative data for statistical purposes, one should take into consideration that administrative data cover specific segments of economic activity and are defined specifically to administer government programmes. Consequently, administrative data may not always fit the exact needs of statistical agencies.

5.105 One of the main advantages of administrative data is that they allow statistical agencies to acquire statistical information at a relatively low cost and to reduce response burden significantly. They also have the advantage of covering a complete segment of the economy, often the whole economy. Owing to the administrative character of the data, non-response is normally negligible and data are subject to substantial scrutiny, which should make them accurate. They are not subject to sampling errors.

5.106 Administrative records have limitations. Individuals and/or entities may not be required to report at common intervals. Some data may be reported monthly while other data are reported quarterly or even annually, and annual data may be presented on a calendar-year basis or on a fiscal-year basis. The availability of administrative records may not align well with the data-release deadlines of the statistical agencies. There may be delays before the data can be used and procedures may be required to allocate the records in the proper period. The intended coverage of administrative data may not satisfy the needs of the national statistical organization. The quality and some of the characteristics of the data may be difficult to establish, as the data are reported and processed in the organizations assembling the administrative data.

5.107 It is necessary to examine the quality characteristics of individual sets of administrative records. The coverage and content of administrative records can be subject to discontinuities resulting from changes in regulations or administrative practices. Also, variables from administrative sources may not all receive the same attention; for example, revenues may be examined closely, but less effort may be devoted to ensuring the industry codes are correct. Discrepancies may arise between administrative concepts and statistical concepts. As the administrative processes are not under statistical office control, concepts regarding variables and units in respect of data coverage, content, quality and consistency may not comply with the needs of the statistical system, limiting the use of administrative data for statistical estimation and analysis purposes. The difficulty of matching administrative and statistical records will also limit the use of administrative records. It is possible that administrative sources arrive at the statistical agencies in an aggregated form; for example, statistics about education on primary schools may be available at an aggregate level only, and in such a case statistical agencies should obtain information about how the data were assembled. Statistical agencies should investigate all the aforementioned issues thoroughly before they start using administrative records on a large scale.

(c) Mapping of concepts and definitions of administrative sources with statistical uses

5.108 In order to make administrative records useful to statisticians, it is necessary to build mappings showing how the concepts, definitions and classifications of administrative data can approximate the economic variables required by the statistical system. For example, a chart of accounts or mappings should be established between the business accounting-type data reported to administrative authorities and the economic variables of the statistical agencies. Methodologies should be developed on ways the

administrative data can be used as extrapolators for economic data collected from official surveys and censuses using economic accounting concepts and definitions.

5.109 Aligning the concepts and definitions of administrative sources to those of the statistical agencies is a necessary criterion for their use in the statistical system. There will be instances in which classifications and definitions might need to be changed so that the administrative data can be integrated with data from surveys or other administrative sources. The definition of units covered in administrative sources often does not align well with the definition used in the statistical system. The legal entity is often the concept used by administrative authorities, while the concept of enterprise and establishment is used by statistical agencies. Moreover, entities can be identified differently in the various administrative databases. Consequently, one of the prerequisites in using administrative data is to establish rigorous mappings between the various structures of entities maintained by administrative departments and the statistical agencies. The mapping is necessary to ensure that there is no duplication in coverage and that it will be possible to match up information from various sources. In countries where a unique identifier is used by all administrative authorities to identify a firm, the use of a unique identifier will greatly facilitate the integration of the administrative records into the statistical system.

(d) Other types of administrative data

5.110 Administrative databases represent excellent sources of information; however, other similar sources of information should also be considered for use in the statistical system. For example, in the cases of public enterprises and public quasi-corporations, reports to government such as income statements may be a basic source of information about the production and financial status of those entities. Statistical offices may also be able to obtain access to such types of data from the private sector. For example, information related to credit cards may be a useful and rich source of information to estimate consumer spending, or data on room vacancy could be a good indicator of accommodation services. Private-sector data suppliers operate on a commercial basis, so the transfer of data from them to the statistical offices may take the form of a contract with a payment of a fee. The data collected by private-sector data suppliers can serve as an important supplement to the official statistics, either as extrapolators or for use in validating estimates from preliminary survey data. Such secondary-source data, however, should be carefully examined for their scope and coverage and considered for use only when found to be of acceptable quality.

E. Dissemination and communication

1. Dissemination

5.111 The dissemination and communication component of the statistical production process is critical to integrated economic statistics. Users ultimately benefit at this final stage from the information services provided by statistical agencies.

5.112 Dissemination and communication are different but intertwined aspects of the ultimate output of the statistical production process. Dissemination provides accessibility to statistical data and metadata through hard-copy publications, web-based databases and other means, and ensures the transparent and impartial release of consistent and coherent data to all users at the same time according to previously announced release calendars. Moreover, when considering data dissemination, the underlying technology used to share the data should be kept in view.

5.113 Traditionally, dissemination is seen as a technical production element of the statistical production process, providing accessibility to data and release numbers mainly to the more specialized and educated users. According to that dissemination approach, it is assumed that the users have the ability to apply analytical techniques to extract and interpret the information the statistics contain. Therefore, dissemination can focus primarily on a one-way communication of numbers to the users without providing much narrative or visualization.

5.114 The integration of economic statistics requires changing the way dissemination and communication are handled in the statistical production process. With the widespread use of the Internet and greater accessibility of low-cost communication and visualization tools, many statistical agencies are introducing an active two-way statistical communication with a much broader spectrum of users for the dissemination of data. The two-way statistical dissemination and communication goes beyond providing accessibility to numbers and introduces a continuous dialogue about how the practical utility and relevance of the information the statistics contain can best be presented. The statistical communication will be based on the dissemination of data and metadata and supported with statistical narratives and visualization, since good practices demonstrate that an increased number and diversity of end users can be reached by including information about the content and interpretation of the statistics disseminated.

5.115 The purpose of producing integrated economic statistics is that users benefit from comprehensive, consistent, accurate and reliable information disseminated on a timely basis, at a reduced burden and cost to those involved in the process—especially data source providers and compilers, but also statistical communication experts. Integration of the production of economic statistics adds value to users by disseminating information in an understandable and comprehensive format that meets their analytical needs and enables them to draw conclusions about the content, structural linkages and quality of the disseminated data. An integrated dissemination in the presentation of an integrated set of macroeconomic and detailed component structural and short-term statistics will benefit the users by creating a better understanding of the disseminated statistics and reinforcing messages for evidence-based policy- and decision-making.

5.116 Dissemination is about accessibility of statistical information in user-friendly and consistent presentations of data across publications, electronic sources and websites. It is also about explaining data to users by making metadata available and announcing the schedule of the releases of data in the form of an advance release calendar, which provides prior notice of the release dates on which the statistical agency undertakes to release specific statistical information to the public. Such information may be provided for the forthcoming period on a weekly, monthly, quarterly or annual basis.

5.117 The accessibility requirement in dissemination relates to the need for data and metadata to be presented in a clear and understandable manner on an easily available, timely and impartial basis. It should be ensured that up-to-date and relevant metadata and prompt and knowledgeable support services are available. An efficient dissemination practice is composed of the following three elements: data accessibility, metadata accessibility and assistance to users.

5.118 Data accessibility for integrated economic statistics means that consistent data formats should be available, so as to enable navigation across sources of dissemination. Integrated economic statistics should be presented in a way that facilitates proper interpretation and meaningful comparisons. The layout should be clear and well structured, following internationally standardized methodologies. Descriptive text should also be clear, and should accompany tables and charts containing data, and the text

should perhaps be augmented by analytically useful applications of the data. Moreover, the statistics should be released according to a previously announced schedule. Statistics should be made available to all users at the same time, although statistics that are not routinely disseminated can be made available on request. The data should be available in an electronic format.

5.119 Metadata accessibility provides for documentation on the concepts, scope, classifications, basis of recording, data sources and statistical techniques that are available, allowing users to note any differences from internationally accepted statistical methodologies, standards, guidelines and good practices. For integrated economic statistics, the metadata should include references and links to the data, as well as cross-references and links across data sets. Ideally, the metadata should be available in an electronic format. Metadata should be available in a number of user-friendly forms (for example, as a section on frequently asked questions) at different levels of technical detail to meet user needs.

5.120 Prompt and knowledgeable support services should be provided to assist users in a timely manner, and contact points for each data set should be adequately publicized. Catalogues of publications, documents and websites, as well as other services that are available to users, including information on changes to data, metadata and dissemination practices, should be widely available. Users should be fully informed of any data that can be made available on request. Users would benefit from explanations and examples in integrated economic statistics so they can note the coherence in concepts. Such clarifications can provide data reconciliations or bridge tables, or distinguish differences in coverage, time of recording and other factors that may lead to statistical discrepancies.

5.121 Good dissemination practices also require the identification of user needs for the release of data with the appropriate periodicity (daily, weekly, monthly, quarterly, annually and so on) and adequate timeliness. By definition, such data should be internally consistent within a data set and across major data sets. This means that the data should be reconcilable (through horizontal and vertical consistency checks) within a reasonable period of time. The data should also be comparable among alternative macro-economic data sets. Data revisions should follow regular, well-publicized and transparent schedules. Preliminary data should be clearly distinguishable from any subsequent revisions or final data. Good practices for the serviceability of the data suggest that revision studies that compare changes in released data over time should be released to the public in a transparent and equitable manner.

5.122 To enhance further the accessibility and presentation of data and metadata to users, the next logical step would be the adoption of the internationally endorsed Statistical Data and Metadata eXchange (SDMX) standards. Specifically, users need to easily and cheaply share, exchange, understand and be able to reuse the data and metadata for their own purposes. Such concerns are related to the presentation of the information, the length of historical data, and electronic access to the data.

5.123 The SDMX standards are designed for the exchange or sharing of statistical information between two or more partners. The SDMX standards have been developed by the sponsoring organizations in order to accommodate national statistical offices, central banks, ministries and other agencies. The standards are intended for reporting or sharing statistical data and metadata in the most efficient way, within national statistical offices, central banks, ministries and other agencies. The SDMX standards can also be used within a national system for transmitting or sharing statistical data and metadata, which is especially useful to countries with a federal structure or a fairly decentralized statistical system. In such cases, a close link can be established between the national and international systems for data sharing, allowing for additional gains in efficiency.

5.124 The use of the SDMX standards for data exchange can easily evolve towards open SDMX-based dissemination; such dissemination may respond well to user demands for well-structured data and metadata in reusable formats, and should be considered as an option for national authorities as well as international organizations. Good practices in data-exchange techniques such as the SDMX standard could significantly improve the usefulness of the disseminated information in its data sharing.

5.125 The SDMX standards can also be used for data and metadata management within statistical organizations, since the information model is applicable to much of the information stored and processed within statistical organizations, and such organizations can make use of the SDMX initiative's information technology tools to reduce the costs of developing their data-management systems. For further details, see case study 5.8.

Case study 5.8

Origins and purpose of the SDMX initiative

1. The SDMX initiative was launched in 2001 by seven organizations working on statistics at the international level: the Bank for International Settlements, the European Central Bank, Eurostat, IMF, OECD, the United Nations Statistics Division and the World Bank. The seven organizations act as the sponsors of the SDMX initiative.
2. The stated aim of the SDMX initiative was to develop and use more efficient processes for the exchange and sharing of statistical data and metadata among international organizations and their member countries. To achieve that goal, the SDMX initiative provides standard formats for data and metadata, together with content guidelines and information technology architecture for the exchange of data and metadata. Organizations are free to make use of whichever elements provided by the SDMX initiative are most appropriate in a given case.
3. With the advent of the Internet, the electronic exchange and sharing of data has become easier and more common, but the exchanges have often taken place in an ad hoc manner using all kinds of formats and non-standard concepts. That creates the need for common standards and guidelines to enable more efficient processes for the exchange and sharing of statistical data and metadata. As statistical data exchange takes place continuously, the gains to be realized from adopting common approaches are considerable both for data providers and data users.
4. The SDMX initiative aims to ensure that metadata always accompanies the data, making the information immediately understandable and useful. For that reason, the SDMX standards and guidelines deal with both data and metadata.
5. Common standards and guidelines followed by all players not only help to provide easy access to statistical data, wherever the data may be and without demanding prior agreement between two partners, but they also facilitate access to metadata that make the data more comparable, more meaningful and generally more usable.

Source: "SDMX User Guide", version 2009.1. Available from <http://sdmx.org/wp-content/uploads/2009/02/sdmx-userguide-version2009-1-71.pdf>.

2. Communication

5.126 Statistical communication has evolved considerably over recent years. Traditionally, statistical organizations focused on dissemination as a one-way communication of information through few media channels, such as newspapers, radio and television. With the growing demand for statistical information from a significantly broader group of users and the application of new technology, statistical services are making increased efforts to communicate coherent, mutually consistent and logically connected data with a higher degree of interpretability. The extensive use of the Internet and the appearance of social media tools have significantly changed the methods of communication and dissemination and increased the numbers and diversity of end users.

5.127 The statistical systems of individual countries have a range of approaches when it comes to managing communication functions. The placement of those functions within the organizational structure will have an impact on their effectiveness. The placement should ensure that the communication of statistical data and the associated technological infrastructure receives a high level of attention from management. Increased competition from other data producers means that there is an increasing need to improve communication from the statistical organizations to mainstream users, such as media and policymakers, as well as hard-to-reach groups.

5.128 Most statistical organizations continue to use the traditional way of disseminating their statistics, using publications and adding websites and other means to their methods of communication to convey the information the statistics contain to the users in a more effective manner. The principal aim of statistical communication is to reveal more of the information contained in statistical data to make statistical information easier to interpret. Statistical communication is about catching the reader's attention with a headline or image; providing explanations for the numbers in an easily understood, interesting and entertaining fashion; and encouraging journalists and other users to consider how statistics might add impact to their analyses.

5.129 Statistical communication conveys a message that tells readers what happened, when and where something happened, and contributes to understanding why and how that something happened. Statistical organizations use communication to demonstrate the relevance of their data to government and the public. In such a way, they can anticipate greater public support for statistical programmes, improve respondent relations and gain greater visibility for their products.

5.130 The complexity of statistical communication depends on the level of aspiration of the statistical agency to interpret the information or knowledge the statistics contain. At their most basic form, the statistics are presented in a traditional tabular format without any narrative. In this case, it is left to the user to apply techniques to transform the data and establish relationships between the data to distil the information from the statistics for a certain object of study, based on theoretical considerations and using statistical techniques with different levels of sophistication. At an intermediate level, for example, the SNA framework is used to make certain macroeconomic and sectoral relationships between primary or disposable income and consumption, investment, trade or debt explicit in macroeconomic indicators. Such indicators might be represented as deviations from the long-term trend for analytical purposes or, alternatively, individual macroeconomic and sectoral indicators can be analytically grouped with individual component short-term statistics based on the established properties of the component data in the past. Therefore, component data on production, turnover, new orders, income, employment, prices, trade, money and financial indicators are grouped with macroeconomic and sectoral indicators to demonstrate the analytical value of the indicators for certain subjects such as international trade, the housing sector and financial markets. Specifically, the general user might be interested in that kind of analytical presentation to understand better and be educated about the information and signals in the statistics. At the most advanced level, individual and composite indicator sets are used to perform some type of sophisticated economic analysis. Advanced statistical and econometric techniques are used to transform and select the individual component data to trace long-term and cyclical trends, detect turning points and explain growth.

5.131 Visualization tools,¹⁸ in addition to statistical narratives and metadata, can enhance the presentation of data. Good practices for the dissemination of integrated economic statistics involve ample use of attractive and informative graphs and charts

18 Good practices in the use of visualizations can be found on the website of Statistics Netherlands. Available from <http://www.cbs.nl/en-GB/menu/publicaties/web-publicaties/interactief/default.htm?Languageswitch=on>.

accompanied by explanatory text, with well-documented sources, including corresponding links to the underlying and related data and metadata. Demonstrating to users how the information can be used may help them create and build new applications of the data and metadata.

3. Practices of international dissemination and communication

5.132 The dissemination of integrated economic statistics benefits from an analytical framework. The IMF Data Quality Assessment Framework¹⁹ provides such an analytical structure and contains specifics on the dimensions of accessibility and serviceability which are directly related to dissemination.

5.133 The Special Data Dissemination Standard and the General Data Dissemination System support good statistical dissemination practices by countries. The Special Data Dissemination Standard prescribes that subscribers disseminate 21 data categories on national summary data pages (posted on national websites) which have a standardized format to disseminate the two most recent observations for each category. The Special Data Dissemination Standard allows flexibility options and “as relevant” features, so that not all data categories are disseminated by every subscriber. The national summary data pages also may contain additional data and hyperlinks to longer time series and more complete data sets. The Special Data Dissemination Standard also requires subscribers to disseminate a standardized advance release calendar covering all the data categories. The implementation of national summary data pages and advance release calendars enhances both data and metadata accessibility, through uniform formatting, the announcement of data releases in advance release calendars and simultaneous data releases on national summary data pages.

5.134 At the international level, IMF and other international agencies (the Bank for International Settlements, the European Central Bank, Eurostat, OECD and the World Bank) have collaborated to create the Principal Global Indicators website (<http://www.principalglobalindicators.org/default.aspx>) as a central international hub for dissemination purposes based on good statistical dissemination practices. The website presents cross-country comparisons of data for the Group of 20, with convenient data mapping facilities and links to other databases.

5.135 In a joint initiative by the United Nations Statistics Division and Eurostat, in response to the effects of the economic and financial crisis in 2007, an updated internationally agreed data template and meta structure with 12 data categories was moderated. It encouraged countries to make further progress in establishing national central data hubs for a minimum core set of quarterly national accounts, high frequency economic and financial indicators, high frequency indicators and related metadata systems for early warning and macroeconomic surveillance purposes. Apart from the inspiration from the Special Data Dissemination Standard, the initiative also benefited from the work done by Eurostat during the past decade in the creation of the Principal European Economic Indicators data set.²⁰ The Principal European Economic Indicators are an integrated presentation of quarterly and flash estimates of national accounts, with supporting high frequency statistics, in a single location for the effective monitoring of the business cycle and for macroeconomic surveillance. The internationally agreed data template further extends the Principal European Economic Indicators with national accounts-based indicators for the measurement of sectoral exposures and vulnerabilities, for those countries that compile institutional-sector accounts.

19 Information on the Data Quality Assessment Framework and the data dissemination initiatives is posted on the IMF Dissemination Standards Bulletin Board. Available from <http://dsbb.imf.org/Default.aspx>.

20 See Eurostat, *Principle European Economic Indicators: A Statistical Guide* (Luxembourg, 2009). Available from http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-81-08-398/EN/KS-81-08-398-EN.PDF. See also <http://epp.eurostat.ec.europa.eu/portal/page/portal/euroindicators/peeis/>.

Chapter VI

Implementation of integrated economic statistics

A. Introduction

6.1 To implement an integrated statistical system, a broad range of actions need to be taken to improve the coherence of the entire system, ranging from the adoption of international standards and classifications to strengthening the institutional arrangements for statistical integration. Each country will have to decide where it should focus its efforts according to its priorities, resources and circumstances.

6.2 A long-term programme of integration should address all stages and all aspects of economic statistics. In the short term, particular agencies will need to focus their efforts on those aspects of the system over which they have the most control and where their efforts will have the greatest effect. Defining that focus will require balancing benefits against costs and will vary depending on whether the statistical system is centralized or decentralized. Statistical leadership will be important.

6.3 The programme of implementation will need to be carefully managed to avoid losing momentum, because it will take a long time to complete the full integration of economic statistics. In a centralized system, the lead agency will be a national statistical office with a clearly specified responsibility to integrate economic statistics within a national statistical system. Coordinating mechanisms will vary depending on the size of the statistics office. In a small office, the mechanism may be a coordinating committee of business unit managers, while more complex arrangements will be needed in a larger organization, including staff appointed to coordination and integration roles and a range of formal decision-making bodies through all levels of the organization. A coordination or integration branch might be needed to develop the programme and ensure that integration needs are taken into account whenever existing statistics are being redesigned or new statistics are being developed. Methodology divisions may need to make the need for greater integration a core requirement for all statistical designs. In a more decentralized statistical system, support for standardized survey methodologies will have to be built across all participants in the economic statistics system.

6.4 Activities that contribute to the integration of the economic statistics system need to be carefully selected for the long-term implementation programme. The order in which the activities are undertaken will vary depending on the nature of the statistical system. Implementing standards and classifications will usually be a good place to start; likewise, it is probably better to focus on key economic measures at the beginning of the programme, and then broaden the perspective once initial success has been achieved. For example, transitioning from a traditional programme of rolling industry surveys and censuses spread over several years to a set of integrated collections using survey and administrative data requires statistical agencies to make careful decisions about the speed at which the work can proceed.

6.5 Changes to economic data collections will generally have to be achieved within existing budgets, timetables and programmes. Getting all users and producers of statistics to agree to implement harmonized concepts, definitions and design standards is a complex task. Business units and agencies responsible for particular statistical outputs will have to be persuaded to adopt integration as an objective for any statistical developments undertaken. All of the changes will have to be fitted into existing development timetables without disrupting the publication timetable or the continuity of time series for existing outputs. Every statistical output will have users with particular needs that need to be taken into account.

6.6 Most statistical agencies have limited resources, so attempts to make changes to the entire economic statistics system in one project is unlikely to be practical. A more realistic approach would be a well-planned set of gradual changes that are implemented effectively over a longer timetable.

6.7 National accounts provide the coordinating framework for integrating economic statistics to ensure conceptual as well as numerical consistency. Integrated accounts present a unified picture of all of the aspects of the economy that are measured in the separate accounts. They have shared conventions, definitions and values, and they allow measures in one account to be directly compared to the same or other measures in other accounts.

6.8 The development of new integrated accounts or the continued improvement or integration of existing accounts should be undertaken through the adoption of concepts, definitions and methods recommended by international standards. Those standards, supported by handbooks and guidelines, serve to harmonize economic accounts across countries, facilitating international comparisons.

6.9 The present chapter will demonstrate how the 2008 SNA, an international statistical standard, is applied as the overall integration framework for economic statistics. Being an accounting system for economic statistics, the integration function of the 2008 SNA is based on institutional sector accounts, input-output accounts and other extensions such as industry accounts, labour accounts and satellite accounts. The present chapter will also point to other reference standards on economic statistics, along with illustrative case studies of those frameworks for the integration of statistics of specific segments and aspects of the economy. The selected country examples illustrate the range and variety of national practices in implementing the integration of economic statistics.

B. Reconciliation of source data

6.10 Comprehensive and consistent source data are essential to developing accurate and reliable national accounts. The source data for each set of integrated accounts should correspond exactly to the concepts and structure of the accounts. Moreover, the data need to be accurate in the scope and coverage of units and in the time of recording and valuation.

6.11 Source data from economic surveys and censuses are generated in part to support economic accounts. Source data is likely to be generated for other purposes, however, such as tax collections, customs and border control and financial regulations. Those types of source data are generally referred to as secondary or mixed-use sources. Secondary sources include data from public authorities, often referred to as administrative data, as well as data from private sources. Administrative data are often tabulated by government entities as a by-product of administering their programmes, such as processing corporate tax returns, regulating public utilities and issuing building permits.

Those types of source data must be adjusted and harmonized for use in the estimation of economic accounts, and may need further adjustment to support a fully integrated system of accounts in which all of the components are fully compatible with all of the accounts that make up the system.

6.12 Adjustments must be used to correct for a variety of problems in the source data, including inconsistencies among aggregates and subaggregates from national samples, incomplete or biased source data, differences in the availability or gaps in the timing of source data and differences in the classification of establishments by agencies gathering data. There are likely to be differences in methodologies and source data used in producing estimates for the various accounts, and systems in which the responsibility for the various accounts is divided.

6.13 The frequency with which source data are available is an important consideration in the development of measures of economic activity. One factor affecting availability is the speed with which the source data are collected, compiled and released. Another factor is whether the source data are part of a statistical programme that provides more complete or otherwise better coverage; for example, when more detailed information is collected for a benchmark or annual survey than for quarterly or monthly surveys.

6.14 In the latter case, source data for the earliest estimates are typically incomplete, preliminary or missing, and trend-based projections are used to fill in the missing pieces. Subsequent revisions incorporate source data available later that are usually more comprehensive and from increasingly reliable sources. The best source data may be obtained from economic censuses that are likely to be undertaken only every several years. That ultimate data set will be annual in frequency; the earliest data may be of monthly or quarterly frequency.

6.15 As an example, table 6.1 illustrates the changing nature of the source data that supports the current quarterly estimates of United States GDP. For the “advance” estimate of GDP, components that are based on survey data for all three months of the quarter account for 45 per cent of the estimate; components that are based on a mix of survey data and extrapolations (normally survey data for the first two months of the quarter, with extrapolation for the third month) account for about 30 per cent of the estimate; and trend-based data accounts for the remaining 25 per cent. For the “second” estimate, 70 per cent of GDP is based on revised monthly survey data and 7 per cent is based on new monthly data. For the “third” estimate of GDP, the proportion of GDP that is accounted for by trend-based data drops to 13 per cent.²¹

Table 6.1.
Shares of source data for the United States quarterly GDP estimates (Percentage)

Data source	Current quarterly estimates			Annual estimate
	Advance	Second	Third	First
Trend-based data	25.1	22.6	12.7	5.6
Monthly and trend-based data	29.7	1.7	1.2	--
Initial monthly or quarterly data	45.3	6.6	16.6	--
Revised monthly or quarterly data	--	69.2	69.5	47.2
Newly available annual data	--	--	--	47.2

21 More-detailed descriptions of the data underlying the current quarterly estimates of United States GDP and gross domestic income may be found in Bruce T. Grimm and Teresa L. Weadock, “Gross domestic product: revisions and source data”, *Survey of Current Business* vol. 86, No. 2 (February 2006), pp. 11-15; and Alyssa E. Holdren and Bruce T. Grimm, “Gross domestic income: revisions and source data”, *Survey of Current Business*, vol. 88, No. 12 (December 2008), pp. 14-20, both available from <http://www.bea.gov/scb/index.htm>.

Source: Bruce T. Grimm and Teresa L. Weadock, “Gross domestic product: revisions and source data”, *Survey of Current Business*, vol. 86, No. 2 (February 2006), pp. 11-15.

6.16 The most comprehensive data are collected only periodically—at 10-, 5-, or 1-year intervals. Such data incorporate larger samples and more data verification and,

as a result, are of a higher quality. Data collected quarterly or monthly are based on a smaller sample with more limited coverage, and are of a less robust quality.

6.17 Data on incomes are available in tax and financial accounting records. A number of challenges arise from using those data sources. The tax and financial data must be adjusted to match the economic concepts of national income. Audit studies that measure the amount of underreporting or non-reporting are often used to derive adjustments for the misreporting of incomes. Case study 6.1 provides further detail on a country practice.

Case study 6.1

Measures of compensation in the United States

1. Measures of compensation in the United States comprise wages and salaries and supplements to wages and salaries. Wage and salary estimates for the most recent quarter are based on the United States Bureau of Labor Statistics' monthly Current Employment Statistics programme, which surveys about 140,000 businesses and Government agencies, representing approximately 410,000 individual work sites, and covers the employment, hours and earnings for all employees. The Current Employment Statistics data do not cover

certain types of irregular pay such as bonuses and stock options. Because coverage of both the number and types of employees has varied in the past, the initial wage and salary estimates have been subject to large revisions when more complete data become available, despite efforts to adjust for systematic bias.

2. The Quarterly Census of Employment and Wages, which is compiled by the Bureau of Labor Statistics from state information as reported by employers covering 98 per cent of jobs in the United States, is the ultimate primary source of wages and salaries by industry for the national accounts, the industry accounts and the regional accounts (for regions, states and counties), and provides consistent and integrated statistics to analyse the United States economy. The data comprise a nearly complete census of wages and salaries, including overtime, bonuses, stock options and other irregular forms of compensation, for virtually all workers, and are incorporated into all but the most recent quarter's estimates.

3. Benchmark and annual estimates of supplements to wages and salaries are comprehensive measures of all such income. The supplements include employer contributions for United States Government social insurance (mostly social security, Medicare and unemployment insurance) and contributions for pensions and private insurance (mostly health insurance) and are developed using a variety of information. Estimates of Government social insurance are primarily based on data from the United States Social Security Administration. Estimates of contributions for private health insurance and for state and local government health insurance are based on data from the Medical Expenditure Panel Survey (Centers for Medicare and Medicaid Services). Estimates of contributions for federal health insurance are based on data from the United States Office of Personnel Management. Estimates of contributions for private pensions and for supplemental unemployment benefits are based on Form 5500 tabulations from the United States Department of Labor. (Form 5500 is a tax return filed by administrators of private pension and supplemental insurance plans.) Estimates of contributions for federal pension plans are based on data from the Monthly Treasury Statement, and estimates of contributions for state and local government pensions are based on annual surveys of state and local government retirement funds by the United States Census Bureau. Estimates for workers' compensation are based on data from the National Academy of Social Insurance and A. M. Best (a private trade source).

C. Industry accounts

6.18 Consistent source data on the outputs, inputs and value added in the production accounts by industry (in short, industry accounts) are essential for identifying the sources of productivity and the industry breakout of GDP growth. Industry and product classification systems establish the framework for defining production and the goods and services produced. Examples of such frameworks include ISIC and CPC, used for international comparisons; the North American Industry Classification System and North American Product Classification System, used by Canada, Mexico and the United States; the Classification of Economic Activities in the European Community and the Classification of Products by Activity, used by the member countries of the European Community; and ANZSIC, used by Australia and New Zealand.

6.19 Within a statistical system, adjustments may be required in order to treat industry and product classifications consistently. For example, different source-data providers can have their own interpretations of industry and product definitions, which would result in inconsistencies across data sets used to construct industry accounts. It is important that suppliers and users of industry and product data eliminate inconsistencies in order to provide an accurate and reliable description of production.

6.20 The unit of measurement should tell a consistent story about industries and production. For example, source data collected from tax records may be on an enterprise, or company, basis rather than an establishment, or plant, basis that is more often used in surveys and is more suitable for economic accounts. As a result, consistency among outputs, inputs and value added may require a translation from an enterprise to an establishment basis, or vice versa. Moreover, differences in methodologies and sampling procedures across source-data providers may require the development of a method that reconciles those data sets on the basis of the relative reliability of the data. That is particularly important when source-data providers use different methods to measure the same, or similar, concepts.

6.21 Measures of industry activity are more consistent in definition and scope the more frequently the activity is measured. In contrast, benchmark or annual industry surveys are likely to be more comprehensive, based on a larger sample and better data verification, but there is also a greater chance that the industry has changed markedly since the last benchmark. In other words, there are trade-offs between the frequency of a series and the quality of a series. Case study 6.2 provides further details on industry accounts.

Case study 6.2

Adjustments to industry source data to improve consistency: the United States enterprise-establishment adjustment process

1. The unit of measurement for the United States industry accounts is the establishment. Many source-data providers in the statistical system of the United States do not collect all data on an establishment basis. The United States Census Bureau prepares quinquennial economic censuses, annual and quarterly surveys primarily on an establishment basis. Those census statistics are used to construct measures of outputs, inputs and expenditures in the input-output accounts. The United States Department of the Treasury's Internal Revenue Service collects consolidated tax-return data on an enterprise basis. The data are used to construct gross domestic income measures in the national

Case study 6.2

Adjustments to industry source data to improve consistency: the United States enterprise-establishment adjustment process (*continued*)

income and product accounts and to construct directly the measure of value added by industry in the annual input-output accounts.

2. More specifically in the annual industry accounts, several subcomponents of gross operating surplus—such as corporate profits before tax, corporate net interest and corporate capital consumption allowance—are based on corporate tax return data from the Internal Revenue Service. Because the enterprise- or company-based data may account for activities by several establishments classified in different industries, the United States Bureau of Economic Analysis must convert them to an establishment, or plant, basis. The conversion is based on employment data for establishments from the quinquennial economic census that is cross-classified by enterprise; the matrix breaks out the consolidated tax-return data separately for each corporate component of gross operating surplus. Corporate business income on an establishment basis is then combined with establishment-based data on outputs, inputs and expenditures within the input-output framework. Inconsistencies that remain between the data sets are reconciled and harmonized through balancing the input-output “use” table.

1. Agriculture

6.22 Concerns about food security and food prices and the increasing demand for alternative uses of agricultural products heighten the need for timely, reliable and high-quality data to monitor progress in the agricultural sector. A key element of the strategic plan for the development of agricultural and rural data systems is the integration of agriculture into the national statistical system. The *Global Strategy to Improve Agricultural and Rural Statistics*,²² endorsed by the Statistical Commission in 2010, involves identifying a suite of methodologies for data collection, enabling the integration of agricultural and rural statistics with the overlapping data requirements of other statistical domains (such as education, labour, health and environment), including macroeconomic statistics and national accounts, and addressing the need to improve statistical capacity.

6.23 The integration of agriculture into the national statistical system includes the development of a master sample frame for agriculture and its use in an integrated survey system, and the implementation of a data management system. Integration means, on the other hand, the use of common classifications and definitions. For the integration of agriculture statistics, countries can rely on international statistical standards and classifications, based primarily on methodological publications by the Food and Agriculture Organization of the United Nations (FAO) that provide national statistical offices with internationally recognized definitions, concepts and classifications, to promote the consistency and comparability of information at the world level. Comprehensive publications on statistical methods and standards in agricultural statistics cover economic accounts for food and agriculture, agricultural census methods and standards and sample survey methods for agricultural surveys.

6.24 The establishment of new classifications for agricultural activities and products, led by FAO, has been carried out in parallel on three fronts: contributing FAO proposals for CPC, ISIC and the International Standard Classification of Occupations, the new versions of which now better reflect the reality and needs of agriculture statistics; updating the FAO list of agricultural inputs and products; and applying international classifications to the World Programme for the Census of Agriculture. In the design of

22 World Bank, et al. (Washington, D.C., 2010). Available from http://www.fao.org/fileadmin/templates/ess/documents/meetings_and_workshops/ICAS5/Ag_Statistics_Strategy_Final.pdf.

the World Programme for the Census of Agriculture 2010, the concepts and principles of the System of National Accounts and ISIC have been used to define the agricultural census units, agricultural activities and the scope of the agricultural census. Moreover, a new crop list has been constructed on the basis of the principles and structures of CPC and ISIC.

6.25 The revised handbook *A System of Economic Accounts for Food and Agriculture*²³ provides a broader framework to bring together various kinds of databases relating to food and agriculture in an integrated system. The concepts and accounting structure of the system are based on the SNA.

23 FAO (Rome, 1996).

6.26 A handbook on rural households' livelihood and well-being,²⁴ jointly prepared by Eurostat, FAO, OECD, the Economic Commission for Europe and the World Bank, responds to the need for better data and indicators on rural economies, the farm household and the environment, providing a set of indicators with focus on the farm household as primary reporting unit.

24 *The Wye Group Handbook: Rural Households' Livelihood and Well-Being* (United Nations publication, Sales No. E.07.II.E.14). Available from <http://www.fao.org/fileadmin/templates/ess/pages/rural/index.htm>.

6.27 The methodological publication *A System of Integrated Agricultural Censuses and Surveys*²⁵ provides guidance on the integrated system approach to agricultural censuses and surveys. It intends to assist countries in the conduct of their national census of agriculture in the framework of the World Programme for the Census of Agriculture 2010.

25 FAO (Rome, 2005).

2. Industry and services

6.28 Data on industrial activities are required for several purposes by a variety of users, including the government, the business community, researchers and others. One of the most important purposes, undoubtedly, is to provide a basis for assessing trends in the economy. For that purpose, annual and infra-annual estimates on the contribution of industrial activities to the national economy are in great demand by:

- (a) Policymakers, who use industrial statistics for the formulation of industrial development strategies and plans at the national and regional levels, as industrial development is important for every economy and provides the necessary impetus for the growth of service activities;
- (b) The business community, which uses industrial statistics for evaluating business options, assessing opportunities for new investments and estimating market shares for their products;
- (c) Researchers, who study the technology employed in the production process in terms of input-output relationships and productivity analysis by detailed economic activity; by size classes of operating units; by geographical characteristics for regional, national and international analysis; and by ownership structure;
- (d) Compilers of national accounts, who make extensive use of industrial statistics, including for:
 - (i) Measuring the annual and quarterly output and value added generated by industrial activities;
 - (ii) The compilation of supply and use tables by product and by industry and input-output tables;
- (e) The general public, who benefit from the availability of timely industrial statistics by using them to evaluate the conditions of the economy, employment and income perspectives in order to make more informed decisions.

26 *International Recommendations for Construction Statistics*, Statistical papers, Series M, No. 47, Rev.1 (United Nations publication, Sales No. E.97.XVII.11). Available from http://unstats.un.org/unsd/publication/SeriesM/SeriesM_47rev1E.pdf.

27 *International Recommendations for the Index of Industrial Production*, Statistical papers, Series F, No. 107 (United Nations publication, Sales No. E.10.XVII.16).

28 OECD (Paris, 2007).

6.29 With a view to establishing a uniform pattern for the measurement of economic activities on a comparable basis, international recommendations have been formulated by the United Nations for the collection of statistics on a number of economic activities. They include international recommendations for industrial statistics,⁷ construction,²⁶ distributive trade⁸ and the index of industrial production.²⁷ Those recommendations, among other things, provide definitions of data items recommended for collection and publication, together with definitions of additional data items derived from the basic system. Compilers are encouraged to use the list of data items as a reference in order to develop a list of data items in accordance with their own statistical circumstances, respondent load and available resources and, after having determined the data items to be placed on that list, should use the definitions presented consistently. Statistical standards for guidelines and recommendations on the compilation of output indicators for the services sector are available in the OECD *Compilation Manual for an Index of Service Production*.²⁸

D. Input-output accounts

6.30 The input-output framework brings together components of gross value added, industry inputs and outputs, product supply and demand and the composition of final demand components for the economy. The framework (in short, input-output accounts) breaks the economy down to display transactions of all goods and services between industries and final consumers for a single period (for example, a quarter or a year). Information can be presented in two key products: supply and use tables, and symmetric input-output tables.

6.31 Supply and use tables show the whole economy by industry and products. The tables show links between components of gross value added, industry inputs and outputs and product supply and demand. Moreover, the supply and use tables contain the product balances, which link the detail of production by domestic industries and imports with the intermediate use by industries and the final use by exports of goods and services, government expenditure, household and non-profit institutions serving households (NPISH) expenditure and capital formation.

6.32 Producing supply and use tables allows an examination of the consistency and coherency of national accounts components within a single detailed framework and, by incorporating the components of the three approaches to measuring GDP (i.e., by production, income and expenditure), enables a single estimate of GDP to be determined, in both current prices and constant prices.

6.33 When balanced in an integrated manner, the supply and use tables also provide coherency and consistency in linking the components of three accounts, these being the goods and services account, the production account (by industry and by institutional sector) and the generation of income account (by industry and by institutional sector).

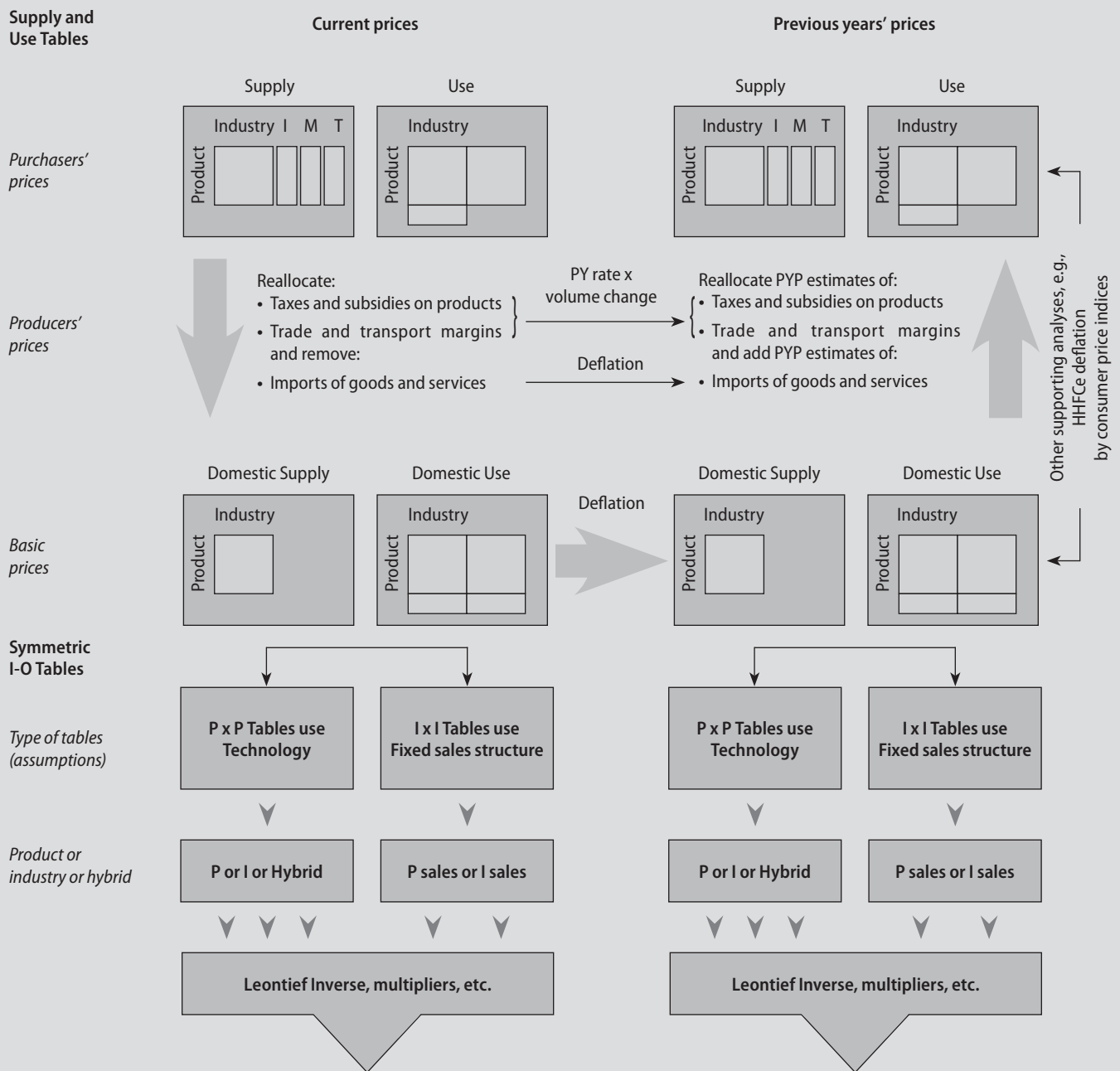
6.34 Symmetric input-output tables are derived from the data in the supply and use tables and other additional sources to form the theoretical basis for subsequent analyses. The tables contain symmetric (product by product or industry by industry) tables and Leontief inverse and other diagnostic analyses such as output and employment multipliers. These tables show separately the consumption of domestically produced and imported goods and services, providing a theoretical framework for further structural analysis of the economy, the composition and the effect of changes in final demand on the economy. Case study 6.3 provides further details on the development and use of the input-output account.

Case study 6.3

Overview of the compilation schematic integrating supply and use tables and symmetric input-output tables: the United Kingdom

1. The schematic below is provided as a case study on a compilation approach integrating supply and use tables and symmetric tables, in both current prices and previous years' prices. The methodology is growing in acceptance and has already helped some countries in the development and use of the input-output framework within some national statistical institutes. The schematic was developed by the Office for National Statistics of the United Kingdom.

An overview of the compilation schematic integrating Supply and Use Tables and Symmetric I-O Tables



6.35 Frequent benchmarking of GDP statistics through input-output accounts that are based on economic censuses and other comprehensive data sources allow for the incorporation of new and emerging economic activity and capture changes in levels that are often missed by higher frequency, less detailed data sets. Annual source data are not as comprehensive or as reliable as the data used to benchmark the GDP statistics, which often come from an economic census. Monthly or quarterly source data are not as comprehensive or reliable as annual source data. Frequent but less comprehensive source data may be used as an indicator of the movements of the component series, rather than as a measure of the levels of the series.

6.36 Time-series data from diverse and partial indicators are used as extrapolators and interpolators to capture changes in growth over time. For example, when annual data are available and the quarterly estimates average to those annual totals, the quarterly pattern is estimated by interpolation. For the periods not yet covered by annual estimates (such as the current quarter), the quarterly estimates are derived by extrapolation.

6.37 Adjustments are used to smooth seasonal fluctuations in the time-series indicators. Quarterly and monthly estimates are seasonally adjusted at the detailed series level when the series demonstrate statistically significant seasonal patterns. Seasonal adjustment removes from the time series the average effect of variations that normally occur at about the same time and in about the same magnitude each year—for example, the effect of weather and holidays. After seasonal adjustment, trends, business cycles and other movements in the time series stand out more clearly.

6.38 The input-output account is a useful framework for data harmonization, reconciliation and integration for both the annual as well as the quarterly production accounts, the latter through the integration of monthly and quarterly source data and supplementary estimates. The primary strength of the input-output accounts is the balanced row-and-column framework that tracks all of the detailed input and output flows in the economy and guarantees that each product produced is either consumed by industries or by final users. An imbalance in the “use” table may indicate a problem with the measures of gross output or intermediate inputs by industry, so the framework provides a consistency check on all of the data used to measure outputs, inputs, value added and expenditures. One approach is to account for differences in source-data quality through the use of reliability, or quality, weighting during balancing. For example, data on the coefficients of variation for point estimates from surveys can be used to determine how much an initial estimate is allowed to change during balancing. If statistical quality measures are unavailable, subjective quality measures, based on the judgement of industry experts, can be used. In other cases, data that are considered of highest quality can be made “unadjustable” or “locked” during a row-and-column scaling procedure. Expenditure statistics based on different sources and methods can be made consistent by forcing one distribution to match “control totals” of the higher quality source. “Feedback” from the balancing process can also identify additional gains from integration. For example, notable differences in final expenditure statistics based on separate sources and methods can be identified and reconciled to improve the accuracy of final expenditures in the calculation of GDP. For country practices in the use of input-output accounts, case studies 6.4, 6.5 and 6.6 provide further detail.

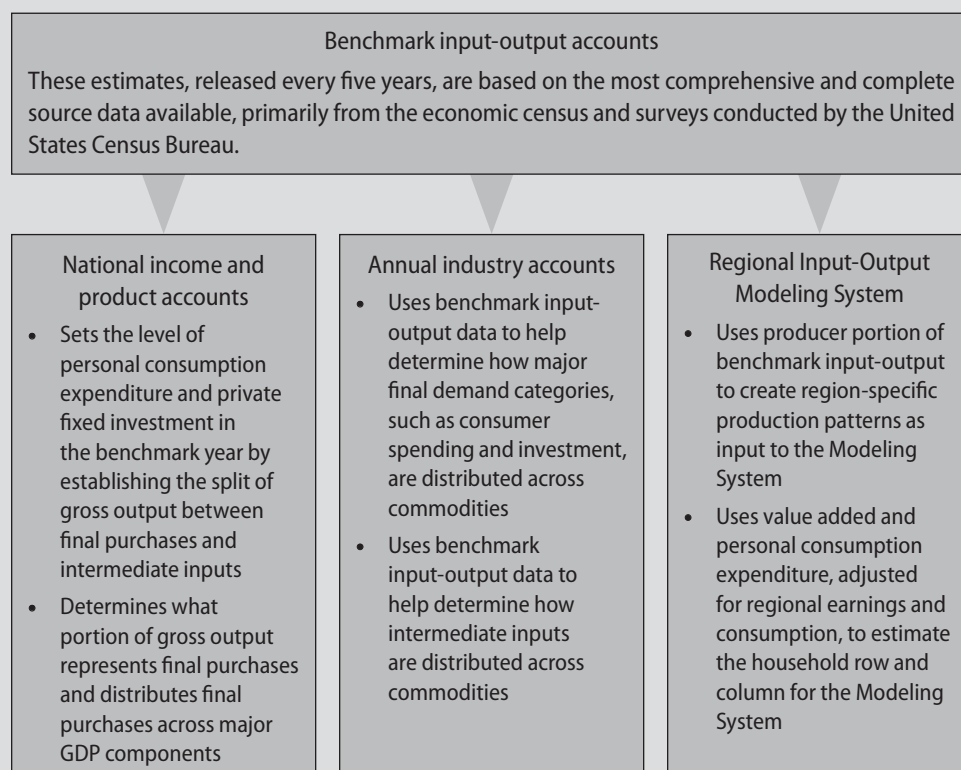
Case study 6.4

Using the input-output accounts to benchmark United States GDP statistics

1. The United States Bureau of Economic Analysis uses the benchmark input-output accounts as the foundation for several other accounts (see figure below). The benchmark input-output accounts are in fact the most important statistical source for the comprehensive revision of the national income and product accounts. They are used to establish the benchmark-year level for consumer spending and private fixed investment and to provide information on the composition of final demand. That in turn provides the basis for the estimates for GDP for the non-benchmark years.
2. Also, the benchmark input-output accounts provide the framework and the basis for the quantity index for GDP by industry statistics. The benchmark input-output accounts also provide the foundation for the annual input-output accounts.
3. The regional programme uses data from the benchmark input-output accounts to generate the Regional Input-Output Modeling System, which can be used to analyse the impact of various projects or changes in economic programmes on state or local economies. For example, state and local government planners can use the model to assess the economic impact of a military base closing, the closing of a major industrial plant or a new development project.

Figure

The relationship between the benchmark input-output accounts and other Bureau of Economic Analysis accounts



Case study 6.5

Development of quarterly national accounts in the Netherlands

1. The development of the quarterly national accounts in the Netherlands started in 1982. Traditionally, the supply and use table is used as an integration framework for economic statistics. Accordingly, quarterly supply and use tables were used for the derivation of the macroeconomic totals on a quarterly basis.
2. The first step, in 1982, was the breakdown of the table for the reporting year 1977 into four quarterly tables. The method adopted in the Netherlands was to extrapolate those tables to the corresponding quarter of the following year. A wealth of data were available for the extrapolation process, including volume or value changes for reporting months or quarters and comparisons to the same month or quarter of the year before. The advantage of that representation is, of course, that no explicit procedure for seasonal adjustment is necessary.
3. The next step in the development of the quarterly national accounts was a simulation to estimate tables for the quarters of 1978. In the simulation, the difference between the supply and demand for each product was calculated for each quarter. The reconciliation of the differences took place in the balancing process to reach consistent supply and use tables for each quarter of 1978. The sum of the four quarterly tables was used for comparison with the final annual 1978 table. The differences between the annual and the sum of the quarters in volume and values were broken down by the quarterly tables of 1978. The quarterly tables were then used as the basis for the extrapolation to the quarters of 1979 and so on.
4. The process of extrapolation uses several assumptions, one of which is the assumption of constant input-output ratios. Of course, no short-term information is available for the intermediate structure of the supply and use table, so volume indicators on the output of the branches of industry are used in the extrapolation process to arrive at a table in constant prices. Price information for each commodity is used separately for the inflation of the rows of the table to arrive at the supply and use table in current prices. In the balancing process, the balancing is done in both constant and current prices simultaneously.

Case study 6.6

Input-output framework as a data-harmonization and integration tool: the integration of the annual industry accounts in the United States

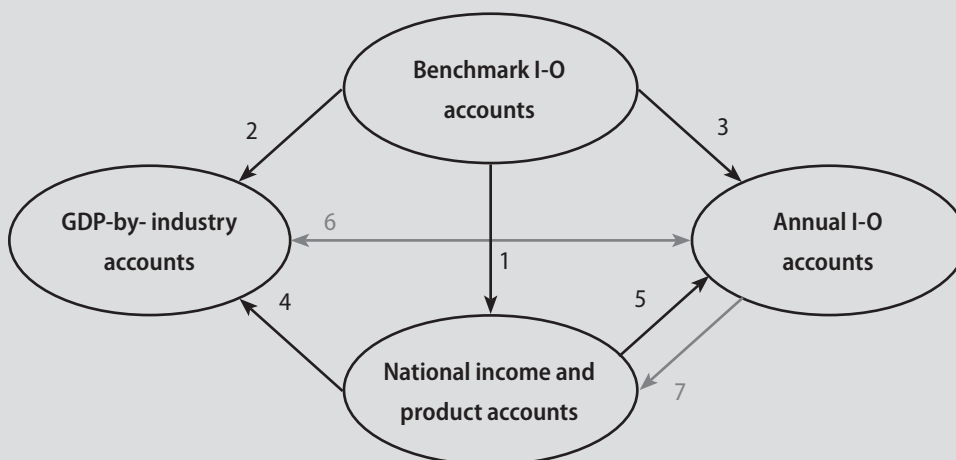
1. The integration of the annual industry accounts in the United States is a case study in using the input-output framework as a data-harmonization and integration tool. Prior to 2004, the United States prepared two sets of national industry statistics: the input-output accounts, which consisted of the benchmark input-output accounts and the annual input-output accounts; and the GDP-by-industry accounts. Both the input-output accounts and the GDP-by-industry accounts presented measures of gross output, intermediate inputs and value added by industry. Those measures were often inconsistent because of the use of different methodologies, classification frameworks and source data.
2. The United States Bureau of Economic Analysis (BEA) developed its integration methodology to take advantage of the richness of the source data that are available in the United States. BEA's methodology ranks the available source data by quality and estimates a balanced set of annual input-output and GDP-by-industry accounts that incorporate a weighted average of the source data on the basis of their reliability, or relative quality. Combining the strengths of the two methods provides a more consistent and more accurate set of statistics. The primary strength of the annual input-output model is the balanced row-and-column framework in which the detailed statistics are prepared. The framework provides a simultaneous look at industries and products in the economy and a "consistency check" between production and consumption.

3. The GDP-by-industry methodology directly estimates value added by industry from high-quality source data. Several factors can affect the quality of the GDP-by-industry statistics for particular industries. For example, corporate tax data must be translated from an enterprise to an establishment basis. In addition, distribution of proprietors' income by industry can introduce errors because of incomplete source data.

4. Thus, the GDP-by-industry value-added statistics can be of higher or lower quality than those constructed from the input-output accounts, depending on source data. For an industry with high-quality data on gross output and intermediate inputs, the measure of value added from the input-output accounts is superior. Alternatively, the GDP-by-industry measure of value added for an industry that incorporates only small enterprise-establishment adjustments and a small amount of proprietors' income is superior. The final combined value added for an industry is an average of the measures from the two sets of accounts, with weights determined by criteria that reflected the relative quality from the two sets of accounts.

5. A further benefit of integrating the annual input-output accounts and the GDP-by-industry accounts is a "feedback loop" to the national income and product accounts. The integration resulted in more than an exchange of information between the annual input-output and GDP-by-industry accounts, it also provided a feedback loop to the national income and product accounts by providing annual estimates of the commodity composition of GDP in non-benchmark years. Fully integrated accounts would, of course, include the benchmark input-output accounts. The figure below illustrates the relationships among the various national economic accounts of the United States. The benchmark input-output accounts provide the best-level estimates and commodity splits of GDP to the national income and product accounts (arrow 1), the best-level estimates of gross output to the GDP-by-industry accounts (2) and the starting point for updating the annual input-output accounts (3). The national income and product accounts provide estimates of gross domestic income by industry to the GDP-by-industry accounts (4) and information on the annual composition of GDP to the annual input-output accounts (5). The integration results in an exchange of information between the annual input-output accounts and the GDP-by-industry accounts (6) and it also provides a feedback loop to the national income and product accounts (7).

Figure
Relationships among the national economic accounts in the United States.



6.39 The integration of statistics on outputs, inputs and value added with other national account statistics can identify the sources of growth and productivity by industry. For example, integrating capital, labour, energy, materials and service inputs (KLEMS) statistics with statistics from production accounts as well as productivity sta-

tistics provides a full accounting of growth from the primary and intermediate factors of production within the domestic economy. Further details of the application of the input-output accounts and industry accounts are provided in case study 6.7.

Case study 6.7

Integration of industry statistics: KLEMS statistics for the United States

a See Dale W. Jorgenson, Frank M. Gallop, and Barbara M. Fraumeni, *Productivity and U.S. Economic Growth* (Cambridge, Massachusetts, Harvard University Press, 1987).

1. The KLEMS statistics for the United States, which the United States Bureau of Economic Analysis (BEA) updates annually, provide greater detail on the types of inputs that are consumed by industries in the production of goods and services. They aggregate the rich product detail underlying the industry statistics of intermediate inputs into three cost categories: energy, materials and purchased services.
2. These aggregates are prepared by applying a KLEMS production framework^a to BEA's statistics of industry production. The availability of the statistics was made possible by the integration of the annual input-output accounts and GDP-by-industry accounts. The result is a set of KLEMS statistics that are derived from and consistent with the published United States annual input-output and GDP-by-industry accounts since 1998. BEA developed this set of statistics in response to demand from data users. The goal was to facilitate research into a wide array of economic issues. With the release of the KLEMS statistics, BEA provides more analytically useful aggregations of intermediate inputs in current dollars and in chain-type quantity and price indices. For example, in recent years, studies on United States industries have explored the relationship among gross output, value added and intermediate inputs using BEA's industry accounts. Such studies have examined the substitution between primary, or value-added, factors of production (labour and capital) and secondary, or intermediate, factors of production (energy, materials and purchased services), the sources of economic growth for industries and the impact of input prices on aggregate price change.
3. The KLEMS statistics also facilitate other types of analyses. The Bureau of Economic Analysis and other United States statistical agencies, as well as academic researchers, have conducted analytical studies using the KLEMS statistics and the integrated annual input-output and GDP-by-industry accounts to measure the effects of domestic outsourcing and imported intermediate inputs on the United States economy. The KLEMS statistics on energy, materials and purchased services have also been incorporated into the Bureau of Labor Statistics' measures of multifactor productivity for the United States.

E. Sector accounts

6.40 In a number of countries, the sector accounts are linked to the input-output tables or to the supply and use tables. The sector accounts—just like the supply and use tables—start with the production process. In the sector accounts, there is no need for detailed information on goods and services. The sector accounts are characterized by transactions between different groups of actors (sectors), such as output, taxes and premiums, subsidies, compensation of employees, property income, income transfers, consumption, investment in fixed assets and capital transfers. In addition, the sector accounts record the transactions in financial assets and liabilities and provide an overview of the balance sheets. The description of the production process (the production account) is followed by the process of distribution of income (the income account, primary distribution of income) and the process of redistribution of income (the income account, secondary distribution of income). The process of expenditure (income account, use of income account) is described. It is followed by the capital account (capital transfers and capital accumulation), the financial and other changes in assets accounts (changes in assets and liabilities and net worth) and the balance sheets (opening and closing stocks of assets, liabilities and net worth and the changes thereof).

6.41 The sector accounts describe the total economy. The breakdown into institutional sectors is based on the economic objectives and behaviours of the various actors in the economy. The process of statistical integration of the source data is a process for each separate sector and collectively for the total economy in the integrated economic accounts. The main sectors distinguished are the following:

- S11 Non-financial corporations;
- S12 Financial corporations;
- S13 General government;
- S14 Households;
- S15 Non-profit institutions serving households;
- S2 The rest of the world.

6.42 Sector accounts present a coherent view of economic activity in terms of production, income generation, income (re)distribution, consumption and accumulation and the economic roles played by households (S14 and S2) and enterprises (S11, S12, S13, S15 and S2) in economic activity. Each economic process is described in a separate account. The accounts register economic transactions, distinguishing between uses and resources, with a special item to balance the two sides of each account. By passing on the balancing item from one account to the next, a connection is created between subsequent accounts. The accounts exist not only for the total economy but are also compiled for separate domestic sectors. In that way, the sector accounts describe: (1) for each economic process, the role of each sector (for instance, general government in the income redistribution and financial corporations in financial intermediation and liquidity and risk management) and (2) for each sector, all economic transactions and their relation with other domestic sectors and the rest of the world.

6.43 Transactions of the rest of the world are the mirror image of the accounts for the national economy. They are presented from the point of view of the rest of the world and contain only a current account, a capital account and a financial account. The current account includes imports, exports and income transactions.

6.44 The surveys that are employed to collect data for the financial accounts should, to the extent possible, use the accounting concepts that enterprises already use for financial reporting. That will reduce respondent burden and increase compliance. Survey instructions should provide links to the accounting standards that should be used. In cases in which companies follow different accounting principles than those used by the compilers—as in the case of the United States, which currently follows its Generally Accepted Accounting Principles, but has some foreign-owned companies that report using the International Financial Reporting Standards—companies should identify the accounting principles that they use. Compilers may need to make adjustments to reported data when the accounting principles used by reporters differ markedly from the principles used in statistical production.

6.45 Surveys that collect financial data should treat bank holding companies, offshore entities and other complex company structures in a uniform manner in order to maintain consistency across the accounts. Compilers may want to treat certain special-purpose entities as any other enterprise, or they may want to “look through” them to the ultimate origin or destination of the investment. That approach may require additional information on those entities.

6.46 An important indicator for the quality of sector accounts is the difference between the balancing item “net lending/net borrowing” resulting from the capital

accounts and the same balancing item resulting from the financial accounts. In theory, the outcomes of the two balancing items should coincide for each (sub)sector in the system of sector accounts. In practice, it turns out to be very difficult to attain that ideal situation and statistical discrepancies arise. It follows that statistical discrepancies can only be calculated when a full set of both non-financial and financial accounts is available. In many countries, financial accounts form a new part of the SNA, and the statistical discrepancies can be calculated in order to judge and to improve the quality of the sector accounts. Case study 6.8 provides a country example in reconciling component data in the sector accounts.

Case study 6.8 Sector accounts in the Netherlands

1. The successive accounts of the Netherlands sector accounts are the following:

Production account;

Income account: generation of income;

Income account: primary income distribution;

Income account: secondary income distribution;

Income account: use of income;

Capital account: capital transfers;

Capital account: capital accumulation;

Financial account;

Statistical discrepancies.

2. The sector accounts can give a complete and fully consistent description of the total economy. Consistency implies that:

A transaction that is recorded as a use in one sector is recorded as a resource in another sector and vice versa. Consequently, for each transaction, the total of uses equals the total of resources. This is called the transaction-identity. A special case is the identity of total supply (output and imports) and total use (intermediate consumption, final consumption expenditure, capital formation and exports).

All available means of a sector are used by that sector. This is called the budget identity. Budget identity implies that, theoretically, for each sector, total resources and change in liabilities equal total uses and change in assets.

3. In the sector accounts, the transaction-identity is fully satisfied. It is not yet possible to meet the budget-identity. Maintaining that identity would require adjustments of the estimates, which cannot be justified by the available data sources. For that reason, statistical discrepancies will be allocated to the financial accounts.

F. International accounts

6.47 Updates to the SNA and BPM6 were closely coordinated to increase consistency between the two sets of international guidelines. Efforts to implement the standards should be done in an equally concerted manner. Given that consistency, adherence to the guidelines in BPM6 will facilitate further integration of the international accounts with the national accounts and related industry and regional statistics. Following the recommended concepts, methods and definitions will also improve the comparability of the international accounts with the accounts of other nations.

6.48 The update of BPM6 was also coordinated with the fourth edition of the *OECD Benchmark Definition of Foreign Direct Investment*,¹⁰ which provides additional

guidelines for measuring FDI. In addition, there are links between BPM6 and other manuals that address, in more detail, specific components of the international accounts, including the *Manual on Statistics of International Trade in Services*,²⁹ *International Merchandise Trade Statistics: Concepts and Definitions*⁹ and *Measuring Globalization: OECD Handbook on Economic Globalization Indicators*.³⁰

6.49 To create an integrated set of accounts, source data should be adjusted when concepts and definitions used in the international accounts differ from those used in the national accounts. The accounts may use different definitions of the economic territory; for example, the national accounts may be compiled on the basis of a narrowly defined “nation”, while the international accounts may include as part of the nation outlying territories that are under its jurisdiction.

6.50 Data on exports and imports of goods are most often collected from customs documents and therefore provide a virtual census of all transactions.³¹ As a result, benchmark, annual and quarterly estimates can be derived with no need for extrapolations from other sources; however, adjustments for coverage, valuation and timing must often be made to customs data to align trade statistics with the balance-of-payments guidelines.

6.51 Customs data will likely need to be adjusted to include in the balance of payments goods that have changed ownership but have not been recorded in the customs data because they have not physically crossed borders. Those include goods such as offshore fish catches, goods procured in ports by carriers and goods purchased by the military for use abroad. Other goods need to be added because they are not processed through customs, including goods transported through parcel post and electricity, gas and water.

6.52 Source data on cross-border trade in goods should be collected on a consistent valuation basis. The valuation recommended in BPM6 is the FOB (free on board) value, based on the transaction price including inland freight, insurance and other charges incurred in placing the merchandise on board the carrier at the port of exportation. That valuation may differ materially from the change of ownership principle employed by BPM6 and the SNA, because the valuation is at the border, not necessarily where the change of ownership actually occurs. Moreover, it is generally the best estimate given data sources and is the valuation recommended by the SNA.

6.53 In practice, source data collection generally follows the definitions set out by the *International Merchandise Trade Statistics: Concepts and Definitions*,⁹ which value goods exports according to FOB, but value imports according to CIF (cost, insurance and freight); that is, the value at the point of entry into the importing economy. For international accounts purposes, the CIF value must be converted to the FOB value by deducting the value of the freight and insurance charges incurred from the frontier of the exporting country to the border of the importing country.

6.54 Bilateral comparisons with major trading partners can be a useful tool for monitoring data quality and identifying gaps in current account statistics. In some cases, data substitution might even be considered. For example, it is more difficult for a country to identify its exports than its imports. The major trading partners may benefit from data-sharing by using their partner’s import data as their export data. For further details, see case study 6.9.

29 United Nations publication, Sales No. E.10.XVII.14.

30 OECD (Paris, 2005). Available from <http://browse.oecd-bookshop.org/oecd/pdfs/browseit/9205061E.PDF>.

31 Merchandise trade statistics generally include estimates for transactions valued below a specified exemption level.

Case study 6.9

United States–Canadian current-account reconciliation and data exchange

1. The United States–Canadian current-account reconciliation, conducted regularly since 1970, provides an excellent example of the benefits of bilateral comparisons. The reconciliation, which explains the differences between the estimates of the bilateral current account published by the United States Bureau of Economic Analysis and those published by Statistics Canada, is undertaken because of the extensive economic links between Canada and the United States. The reconciled estimates are intended to assist analysts who use both countries' statistics and to show how the current-account estimates would appear if both countries used common definitions, methodologies and data sources. In principle, the bilateral current account of one country should mirror the bilateral current account of the other country. Differences occur in the published estimates of the United States and Canadian current accounts because of variations in the definitions, methodologies and statistical sources that are used by each country.
2. The long-standing United States–Canadian current-account reconciliation is among the leading examples of the benefits of international data exchanges. As a part of the reconciliation process, Canada and the United States have evaluated the accuracy of each other's estimates, and as a result each country now includes in its published estimates some data that are provided by the other country. The exchange of data between Canada and the United States for transactions such as trade in goods, travel, passenger fares, Canadian and United States government transactions and some large transportation transactions covers a substantial portion of the value of the Canadian and United States current account and has eliminated some of the differences in the United States- and Canadian-published estimates. In addition, the reconciliation process has highlighted areas where errors and omissions may exist in each country's estimates, which has helped in targeting data improvement efforts. Other benefits of the data exchange include the elimination of some duplication of effort, a reduction in some government processing costs and reductions in respondent burden.
3. The estimates published in the United States and those published in Canada are reconciled, and there is extensive exchange of data between Canada and the United States, but differences in the published estimates remain. Complete substitution of the reconciled estimates for published estimates and complete exchange of data are not feasible for several reasons. For trade in goods, imports in the United States accounts would be affected because the United States attributes Canadian re-exports to the country of origin rather than to Canada, the last country of shipment. For some accounts, the protection of confidentiality of the source data bars the exchange of data. Finally, a few differences are attributable to different requirements for integrating the international and national (domestic) accounts in each country.

6.55 In order to produce an integrated set of economic statistics, the financial and capital accounts from the international accounts need to be produced in a manner that is consistent with the way the domestic financial sector statistics are produced. That requires parallel presentations of the domestic and international financial accounts by institutional sector and by financial instrument. The 2008 SNA and BPM6 provide sector and instrument classifications that have been harmonized for that purpose. Surveys need to be examined to ensure that information is collected in a way that enables compilers to produce statistics at that level of detail.

6.56 In the international accounts, financial transactions are classified into five functional categories—direct investment, portfolio investment, financial derivatives (other than reserves) and employee stock options, other investment and reserve assets—that group transactions in financial instruments according to the economic motivation of the investment. Direct investment, portfolio investment and other investment transactions are often collected by separate surveys, and in some countries those surveys are conducted by different agencies. Agencies must be careful to avoid overlap and duplica-

tion. To do so, it may be necessary to compare individual company reports. In countries with highly decentralized systems, that may require some form of data-sharing agreement.

6.57 It is important to classify properly a transaction by type of investment (direct investment, portfolio investment or other investment) during the data-collection process. To do so, the data-collection programme must employ clear definitions of the different types of investment. Respondent education is vital to ensure that the information collected is accurately classified, particularly when companies may be required to report different types of transactions to different agencies. In situations in which an agency may collect data on both direct investment and portfolio investment, for example, because of reasons of convenience (such as legal restrictions, greater access to and familiarity with potential respondents or historical accident), it may be necessary to adjust data to reclassify certain transactions from one type of investment to another and to eliminate gaps and overlaps in coverage.

6.58 Financial asset positions and the related income flows are often collected independently. When that is the case, a rate of return can be calculated and compared to comparable rates of return (such as a market interest rate) to test the consistency of the income and position estimates.

6.59 Positions may be collected using a variety of different valuations, including book value, historical cost, market value or fair value. The 2008 SNA and BPM6 recommend the use of market values for traded securities and the use of nominal values for loans, deposits and other accounts receivable or payable; however, data may not be collected using those valuation methods, and might then need to be adjusted.

6.60 Data collected from enterprises are often based on tax or accounting standards and may not reflect market values. For example, direct investment positions are often collected at the historical cost or book value. That value can be converted to a current-period price basis by valuing capital equipment, land and inventories at their current-period price or replacement cost. Direct investment positions can also be adjusted to a market-value basis by valuing the equity portion of the position using indices of stock market prices. One shortcoming of those methods is that it may be difficult to make those adjustments beyond the aggregate level.

6.61 Cross-country comparisons can be undertaken through initiatives organized by international institutions. Examples include the IMF Coordinated Portfolio Investment Survey and its Coordinated Direct Investment Survey and the Bank for International Settlement's international banking statistics.

6.62 Asymmetries in bilateral statistics can arise from the attribution of transactions to the "ultimate" or the "immediate" country of ownership or destination. In theory, transactions in goods should be attributed to the residence of the seller/purchaser of a good, in accordance with the change of ownership principle. In practice, trade in goods is usually attributed to the country of origin for imports and the country of final destination for exports. That can lead to asymmetries in the attribution by partner economies, particularly when goods are routed through an intermediate country.

6.63 Analogous problems may result when financial flows are collected on an immediate counterparty basis while financial positions are collected on the basis of the issuer or holder. In order to facilitate comparisons with partner countries, statistics can be compiled on both bases, as is recommended for direct investment transactions and positions. The *OECD Benchmark Definition of Foreign Direct Investment*¹⁰ describes a method for allocating inward investment to the ultimate investing country, but allo-

cating outward investment to the ultimate host country is a topic that remains on the research agenda.

6.64 Statistics on the activities of multinational enterprises (AMNE) provide information on the operations of a multinational enterprise, including variables such as employment, sales, value added, employee compensation, research and development expenditures and total imports and exports. Unlike FDI statistics, which focus on cross-border relationships between parent companies and their affiliates, AMNE statistics cover the full operations of the entire multinational enterprise. AMNE statistics are based on the idea of control, or majority ownership, whereas FDI statistics are based on relationships that exhibit influence, or ownership, of 10 per cent or more.

6.65 Both FDI statistics and AMNE statistics are important for assessing the economic impact of multinational enterprises and for understanding globalization. The *Manual on Statistics of International Trade in Services*²⁹ and the *OECD Handbook on Economic Globalization Indicators*³⁰ provide recommendations for the compilation of key indicators based on FDI data and data on AMNE to address questions related to globalization.

6.66 Although FDI and AMNE statistics are related, it can be difficult to establish links between the two data sets because of differences in methodology. For example, statistics on AMNE should be presented on a directional basis (i.e., inward and outward investment) and should be classified according to the country of the entities covered. Statistics on foreign-owned affiliates in the compiling economy (inward investment) should be attributed to the country of the ultimate investor. In order to reconcile those statistics with FDI statistics that are classified according to the country of the immediate counterparty, compilers will need to collect AMNE data based on the country of the immediate investor as well.

6.67 The enterprise populations for FDI and AMNE statistics are not equal; AMNE statistics cover a subset of the enterprises involved in FDI. In some countries, where FDI and AMNE data are compiled by the same agency, the data collection for the two data sets is largely consistent. In many cases, however, the data are compiled by different agencies and collected on different surveys, which can make it difficult to integrate the two sets of statistics. Two OECD groups, the Investment Committee's Working Group on International Investment Statistics and the Committee on Industry, Innovation and Entrepreneurship's Working Party on Globalization of Industry, have been working jointly on efforts to integrate further FDI and AMNE statistics.

6.68 The economic globalization indicators presented in the *OECD Handbook on Economic Globalization Indicators* were developed from the concepts in the SNA. One of the "basic" AMNE variables is value added, a multinational firm's contribution to GDP. Value added of a multinational enterprise should be estimated in a way that is comparable to the method for calculating GDP. That allows the statistics to be used together to analyse a firm's impact on a host economy.

6.69 AMNE statistics are also presented by activity or industry. Industry classification can be difficult because enterprises are often engaged in several activities. Ideally, the enterprise should be classified according to the primary economic activity—for example, the one that contributes most to value added or to employment. To facilitate cross-country analysis, industry statistics should be compiled using standard industry classification codes. That may be challenging, because while some countries use ISIC, other countries use their own national classification systems; for example, Canada, Mexico and the United States use the North American Industrial Classification System.

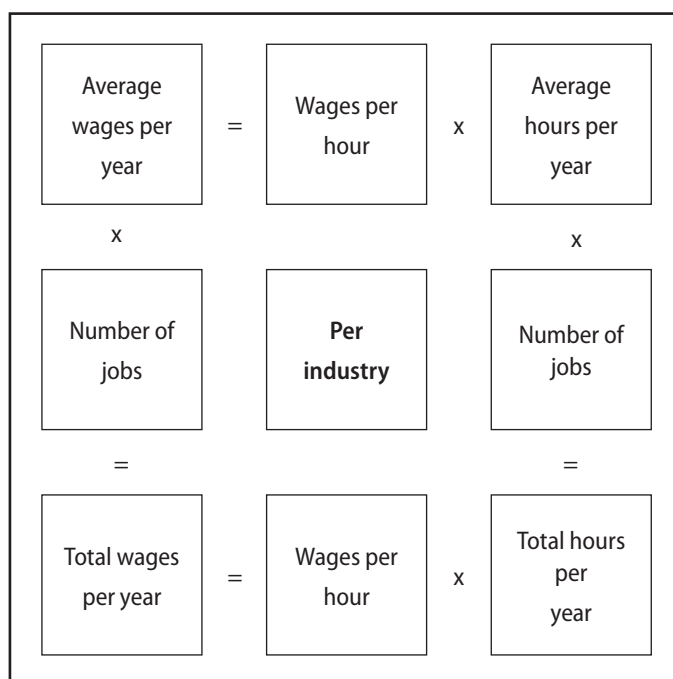
Reconciliations between national classification systems and ISIC are important to enable international comparability.

G. Labour accounts

6.70 Labour statistics have their own character depending on their use in the economic or social context. Labour is far from homogeneous as a production factor, with the differences in education level, skill, experience, sex, age, status, wages and salaries, labour cost and hours worked, which are some of the main statistical descriptors of labour force and employment.

6.71 The development of a system of population and labour statistics that is integrated with the national accounts is an essential part of the central framework of the national accounts and is at the heart of economic accounting and productivity analysis. The relationships among wages, jobs and hours worked used in that kind of analysis are depicted in figure VI.1.

Figure VI.1.
Labour accounts



6.72 Structural and short-term business surveys and household surveys combined with administrative data are primary sources of labour-related statistics. Information on productivity is necessary in the source statistics and in the national accounts, for reasons of both economic policy and plausibility. Information on the self-employed (either as employer, own-account worker or contributing family member) is necessary for the same reasons, and special collection efforts have to be made in those countries in which that form of employment is ubiquitous.

6.73 Many countries have developed a system of labour statistics consistent with national accounts. Such integration greatly improves the ability to integrate macroeco-

conomic analysis of labour markets and the overall economy. Case study 6.10 provides further details on the experience in developing labour accounts.

Case study 6.10

Development of labour accounts in the Netherlands

1. The development of the labour accounts in the Netherlands started in the mid-1980s. The initial development was considerably hampered by many discrepancies between the source data. Each source had its own limitations. For instance, administrative data was generated mainly for administrative and not statistical purposes, and employment-related information obtained from enterprise registration was restricted to what was available in the enterprise registration. Moreover, surveys of individuals were not always reliable in responding to queries on contractual working hours.
2. For the development of the labour accounts, considerable effort was made to harmonize concepts, definitions and classifications across the various survey and administrative sources and to reach the appropriate scope and coverage of the statistical population. For the data estimation methods, variables and reference periods had to be harmonized, for which intermediary concepts in the relevant sources were introduced that could be bridged with the official labour statistics to be published.
3. After conceptual harmonization was obtained among the source data, integration for labour statistics was introduced in four steps. In the first and the second steps—harmonization and exhaustiveness—the data were treated in such a way that all data were abridged to the same definitions and populations. In the third step—minimizing measurement errors—the causes of data errors were traced and removed. In the fourth and last step of the integration process, the remaining discrepancies were reconciled through a statistical balancing process of the data.
4. After those four steps were carried out, a consistent and coherent picture for labour statistics emerged. That consistency and coherence was obtained only among the statistical information available from the many different source statistics for the labour accounts, and that internal consistency and coherence was no guarantee for external consistency and coherence. In particular, there were differences between the labour accounts and the national accounts.
5. At the time when the labour accounts were developed in the Netherlands, the next benchmark revision year of the national accounts was 1987. The revision was completed in 1992, but the new labour accounts could play only a partial role in that revision. The full consistency and coherence between the two statistical systems was reached in the benchmark revision of the year 1995, first published in 1999.

H. System of price and volume measures

6.74 The SNA provides detailed recommendations on the use of price and volume measures. The compilation of price indices is addressed in several other manuals, which have been prepared on the same structure. The *Consumer Price Index Manual: Theory and Practice* and the *Export and Import Price Index Manual: Theory and Practice*³² were produced by a collaborative group made up of the International Labour Organization (ILO), OECD, Eurostat, the United Nations, the World Bank and IMF. The *Producer Price Index Manual: Theory and Practice* was produced by IMF, and Eurostat produced the *Handbook on Price and Volume Measures in National Accounts*.³³ Given the importance of measures of inflation, real GDP and productivity to monetary and other policies, it is critical that policymakers receive consistent and unbiased measures for prices and volumes.

6.75 The SNA recommends using superlative price indices to measure price movements of aggregate measures of economic activity (flows of goods and services,

32 ILO, et al., (Geneva, 2004), available from <http://www.ilo.public/english/bureau/stat/guides/cpi/index.htm>; IMF, et al., (Washington, D. C., 2009), available from <http://www.imf.org/external/np/sta/xipim/pdf/xipim.pdf>.

33 IMF, et al., (Washington, D. C., 2004), available from <http://www.imf.org/external/np/sta/teggpi/index.htm>; Eurostat (Luxembourg, 2001), available from http://www.euklems.net/pub/eurostat_handbook_on_volumes_&_prices.pdf.

gross value added and gross domestic product). Superlative price indices are symmetrical, provide reasonable approximations to the underlying economic theoretical ideal (cost of living and output price indices) and treat prices and quantities equally across periods. As a result, superlative price indices provide more consistent measures of aggregate prices over periods experiencing appreciable price changes and address the aggregation bias present in fixed-weight price and output indices.

6.76 A common type of superlative price index is the Fisher chain price index. With a chained price index, the weights are changed each successive period. To calculate a price index for period 2, two individual price indices are calculated. One uses weights from period 1 (a Laspeyres price index), and one uses weights from period 2 (a Paasche price index). Changes in prices from period 1 to period 2 for each component are weighted together using the two sets of weights. The resulting two changes in prices are then multiplied together, and the square root of the product yields the change in the Fisher chain price index from period 1 to period 2. To calculate the change in the index from period 2 to period 3, the process is repeated, but using weights from periods 2 and 3 for the calculations. The process is repeated with each successive period.

6.77 With price developments a recurrent phenomenon in the market economies of many countries, most measures of economic activity are adjusted for price movements. Measures of economic activity are “deflated” at a detailed level of economic activity and aggregated using some form of index. Consumer price indices are used primarily to deflate personal consumption expenditures, certain components of the change in private inventories and state and local government purchases. Producer price indices are primarily used to deflate private investment in equipment and software and in structures, certain components of the change in private inventories, government purchases and, on occasion, exports and imports (when an item does not have a satisfactory international price index). International price indices are primarily used to deflate imports and exports. They are also used to deflate the imported items included in private investment and in the change in private inventories.

6.78 The source data for the calculation of price indices may vary both from category of products and over time. The source data will come either from official surveys of prices or from other mixed-use sources, including private sources. The principle underlying the selection of price-related source data is to use the best available data at the finest level of detail that can be managed. As a result, either the available detail for price source data or the available detail for the nominal values of products may determine the level of detail that is deflated. If the detailed quantity adjustments are chained together, the totals will not add up to the chained totals. The methodology preserves growth rates when base periods for real calculations are changed, but at the cost of additivity.

6.79 In some cases, compilers may have more than one set of price estimates available; however, those price estimates may exhibit somewhat different patterns. It may be necessary to select either the best price series or a suitable methodology for incorporating information from all of them in some fashion.

6.80 The overall coherence and consistency between the price, volume and value estimates can be significantly improved when a system’s approach to price and volume indices is applied. That system of price and volume indices uses the structure of the input-output accounts in preparing input-output accounts for consecutive periods with annual and quarterly frequency expressed in value and volume terms.

6.81 Case studies 6.11 and 6.12 provide national practices in compiling and improving the coherence and consistency among price indices. The application of a system of price and volume indices has also been demonstrated in case studies 6.1 and 6.4.

Case study 6.11**Towards integrated price and volume system: the practical experience of Statistics Finland**

1. Between 2008 and 2010, Statistics Finland launched a development programme to improve the coherence and quality of price and volume indices. The programme consisted of several smaller projects and was a joint undertaking by experts from national accounts, price statistics and short-term business statistics. Coherence was sought with a methodology in which volume data are derived—to a greater extent than before—from data concerning prices and production values. Special emphasis was put on consistency of prices, volumes and values in the compilation of national accounts.
2. In order to increase quality, several improvements were made to the coverage and level of detail of price indices, in addition to other changes in quality. The development programme also addressed the need to standardize the information systems of indices. A specific emphasis was put on the coherence of input data from large multinational enterprises.
3. The main results of the projects carried out under the umbrella of the integration programme were the following:

The quality of the volume index of industrial output was improved significantly by collecting more value data for industrial products and by increasing the sample of the respective production price indices to a remarkable degree. That enabled a move away from the volume-extrapolation method towards the deflation method in many industries where the sole information of output quantities was considered less reliable than information on the value of output.

A new information system was introduced in national accounts, and methodological changes concerning price and volume calculation were also made. Consequently, the new deflation method based on products in the quarterly national accounts is now in conformity with the annual national accounts and produces price estimates that are closer to those of annual accounts. A specific task group responsible for the system of price and volume indices in national accounts was created.

A new producer price index for private health care as well as new price indices for owner-occupied housing were developed, the latter as part of a European Union-wide project.

A new, generic metadata-driven and process-steered information technology system called the index engine was developed for index calculation, and it will be used in the production of several price and cost indices in the near future.

4. The coherence between the price and volume measures will continue to be improved with the gradual change to new information systems for index calculation and the introduction of chain price indices for the consumer price index.
5. In addition, it is important also to continue the work as it relates to large enterprises. An expert team at Statistics Finland specializes in the collection and processing of data on large enterprises. Moreover, an ongoing project on an integrated information system for business statistics will also contribute to the overall coherence of economic statistics and classifications.

Case study 6.12**Price indices in the United States national accounts**

1. The price source data underlying the bulk of United States GDP comes from three sets of prices compiled by the United States Bureau of Labor Statistics. Fine-level components of CPI are used to deflate most of the detailed components of personal consumption expenditures. Some components have been deflated using other price data, including components of PPI. Because of that, and because CPI is a fixed-weight index and the personal consumption expenditures deflator is a chain price index, the two are not identical. The Bureau of Labor Statistics and the Bureau of Economic Analysis have published reconciliations.

2. Components of PPI are used to deflate much of investment. Similarly, estimates of most import and export prices are provided by price estimates from the international price project (IPP). The three sets of price indices (CPI, PPI and IPP) also underlie the deflation of most government purchases of goods and services, for both the federal government, and for state and local governments. Estimates of prices for the compensation of government employees at all levels are calculated by the Bureau of Economic Analysis using compensation rates for government employees and making the assumption that there are never any changes in the productivity of the employees.
3. Some other components of GDP, however, are deflated using other price estimates. For example, observations of prices charged are used to deflate imports of electricity from Canada. As another example, the Census Bureau's hedonics-based price index for single-family houses is used to deflate investment in those structures.
4. The price indices for non-residential structures provide examples of the changing data sources and estimation methodologies that underlie estimates that have not been deflated using CPI, PPI or IPP data. Until 1997, the price index for those structures was calculated using an unweighted average of movements in the Census Bureau's price index for single-family structures and a private construction cost index generated by a large, multi-city construction company. From 1997 to 2010, the Bureau of Economic Analysis calculated the prices using hedonics-based price indices based on private, published costs of construction for a variety of types of non-residential structures. Going forward, the Bureau of Economic Analysis plans to use PPIs for non-residential structures that the Bureau of Labor Statistics recently began publishing. The hedonic price indices were developed to serve as stopgaps until the work of the Bureau of Labor Statistics on PPIs became available, owing to the gestation time for PPIs, which are based on much more comprehensive data rather than hedonic regressions.

I. Regional accounts

6.82 Regional accounts must be consistent with those used in national and industry accounts programmes, and the regional areas that form the basis of such statistics should be consistently defined across programmes and over time. Such consistency not only mitigates possible confusion relating to what the regional statistics measure, but also allows regional statistics to be used in unison with national and industry data. Access to measures of a region's contribution to a nation's growth may deepen our understanding of business-cycle behaviour and provide information on potential sources of recovery. The importance of consistent definitions of regional areas across programmes and over time is illustrated by many countries' use of regional data for the allocation of federal funds across provinces, states and other levels of government, and the use of more detailed geographical data for the allocation of provincial and state data to counties and municipalities.

6.83 It would be useful for national surveys to include information on geographical location so that regional estimates can be derived from the same source data as national estimates. There are difficulties associated with the use of administrative records at the subnational level because programmes and reporting requirements may differ across geographical regions. For example, the primary source of data on wages and salaries in the United States is the Quarterly Census on Employment and Wages, which is constructed from administrative records related to state-administered unemployment insurance programmes. As the reporting requirements and definitions of wages and salaries differ across states, much effort is expended in the United States to adjust the administrative records data to derive regional wage and salary measures that can be meaningfully compared to those of the nation and to other regions.

6.84 The surveys that are employed to collect regional economic data should be designed for a fine level of detail, because regional units of different sizes are appropri-

ate for different types of economic analyses. Related economic activity may be localized within a relatively small or large area depending on many factors, including labour mobility and the ease with which goods can be transported. Even though statistics related to economic activity may bear little relation to subnational political boundaries, statistics for subnational political subdivisions may also be useful, because national programmes may distribute funds to subnational governments based on economic measures for each political jurisdiction. For example, significant sums of monies in federal assistance may be distributed across regions based on regional-level measures of economic activity.

6.85 Whenever possible, data on income flows should be collected and maintained in a manner that accounts for the differences between the location of work and the location of the residents of households. Tracking that information is important because measures of current production, such as GDP, are based on where production occurs, while measures of income, such as personal income, are based on the location of residence. Therefore, a regional area may be growing in terms of the final goods and services that it produces, but the income of the local residents may not, if many of the employees in the geographical area reside in a different location. Such a distinction may have important policy implications.

J. Satellite accounts

6.86 Satellite accounts may be linked to the accounts of the SNA, but they may incorporate definitional and conventional changes that improve the accounts' abilities to examine specific areas of the economy. Examples are provided by tourism satellite accounts and health satellite accounts. Satellite accounts are internally integrated, but they are not in complete accord with the integrated economic accounts of the SNA. For example, an account for research and development might define those activities as investment, even though they are treated as intermediate consumption in the SNA.

1. Tourism satellite accounts

6.87 Tourism statistics in most countries include a large set of data items ranging from the number of visitors, their socioeconomic characteristics and their duration of stay to hotel capacity and occupancy rate. Those statistics are representative at the country level, but are not necessarily consistent with macroeconomic statistics. Tourism as an economic activity is, of course, included in national accounts, but given its nature, it is not made explicit in the national accounts, because tourism-related activities and products are not explicitly recognized in the international product and industry classification. Given the contributions of the tourism industry to many national economies, the concept of a tourism satellite account has been developed to identify the phenomena of tourism in each of the industries in the national accounts in order to measure the contribution of the tourism industry in national economies.

6.88 The conceptual development of tourism satellite accounts is the result of continuous efforts and international collaboration since the 1970s. In 1983, the first proposal from the World Tourism Organization stressed the need for a "uniform and comprehensive means of measurement and comparison with other sectors of the economy" following the recommendations of the SNA of that time. OECD contributed to the discussion in 1991 with the development of its *Manual on Tourism Economic Accounts*.³⁴ After the adoption of the recommendations on the definitions and classifications developed at a conference in Ottawa in 1993, the World Tourism Organization, OECD, Eurostat and the United Nations developed the conceptual framework for tourism satellite

34 OECD (Paris, 1991).

accounts, which was published in 2001 and later resulted in the updated manual *Tourism Satellite Account: Recommended Methodological Framework 2008*.³⁵

6.89 Country practices in the development of tourism accounts are presented in case studies 6.13 and 6.14.

35 United Nations publication, Sales No. E.08.XVII.27. Available from http://unstats.un.org/unsd/publication/Seriesf/SeriesF_80rev1e.pdf.

Case study 6.13

Tourism satellite accounts in the Netherlands

1. The national accounts are an important data source for the Netherlands tourism satellite accounts and determine what can be called the “borders” of the tourism satellite accounts. The tourism satellite accounts distinguish among inbound, outbound and domestic tourism on day trips and overnight stays with a recreational motive and business travel, consumer durables and social transfers in kind. Different types of surveys are available to supply detailed data on each of those types of tourism expenditure. A survey on day trips is undertaken once every five or six years and is aimed at collecting information on the kinds of activities, destinations and expenditures of day trips of Dutch persons. The “continual holiday” survey takes place every quarter and is aimed at gathering data on the activities and expenditures of Dutch people on vacation or on business trips in the Netherlands or abroad. A mobility survey is aimed at collecting information on all aspects of mobility of the Dutch population, ranging from the mode of transportation and time of departure to destination and motive for travel. A sample of accommodations and lodgings are asked for information on the number of visitors and overnight stays of Dutch and foreign visitors. The “accommodations and lodgings” survey takes place on an annual basis. Finally, the “inbound tourism” survey is undertaken once every five years. That survey includes information on motive and characteristics of the visit, country of origin of the visitor, mode of transportation and expenditures per category.

2. To facilitate the integration process in specific areas, separate modules have been developed. In those modules different kinds of data are grouped together and analysed, after which the information is returned to the main framework. The ratios and other computations need to have a plausible value before the integration process is complete.

Case study 6.14

United States travel and tourism satellite accounts

1. The United States travel and tourism satellite accounts have presented a detailed picture of travel and tourism activity and its role in the United States economy since 1998. They are based on the detailed benchmark input-output accounts and are consistent with the integrated annual industry accounts. The methods that are used to prepare the travel and tourism satellite accounts are also consistent with the methods used to estimate GDP, national income and other national economic measures. The accounts are developed with the support of the Office of Travel and Tourism Industries, the International Trade Administration and the United States Department of Commerce in order to measure more accurately the contribution of travel and tourism to the economy.

2. There is no explicit “travel and tourism” industry in the United States industry accounts. Rather, travel and tourism is distributed across many industries, including food and accommodation, transportation, recreation, entertainment and retail. They present estimates of current and real expenditures by tourists, or visitors, on 24 types of goods and services from 1998 onward. The accounts also present estimates of the income generated by travel and tourism and estimates of output (in current and volume terms) and employment generated by travel and tourism-related industries. The accounts are updated annually and have been expanded to provide quarterly estimates of the sales of goods and services to travellers and employment attributable to those tourism sales. The travel and tourism satellite accounts can be used to determine the size of tourism and the components of

Case study 6.14

United States travel and tourism satellite accounts (*continued*)

travel and tourism. Specifically, the accounts can be used to determine the shares of the goods and services that were sold to visitors and the shares that were sold to local residents, to assess the effects of travel and tourism on the United States economy, to examine the relationship among the travel and tourism industries, to determine the expenditures of tourists and to compare travel and tourism industries to other manufacturing and services industries.

2. Health satellite accounts

6.90 The updating of the System of Health Accounts as a joint effort by OECD, Eurostat and the World Health Organization is under way. In the further development of health satellite accounts, the following categories of information need to be considered: a functional classification of health care, an analysis of health care provider units, expenditure on health care and information about the funding of health care. For a national example of health satellite accounts in Brazil, see case study 6.15.

Case study 6.15

Health Satellite Account, Brazil, 2005-2007

a IBGE, *Health Satellite Account, Brazil, 2005-2007* (Rio de Janeiro, Brazil, IBGE, 2009). Available from http://www.ibge.gov.br/english/estatistica/economia/economia_saude/css_2005_2007/default.shtm.

b IBGE, *Health Economics: A Macroeconomic Perspective 2000-2005* (Rio de Janeiro, Brazil, IBGE, 2008). Available from http://www.ibge.gov.br/english/estatistica/economia/economia_saude/default.shtm.

1. Health care industry is of significant importance in many countries in terms of size and employment. The publication *Health Satellite Account, Brazil, 2005-2007*^a has been compiled with a focus on policy and analytical needs. That approach, however, is fundamental to obtaining knowledge of the productive structure and of the dynamics of the sector—including financial aspects, interaction with the rest of the economy and the destination given to the goods and services produced—and for the formulation and implementation of policies aimed at a more effective use of public resources and at a better distribution of health benefits among the population.

2. In order to provide an overall view of health resources and uses in Brazil, IBGE released, in 2008, the study *Health Economics: A Macroeconomic Perspective 2000-2005*.^b That preliminary publication compiled and systematized data on production, consumption, international trade of goods and services related to health, as well as employment and income obtained from economic activities, which generate such products and the infrastructure of the health sector, having as its main source the System of National Accounts. The study measured, for the first time, the contribution of the health care industry to the economy of Brazil. The current *Health Satellite Account, Brazil, 2005-2007* is a consequence of the improvement of that first initiative.

3. The publication describes methodological procedures that have guided the compilation of the Health Satellite Account, the boundaries of which, also based on the National Classification of Economic Activities, increase data coverage and, in some cases, improve the disaggregation of some activities approached in that preliminary phase. The analysis of results that follows is illustrated by tables and graphs, and it encompasses, for each economic activity treated, information on the gross data of production of health goods and services, inputs consumed in productive processes, gross value added, final consumption of health goods and services, investments, salaries and job positions, among other aspects, for the period 2005-2007. The publication also includes a glossary of concepts considered relevant to the understanding of results, as well as appendices that show the detailed structure of the tables of resources and uses and their results for the period 2005-2007 and the integrated economic accounts for the period 2005-2006.

K. Environmental accounts

6.91 The System of Environmental-Economic Accounts (SEEA) is a multipurpose conceptual framework that describes the interactions between the economy and the environment and the changes in the state of the environment over time. At the heart of SEEA is an accounting approach that describes, as completely as possible, the stocks and flows that are relevant to the analysis of environmental and economic issues. The accounting approach of SEEA follows the system's approach as described in the SNA. Using common concepts, definitions and classifications, SEEA extends the monetary focused recording in the SNA to incorporate many environmental statistics that are usually available in physical or quantitative terms. The power of SEEA comes from its conceptual framework, which presents the interaction between the environment and the economy in coherent physical and monetary terms.

6.92 As an integrated accounting system, SEEA stands apart from individual sets of environmental statistics. While sets of environmental statistics are usually internally consistent, there is, for good reason, often no strict consistency between one set of statistics and another. Environmental statistics are often collected with a particular regulatory or administrative purpose in mind and the way in which they are structured is specific to that need. SEEA also relies upon sets of environmental statistics for the basic statistics required in its implementation. It describes the conceptual accounting frameworks of flows and stocks for water, minerals, energy, timber, fish, soil, land and ecosystems, pollution and waste in relation to the economic activity of production, consumption and accumulation. Each of those natural resources and other materials has specific and detailed measurement approaches that are integrated in SEEA. SEEA is not designed to provide or replace the richness and depth that each of those individual sets of environmental statistics brings to their own areas, rather, the linkages and connections developed in SEEA provide an additional and broader perspective and hence add value to the detailed information already available. An accounting approach distinguishes SEEA from general sets of statistics on environmental and economic issues because it demands coherence and consistency with a core set of concepts and definitions. Therefore, using a wide range of source data, SEEA provides a consistent and coherent set of environmental statistics using a systems approach to compare and contrast source data and presents aggregate and their components data across a broad spectrum of environmental and economic issues.

6.93 SEEA consists of a coherent, consistent and integrated set of tables and accounts which focuses on different aspects of the interaction between the economy and the environment or on the changing state of the environment. The tables and accounts are based on internationally agreed concepts, definitions, classifications and accounting rules. There are five main types of accounts and tables in the SEEA framework: (a) physical flow accounts presented in supply and use tables, (b) asset accounts in physical and monetary terms, (c) the sequence of economic accounts, (d) functional accounts for environmental transactions, and (e) tables containing demographic and employment information. Each of the different accounts is connected to the other within the SEEA framework, but each one focuses on a different part of the interaction between the economy and the environment.

6.94 National practices on the application of environmental accounting by the Netherlands are presented in case study 6.16.

Case study 6.16**Environmental accounting in the Netherlands**

1 In 1991 an illustrative national accounting matrix including the environmental accounts (NAMEA) was presented for the first time; however, insufficient data were available for an immediate operationalization of the conceptual framework. It was decided to compile a more modest pilot-NAMEA, making use of a so-called national environment policy plan in which a number of environmental themes were distinguished. A single indicator had been designed for each of the themes.

2 In 1993, that first NAMEA became available and the present NAMEA systems basically maintained that format. The NAMEA systems focus on the following themes: the greenhouse effect, ozone layer depletion, acidification, solid waste, wastewater and the exploration of crude oil and natural gas.

3 During the 1990s and the early 2000s, a number of pilot projects were performed to extend the system of environmental accounts. Following a pilot project in 1997, the system of environmental accounts for the Netherlands was extended in 2002 with the national accounting matrix including water accounts (NAMWA). Other pilot projects focused on energy, land use, subsoil accounts and environmental taxes. Between 2004 and 2007, subsystems based on those pilots were developed and implemented, while the air emission accounts and the water emission accounts were further extended. In 2009, a programme for advancing new statistics on sustainable development was initiated. In cooperation with other institutes, new statistics will be developed to answer all kinds of relevant social, economic and environmental questions. New projects in the area of environmental accounting were started with that scope.

Annex

List of domains for integrated economic statistics

The descriptions provided here are summarized from the original reference document developed by the Conference of European Statisticians. For the full description of classification categories, see the Classification of Statistical Activities (available from <http://www1.unece.org/stat/platform/download/attachments/58492889/Classification+of+statistical+activities.pdf?version=1>).

1. Demographic and social statistics

1.2 Labour

Covers statistics on labour force, labour market, employment and unemployment.

1.5 Income and consumption

Covers statistics on household income and expenditures and consumption patterns.

2. Economic statistics

2.1. Macroeconomic statistics

All activities that deal with economy-wide statistics at the macro level that go beyond or are different from national accounts, whether annual, quarterly or monthly.

2.2. Economic accounts

Covers work on national accounts in current and constant prices. Excludes agricultural accounts (in 2.4.1), tourism satellite accounts (in 2.4.5), government accounts and financial accounts (in 2.5).

2.3. Business statistics

Economy-wide statistics on the activities of enterprises. Covers work on economic statistics across different sectors, business services and enterprises by size class. Excludes statistics of specific individual sectors (in 2.4).

2.4. Sectoral statistics

Statistical activities dealing with one of the specific branches of industry or services.

2.4.1 Agriculture, forestry, fisheries

All agriculture, forestry, fishery-related statistics, agricultural farm structures, crop and animal production and commodities.

2.4.2 Energy

Energy supply, energy use, energy balances, energy markets and energy efficiency. Excludes energy prices (in 2.7).

2.4.3 Mining, manufacturing, construction

Statistics on specific industrial activities related to mining, manufacturing and construction.

2.4.4 Transport

Covers statistics on all modes of transport, equipment, transport infrastructure, passengers and freight transport and road traffic accidents.

2.4.5 Tourism

Covers statistics regarding visitor activity (e.g., expenditures, arrivals/departures and overnight stays) associated to inbound, outbound and domestic forms of tourism, and on tourism infrastructure, employment and tourism satellite accounts.

2.4.6 Banking, insurance, financial statistics

Money, banking and financial market statistics, interest rates, exchange rates, stock market indicators and pension fund statistics.

2.5. Government finance, fiscal and public sector statistics

All statistics related to the government sector, including debt, deficit, revenue, expenditure, accounts of the government sector and tax and benefit systems.

2.6. International trade and balance of payments

Statistics on all cross-border transactions recorded in the balance of payments, including foreign direct investment and foreign aid.

2.7. Prices

Any statistics dealing with prices, including consumer price indices, producer price indices, price indices of specific products and services and purchasing power parities.

2.8. Labour costs

Statistics on labour costs, earnings and wages, both for structural and short-term statistics.

2.9. Science, technology and innovation

Covers activities on science, technology and innovation, research and development, patents and knowledge-based services.

3. **Environment and multi-domain statistics**

3.1 Environment

Includes climate, climate change, biodiversity, natural resources, soil, water, air, waste, pollution and environmental accounts.

4. **Methodology of data collection, processing, dissemination and analysis**

Includes metadata (4.1), classifications (4.2), data sources (4.3), business and agricultural censuses and registers (4.3.2), household surveys (4.3.3), business and agricultural surveys (4.3.4), other administrative surveys (4.3.5), data editing and data linkage (4.4), dissemination and data warehousing (4.5).

5. **Strategic and managerial issues of official statistics**

Includes institutional frameworks and principles, role and organization of official statistics (5.1), statistical programmes, coordination within statistical systems (5.2), quality frameworks and measurement of performance of statistical systems and offices (5.3), management and development of human resources (5.4), management and development of technological resources (5.5), technical cooperation and capacity building (5.7).

References

- Australian and New Zealand Standard Industrial Classification. 2006. Available from <http://www.abs.gov.au/ANZSIC>.
- Bank of England. *Cost-Benefit Analysis of Monetary and Financial Statistics: A Practical Guide*. London: Bank of England, 2006. Available from <http://www.bankofengland.co.uk/statistics/about/cba.pdf>.
- Bergdahl, M. Process orientation at Statistics Sweden: implementation and initial experiences. Paper presented at International Association for Official Statistics conference. Shanghai, China, October 2008.
- Braaksma, B. Redesign of the chain of economic statistics in the Netherlands. Paper presented at the Seminar on Registers in Statistics. Helsinki, May 2007.
- Central Bureau of Statistics of the Netherlands. *Arbeidsrekeningen, Kern van het statistisch systeem over arbeid*. Amsterdam: Central Bureau of Statistics, 1996.
- Commission of the European Communities. Communication from the commission to the European parliament and the council entitled On the production of EU statistics: a vision for the next decade. Com 404 final. Brussels, 2009.
- Committee on Monetary, Financial and Balance of Payments Statistics. *Promoting Excellence in European Statistics, CMFB, 20 Years*. Lisbon: CMFB, 2011. Available from http://www.cmfb.org/pdf/2011-11-25%20CMFB_Promoting%20Excellence%20in%20European%20Statistics.pdf.
- Cummings, Thomas G., and Christopher G. Worley. *Organization Development and Change*, Eighth edition. Mason, Ohio: Thomson South-Western, 2005.
- Duncan, Joseph W. *Revolution in United States Government Statistics, 1926-1976*. Washington, D.C.: U.S. Department of Commerce, Office of Federal Statistical Policy and Standards, 1978.
- European Central Bank. The ECB Statistics Quality Framework and quality assurance procedures. Available from <http://www.ecb.europa.eu/stats/html/sqf.en.html>.
- Eurostat. *Handbook on Price and Volume Measures in National Accounts*. Luxembourg: Office for Official Publications of the European Communities, 2001. Available from http://www.euklems.net/pub/eurostat_handbook_on_volumes_&_prices.pdf.
- . Classification of Economic Activities in the European Community (NACE), rev.2. Luxembourg, 2006. Available from [http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_\(NACE\)](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_(NACE)).
- . Classification of Products by Activity (CPA). Luxembourg, 2008. Available from http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:CPA.
- . European Statistics Code of Practice for the national and community statistical authorities. Adopted by the European Statistical Systems Committee, 28 September 2011. Available from http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/CoP_October_2011.pdf.
- FAO. *A System of Economic Accounts for Food and Agriculture*. Rome, 1996.

- . *A System of Integrated Agricultural Censuses and Surveys*. Rome, 2005. Available from <http://www.fao.org/docrep/009/a0135e/A0135E00.htm>.
- Froyen, Richard T. *Macroeconomics: Theories and Policies*. New Jersey: Prentice Hall, 2005.
- Grimm, Bruce T., and Teresa L. Weadock. Gross domestic product: revisions and source data. *Survey of Current Business*, vol. 86, No. 2 (February 2006).
- Holdren, Alyssa E., and Bruce T. Grimm. Gross domestic income: revisions and source data. *Survey of Current Business*, vol. 88, No. 12 (December 2008). Available from <http://www.bea.gov/scb/index.htm>.
- ILO, et al. *Consumer Price Index Manual: Theory and Practice*. Geneva, 2004. Available from <http://www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm>.
- IMF. External Debt Statistics: Guide for Compilers and Users. Washington, D.C., 2003. Available from <http://www.imf.org/external/pubs/ft/eds/Eng/Guide/index.htm>.
- . *The System of Macroeconomic Accounts Statistics: An Overview*. Washington, D.C., 2007.
- . *Balance of Payments and International Investment Position Manual, Sixth ed.* Washington, D.C., 2008. Available from <http://www.imf.org/external/pubs/ft/bop/2007/bopman6.htm>.
- IMF, et al. *Producer Price Index Manual: Theory and Practice*. Washington, D.C., 2004. Available from <http://www.imf.org/external/np/sta/tegeppi/index.htm>.
- . *Export and Import Price Index Manual: Theory and Practice*. Washington, D.C., 2009. Available from <http://www.imf.org/external/np/sta/tegeipi/index.htm>.
- Janssen, R. J. A. Economic indicators: research on the business cycle and quarterly national accounts. In *A Century of Statistics*, J. G. S. J. van Maarseveen and M. B. G. Gircour, eds. Amsterdam: Stichting beheer IISG, 1999.
- Janssen, R. J. A., and S. B. Algera. The methodology of the Dutch system of quarterly accounts. Occasional papers, NA-25. Amsterdam: Central Bureau of Statistics, 1988.
- Jorgenson, Dale W., Frank M. Gallop and Barbara M. Fraumeni. *Productivity and U.S. Economic Growth*. Massachusetts: Harvard University Press, 1987.
- Kuznets, Simon. National Income 1929-1932. Senate Document No. 124, 73rd Congress, 2nd Session. Washington, D.C.: U.S. Government Printing Office, 1934.
- Lundberg, Erik. Nobel Award Ceremony speech honouring Sir Richard Stone. In *Nobel Lectures, Economics 1981-1990*, K. G. Mäler, ed. Singapore: World Scientific Publishing Company, 1992.
- Mäler, K.G. *An Analysis of the Sources of War Finance and Estimate of the National Income and Expenditure in 1938 and 1940*. London: The Stationery Office, 1941.
- Marcuss, Rosemary D., and Richard E. Kane. U.S. national income and product statistics: born of the Great Depression and World War II. *Survey of Current Business*, vol. 87, No. 2 (2007).
- Monty, André. Relationship between statistical, accounting and administrative units. Technical paper. Statistics Canada, 2003.
- Morisi, Teresa. Recent changes in the national current employment statistics survey. *Monthly Labor Review* (June 2003).
- National Statistics. *National Statistics Code of Practice: Statement of Principles*. London: The Stationery Office, 2002. Available from http://www.statistics.gov.uk/about_ns/cop/default.asp.

- . *National Statistics Code of Practice: Protocol on Data Access and Confidentiality*. London: The Stationery Office, 2004. Available from http://www.statistics.gov.uk/about_ns/cop/default.asp.
- . *National Statistics Code of Practice: Protocol on Statistical Integration and Classification, revised version*. London: The Stationery Office, 2008. Available from http://www.statistics.gov.uk/about_ns/cop/default.asp.
- North American Industry Classification System (NAICS). 2007. Available from <http://www.ntis.gov/products/naics.aspx>.
- North American Product Classification System (NAPCS). 1999. Available from <http://www.census.gov/eos/www/napcs/index.html>.
- OECD. *Measuring Productivity: Measurement of Aggregate and Industry-level Productivity Growth*. Paris, 2001. Available from <http://www.oecd.org/dataoecd/59/29/2352458.pdf>.
- . *Measuring Globalization: OECD Handbook on Economic Globalization Indicators*. Paris, 2005. Available from <http://browse.oecdbookshop.org/oecd/pdfs/browseit/9205061E.PDF>.
- . *OECD Benchmark Definition of Foreign Direct Investment*, Fourth edition. Paris, 2008. Available from <http://www.oecd.org/dataoecd/26/50/40193734.pdf>.
- Rayner, E. Creating a new business model for NZ's national statistical office of the 21st Century. Paper presented at the Business Process Management Conference. Sydney, 13-16 March, 2007.
- Renssen, R. H. and A. van Delden. Standardization of design and production of statistics: a service oriented approach at Statistics Netherlands. Statistics Netherlands discussion paper 09034, 2009.
- Sauers, Renee, Edward Dozier and Denis Caron. Reconciliation of the U.S.-Canadian Current Account, 2006-2007. *Survey of Current Business*, vol. 88, No. 11 (November 2008).
- Schenu, Sjoerd, Roel Delahaye, Cor Graveland and Maarten van Rossum. The Dutch environmental accounts: present status and future developments. Paper of the National Accounts Department, Statistics Netherlands, 2009.
- Statistics Canada. Draft report on Quality Assurance Frameworks for the forty-first session of the United Nations Statistical Commission 2010, version 1. September 2009. Available with comments from <http://unstats.un.org/unsd/dnss/QualityNQAF/nqaf.aspx>.
- Statistics New Zealand. *Statistics New Zealand's generic Business Process Model (gBPM) v2*. Wellington: Statistics New Zealand, 2006.
- Steeg, A. M. van de. *Accounting for Tourism, The Tourism Satellite Account (TSA) in Perspective*, The Hague: Statistics Netherlands and University of Groningen, 2009.
- United Kingdom Statistics Authority. *Code of Practice for Official Statistics*. London: United Kingdom Statistics Authority, 2009. Available from <http://www.statisticsauthority.gov.uk/assessment/code-of-practice>.
- United Nations. *Fundamental Principles of Official Statistics*. 1994. Available from <http://unstats.un.org/unsd/methods/statorg/FP-English.htm>.
- . *Strategies for Measuring Industrial Structure and Growth*. Studies in Methods, No. 65. Sales No. E.94.XVII.11. Available from http://unstats.un.org/unsd/publication/SeriesF/SeriesF_65E.pdf.

- . *International Merchandise Trade Statistics: Concepts and Definitions*. Studies in Methods, Series M, No. 52, Rev.2. Sales No. E.98.XVII.16. Available from http://unstats.un.org/unsd/publication/SeriesM/SeriesM_52rev2E.pdf.
- . *Handbook of Statistical Organization, Third edition: The Operation and Organization of a Statistical Agency*. Studies in Methods, Series F, No. 88. Sales No. E.03.XVII.7. Available from http://unstats.un.org/unsd/publication/SeriesF/SeriesF_88E.pdf.
- . *Rural Households' Livelihood and Well-Being: Statistics on Rural Development and Agriculture Household Income*. Sales No. E.07.II.E.14. Available from <http://www.fao.org/fileadmin/templates/ess/pages/rural/index.htm>.
- . *International Recommendations for Distributive Trade Statistics 2008*. Statistical papers, Series M, No. 89. Sales No. E.08.XVII.26 Available from <http://unstats.un.org/unsd/EconStatKB/Attachment364.aspx>.
- . *International Recommendations for Industrial Statistics 2008*. Statistical papers, Series M, No. 90. Sales No. E.08.XVII.8. Available from <http://unstats.un.org/unsd/EconStatKB/Attachment387.aspx>.
- . *International Standard Industrial Classification of All Economic Activities, revision 4*. Statistical papers, Series M, No. 4, Rev.4. Sales No. E.08.XVII. 25 Available from <http://unstats.un.org/unsd/cr/registry/isic-4.asp>.
- . *Central Product Classification, version 2*. Statistical papers, Series M, No. 77, Ver. 2. Sales No. E.08.XVII.7. Available from <http://unstats.un.org/unsd/cr/registry/cpc-2.asp>.
- . *System of National Accounts 2008*. Sales No. E.08.XVII.29. Available from http://unstats.un.org/unsd/publication/seriesf/SeriesF_2Rev5e.pdf.
- . *Tourism Satellite Account: Recommended Methodological Framework 2008*. Sales No. E.08.XVII.27. Available from http://unstats.un.org/unsd/publication/Seriesf/SeriesF_80rev1e.pdf.
- . *Manual on Statistics of International Trade in Services 2010*. Sales No.E.10.XVII.14. Available from http://unstats.un.org/unsd/publication/Seriesm/seriesM_86Rev1e.pdf.
- United Nations, Economic Commission for Europe. Making data meaningful, part 1: a guide to writing stories about numbers. ECE/CES/STAT/NONE/2009/4. Available from http://www.unece.org/stats/documents/writing/MDM_Part1_English.pdf.
- . General statistical business processing model. Paper presented at the Joint Economic Commission for Europe/Eurostat/OECD Work Session on Statistical Metadata (METIS), 2009.
- United Nations, Statistical Commission. Report on global initiatives to improve agricultural and rural statistics. 16 December 2008. E/CN.3/2009/3.
- United States Generally Accepted Accounting Principles (U.S. GAAP). 2009. Available from <http://cpaclass.com/gaap/gaap-us-01a.htm>.
- World Bank, et al. *Global Strategy to Improve Agricultural and Rural Statistics*. Washington, D.C.: World Bank, 2010. Available from http://www.fao.org/fileadmin/templates/ess/documents/meetings_and_workshops/ICAS5/Ag_Statistics_Strategy_Final.pdf.
- Wouters, Hans. Treatment of statistical discrepancies. Internal paper of Statistics Netherlands, 2008.