Introduction to Global Value Chains

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A. Introduction to Global Value Chains

1. Globalization is a centuries old phenomenon of growing interactions between countries. In recent decades, the traditional interrelations have grown considerably. Due to reductions in transportation costs, the information technological revolution, and more open economic policies, production processes of a final product are increasingly fragmented across the national economies in a production chain between resident and non-resident firms. The parts and components that now make up a final product, being either a good or service, are produced in different countries, what has been termed the "unbundling" of production. Therefore, intermediate goods and associated services may cross national borders several times before they are assembled and sold as a final product in the market or delivered to a third party. Moreover, international trade in goods and services is increasingly intra-firm trade, often organized and led by large multinational enterprises or enterprise groups (MNEs). These interlinked core production activities and supporting services activities to produce a final product coordinated and led by a lead firm are commonly referred to as global value chains (GVCs).

2. Given the emerging cross border production arrangements between lead and specialized supplier firms and their impact on both levels and growth rates of employment, income, trade and productivity, there is a need for the current macroeconomic, business and trade statistics frameworks to better capture these complex cross-border activities and risks associated with the growing interconnectedness of national economies.

3. While national Statistical Organizations (NSOs) currently produce a wealth of information on international trade, economic performance, foreign investment, and employment – all of which encompass the activities of the economic actors participating in GVCs – such information is not often assembled or presented in a way that permits an understanding of the role and impact that GVCs have within a given economy and within the broader global economy. Existing macroeconomic accounting frameworks, such as supply and use tables and national accounts, effectively describe the relationship between one industry and another within a given economic territory, but are not able to illustrate the international linkages that are essential to analyzing the impact and importance of GVCs. In addition, standard macroeconomic account tools are organized around products, industries and sectors, while the more applicable organizing framework to explain a GVC are business processes and activities.

4. Moreover, where firms organize their activities on an international basis, national statistical compilers will see only parts of their global activities. To arrive at a whole and consistent view of how business inputs relate to outputs requires the ability to view parts of the MNE in relation to each other. The treatment of local entities in countries as individual enterprises can hide the real relationships between units within MNEs. Furthermore, while most national business registers identify membership of foreign-controlled enterprise groups and the country from which the control is exercised, few capture economic data on activities outside the domestic economy.

5. There are several ways of that NSOs could measure GVCs within the context of the existing System of National Accounts (SNA). One approach is extending the existing SNA production, distribution and use of income, capital, financial, and price and volume accounts to detail the international contributions to the national economy, both in the aggregate and by industry. Such extensions would be based on national supply-use and input-output (I-O) tables expanded with more detail utilizing MNE surveys, surveys for Balance of Payments purposes, tax data on international financial and non-financial flows and ownership, integrated business statistics, and reconciled trade statistics, among others. They would provide more detailed and homogenous information, such as breakdowns by type of ownership (e.g., foreign or domestically owned MNEs, foreign or domestic affiliates) and possibly by trading status (e.g., export orientation), thereby capturing important differences in the input structure of different types of producers the same industry that are currently absent from conventional I-O tables. Under this approach, as with other satellite accounts, countries would implement them according to their own priorities and resources.

6. Extended global supply and use tables, or multi-country input-output tables, such as the OECD's TIVA accounts or the World Input-Output Tables (WIOT), would complement such extended SNAs. A multi-country input-output table provides a comprehensive map of international transactions of goods and services in a massive dataset that combines the national input-output tables of various countries at a given point of time. Because the tables contain information on supply–use relations between industries and across countries—which are totally absent from foreign trade statistics—it is possible to identify the vertical structure of international production sharing. Moreover, input-output analysis covers an entire set of industries that make up an economic system, thus enabling the measurement of cross-border value flows for a country or region. Theoretically, such analysis has the capacity to track the value-added generation process of every product in every country at every production stage.

7. However, Sturgeon and others (2013) have pointed out the limitations of (multi-country) input-output analyses arising from the statistical characteristics of input-output tables. For instance, the such tables' sectoral classification is based on industrial categories so that the value-added of a specific task, such as product design or assembly cannot be identified. Second, transactions are recorded on a domestic basis, so production activities are circumscribed by territorial borders rather than by the nationality that the produced goods are associated with, which may cause (analytically) inappropriate attribution of value added among countries. Third, information on the nature of specific transactions is totally absent from input output statistics, making qualitative analyses of GVCs difficult, if not impossible.[1]

8. The increasing global demand for more detailed and more accurate data on specific GVCs suggest that a ground-up approach, using firm-level data on specific industries and final products of an MNE, is

[1] *Global Value Chain Development Report*. 2017 International Bank for Reconstruction and Development/The World Bank. Chapter 1 by Satoshi Inomata.
http://documents.worldbank.org/curated/en/440081499424129960/pdf/117290-WP-P157880-PUBLIC.pdf.

likely to produce more accurate and relevant data on specific industries and MNEs to complement and benchmark macro-based GVC extensions. Indeed, a number of recent globalization studies, guidelines, and reports have suggested that for issues related to alternative concepts or definitions, such as the treatment of the transactions and positions of global enterprises, the "most likely way forward would be by way of supplementary tables.[2]

9. Therefore, the approach to measuring GVCs which is the main focus of this Handbook is the development of GVC satellite accounts and associated institutional sector accounts that focus on a specific product or group of products produced within the GVC among a group of key partner countries. Countries themselves can choose to focus on particular GVCs and particular partner countries based on their relative importance in terms of value added to the national economy, international investment and trade relations, and to address specific policy questions. Such accounts would be based on existing firm-specific micro data, publicly available micro data, existing input-output coefficients, and existing, or newly collected, information on governance and business functions. The GVC satellite accounts and institutional sector accounts are also developed within, and can be linked to, the SNA accounts (distribution and use of income, capital, financial, and price and volume accounts).

10. Such satellite accounts would have the advantage of providing a supplementary framework for developing new measures, without overburdening or reducing the accuracy or consistency of the core accounts. While there is a strong connection between an expanded multi-country supply and use table and a GVC satellite account (in fact, in many ways a GVC satellite account can be seen as a natural extension of an extended SUT in that it focuses a lens on a specific set of products produced in a GVC), a GVC satellite account would allow for adding flexibility and highlighting flows and interactions that may not be visible with a more structured and aggregated set of extended supply and use tables.

11. Using the flexibility of classifications of the System of National Accounts, the Supply and Use Table and institutional sector accounts can be rearranged in a satellite account for global value chain accounting to capture the growing interdependence of the national economies from a national perspective. With the cross-border production arrangements increasingly becoming regional and involving limited number of partner countries within a region, a satellite framework of multi-country national accounts tables and accounts can be elaborated to capture the growing interdependence of economies between partner countries in the global value chains for a national perspective.

12. With the increasing understanding of the input-output relationships between core and supporting activities of GVCs for specific industries, industry-specific Supply and Use Tables can be delineated in standardized presentations of products and industry classifications. Progressively, with further profiling of GVCs for specific industries, the available product and industry classifications for automotive, apparel and textile and electronics industries will be extended to other industries such as the agri-food, chemical and pharmaceutical industries.

13. Apart from the description of the economic cross border production activities of the lead enterprise and supplying enterprises, the coordination and governance of the GVCs can be described using the institutional sector accounts of the System of National Accounts. The institutional sector transactions between the enterprises in GVCs delineate their behavior in taking different degrees of control by taking ownership positions in the supplying firms in the chain through foreign direct investment or other forms of control through market dominance for purposes of production, tax and financing considerations.

[2] See UNECE, EUROSTAT, OECD 2011, A4.12

Moreover, the institutional sector accounts for GVCs will provide an economic overview of the optimization of the distribution of value added and related income across the different countries through transactions in goods, services, income, assets, and liabilities in its network of affiliate and non-affiliate firms depending on the economic and regulatory environment of the countries in which the GVCs of the lead firms operate.

14. This GVC satellite accounting framework is complemented by the GVC framework of integrated business statistics that should render the firm level statistics in the GVC network. Global enterprise profiles and related global and national business registers should identify the domestic and cross border mechanisms of control and ownership established by the lead firms in their firm networks. These profiles should clarify the structure, transactions and positions to compile the multi-partner country SUT and institutional sector accounts for specific industries of GVCs. The integrated business statistics will allow determining the impact on the firm level statistics and indicators on key variables such as employment, income, productivity and international trade within the GVCs as compared to firms not participating in the GVCs within a specific GVC industry.

15. Through the profiling of the GVC related networks in the national statistical business and global enterprise registers, the statistical infrastructure will be established to better target the integrated data collection of the firms within GVC networks based on the understanding of the interdependencies between cross border transactions in goods, supporting services and income and in positions of assets and liabilities between partner countries. Furthermore, these national statistical business and global enterprise registers will allow for tailored collaboration between partner countries in analyzing bi-lateral asymmetries, developing global enterprise registers and establishing early warning systems for large statistical impact events on economic statistics, like large corporate investments and inversions.

16. In this context, this Handbook proposes a framework for better measuring and analyzing the globalization phenomenon that builds on the theoretical foundation of the global value chain (GVC) framework. This GVC framework focuses on: (i) a national perspective to measuring globalization with a firm and product-centric approach; (ii) the description of the main components of GVC framework: the input-output relations of goods and value adding services for the GVC, the different geographical jurisdictions in which the GVC operates, the governance structures for the control and coordination of the GVC and the institutional context and regulatory environments of the different jurisdictions (iii) the description of the GVC industry-specific multi-partner SUTs and related institutional sector accounts; (iv) the GVC framework for integrated business statistics; and (v) the GVC analysis and policy framework.

B. Global Value Chains in Perspective

17. This Handbook builds on a significant body of research by the statistical and academic community to delineate globalization and to meet the statistical challenges in measuring the impact of the global value chains on macroeconomic, business and international trade statistics. Noteworthy progress has been made towards a better understanding of the nature of global production and the complex measurement issues that need to be considered. Namely, in April 2007, a United Nations Economic Commission for Europe (UNECE)-led Expert Group on the Impact of Globalization on National Accounts (GGNA) was established, following a decision of the Conference of European Statisticians (CES). The Group was organized jointly with the OECD and Eurostat and published the guide, “The Impact of Globalization

on National Accounts,"[3] which focuses on the main aspects of globalization and recommends solutions and best practices aimed at improving the design, processing and use of the data and achieving better international consistency in the identified problem areas.

18. Furthermore, in 2015, the UNECE/Eurostat/OECD Group of Experts on National Accounts published its "Guide to Measuring Global Production"[4] in 2015. This guide has a greater focus on the behavior of multinational enterprises that engage in global production, providing a conceptual framework for understanding the structures, ownership and in particular the significance of intangibles such as patents and the related royalty service flows. It also provides comprehensive guidance to compilers of national accounts, balance of payments and related economic statistics, as well as to data users, on the challenges in collection, production and analysis of data related to global production arrangements.

19. Another initiative is the WTO Made in the World initiative,[5] launched in 2011. It is a project to support the exchange of experiences and practical approaches in measuring and analyzing trade in value added and global value chains (GVCs). It collects and publishes articles from WTO delegates, non-governmental organizations, academic experts, WTO staff, and others.

20. Building on these initiatives, the Friends of the Chair Group on the Measurement of International Trade and Economic Globalization was established by the UN Statistical Commission at its forty-fourth session in 2014 and was tasked with preparing a concept paper on the measurement framework for international trade and economic globalization. That report provided an overview and assessment of the conceptual, compilation and analytical issues that have emerged in respect of the prominence and governance of GVCs in international production and trade. The Group concluded that a GVC satellite extension of the national accounts and a GVC framework of integrated business statistics were needed to address the measurement issues in a coherent way. At its 46th session, the UN Statistical Commission established the Expert Group on International Trade and Economic Globalization Statistics[6] to develop a Handbook that will address the GVC-related classifications and the integration of the economic, environmental and social dimensions of trade and globalization as an extension of the System of National Accounts 2008 (2008 SNA)[7] supported by an integrated framework of business and trade statistics. The UN Statistical Commission also agreed with the proposed development of a global enterprise group register to assist national statisticians to better understand business strategies and the international trade and foreign direct investment relations between enterprises in compiling cross-border macroeconomic, trade and business statistics.

21. The UN Statistical Commission[8] further agreed that the handbook will build on existing work by the Economic Commission for Europe (ECE), the Organization for Economic Cooperation and Development (OECD), the World Trade Organization (WTO), Eurostat and others. Thus, this Handbook incorporates and

[3] UNECE, Eurostat, and OECD. *The Impact of Globalization on National Accounts*, 2012. https://www.unece.org/fileadmin/DAM/stats/publications/Guide_on_Impact_of_globalization_on_national_accounts__web_.pdf.
[4] UNECE. *Guide to Measuring Global Production*, 2015. https://www.unece.org/fileadmin/DAM/stats/publications/2015/Guide_to_Measuring_Global_Production__2015_.pdf.
[5] https://www.wto.org/english/res_e/statis_e/miwi_e/miwi_e.htm.
[6] In the UN Statistical Commission decision 46/107.
[7] United Nations publication, Sales No. E.08.XVII.29.
[8] as described in previous reports to the Commission on this topic in the past four years (E/CN.3/2013/7, E/CN.3/2014/7, E/CN.3/2015/12 and E/CN.3/2016/23).

builds on the work of these initiatives. Moreover, the Handbook setting forth a national, firm- and product-centered approach complements other initiatives undertaken at regional and international levels, such as the extensive work by the OECD-WTO Trade in Value Added (TiVA) project and the Eurostat 'Full International and Global Accounts for Research in Input-Output Analysis (FIGARO) project and Framework for Integrated Business Statistics (FRIBS). Other initiatives brought into view are the World Input-Output Database (WIOD) initiative, Asian I-O table (of IDE-JETRO), the environmental-economic extensions (EE-MRIO), such as EXIOPOL and Eora, and the IMF led G-20 data gaps initiative on global economic and financial interdependencies and vulnerabilities, among others.

C. The Global Value Chain Framework

22. Along with the emergence of the global value chains in the structures of the domestic industries, new enterprise networks of affiliated and non-affiliated enterprises are established characterized by multinational enterprise or enterprise groups that take various levels of control and ownership through foreign direct investment to coordinate and continuously optimize their domestic and cross border business activities. As a result, heterogeneous production processes for industrial sectors are now predominant in the national economies for those firms inside and outside the GVC network as higher levels of specialization and productivity are generally observed in the production process of those firms inside the GVC network. It is through specialized capabilities and skills of the firms within the GVC networks that also the qualities of the produced products at the various stages of the vertically integrated production chain differ. The firms within the GVC network not only dominate the overall of industrial sectors in terms of value added, income, productivity and related assets and liability measures in many countries, but also differ in their dynamics as measured in terms of rates of growth of in key variables of business and macroeconomic statistics. Moreover, due to their continuous process of optimization of revenues and profits for the enterprise group within and across economic jurisdictions, their underlying legal structures measured in statistical units often witness remarkable changes on an annual basis, raising new challenges for statistical measurement of the firms within the GVC networks.

23. Given this new understanding of globalized production, tax and financing arrangements, the term "global value chains" (GVC) has emerged. As defined by Gereffi, et. al[9]:

> "The value chain describes the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond. This includes activities such as research and development (R&D), design, production, marketing, distribution and support to the final consumer. The activities that comprise a value chain can be contained within a single firm or divided among different firms."

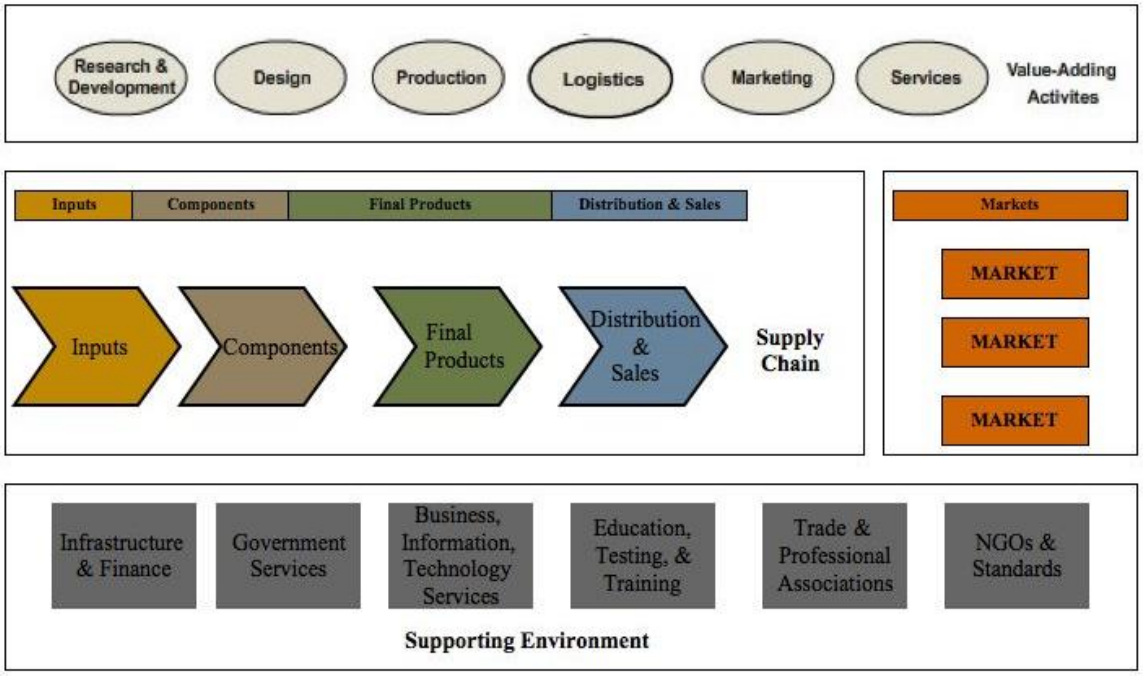
24. The GVC framework is comprised of dimensions that describe the structure, dynamics and relationships among stakeholders in GVCs: business functions, geography, governance and institutions.

[9] Gereffi, Gary and Fernandez-Stark, Karina, *Global Value Chain Analysis: A Primer*, Second Edition, The Duke Center on Globalization, Governance & Competitiveness, July 2016. https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/12488/2016-07-28_GVC%20Primer%202016_2nd%20edition.pdf?sequence=1

These four dimensions can be translated into steps used to carry out a value chain research approach and analysis.

- **Business functions**: includes all supply chain segments (inputs, components, final products, distribution/sales) and value-adding activities (research, design, marketing and support services).
- **Geography**: the business functions are often carried out in different countries that participate in the GVC by leveraging their competitive advantage. Usually the optimization process of the GVC firm network is based on labor costs, proximity to markets and raw materials, as well as access to research and development, design and marketing.
- **Governance**: is about the ability of a firm (or organization or institution) to exert control along the value chain by setting and/or enforcing parameters under which others in the chain operate.
- **Institutional context**: identifies how local, national and international conditions and policies shape the globalization of each stage of the value chain. GVCs are embedded within economic, social and environmental institutional dynamics.

Figure 1.1: Four Parts of the Value Chain Reference Model (to be made consistent with Part II)



25. Given this new understanding of globalized production systems, conventional international trade theory has evolved and incorporated the concept of GVCs to explain the new and related international trading patterns in goods and supporting services.

26. Since David Ricardo established the foundation of international trade theory two centuries ago, mainstream thought, from Heckscher-Ohlin to Samuelson, has hinged on three classic premises:

- Markets are perfectly competitive, and producers operate at constant returns to scale.
- An industry consists of homogeneous producers.
- Countries trade only final products—traditionally phrased as Portuguese wine for English cloth—and each product is made using the production factors of only the exporting country.

27. The first premise was shaken in the 1970s and 1980s when a new school of thought, New Trade Theory, emerged. Its key feature, pioneered by Krugman (1979, 1980) and generalized by Helpman and Krugman (1985), was the theoretical scope for considering production technology with increasing returns to scale (paired with the love of variety), which underpins the analytical frameworks of international trade under imperfect competition. The models provided a plausible explanation for the prevalence of intra-industrial trade between countries with similar technology and resource endowments—a phenomenon that cannot be explained by the orthodox notion of comparative advantage.

28. Just as the empirical findings on intra-industry trade, notably those of Grubel and Lloyd (1975), were followed by New Trade Theory, so too was the second classic premise of homogeneous producers reconsidered following evidence in the late 1990s. Bernard and Jensen's (1995, 1999) detailed examination of firm-level microdata revealed substantial heterogeneity in firm productivity between exporters and non-exporters in the same industrial sector.

29. Melitz (2003) pioneered an explanation for these observations, advancing in the quest for what was later called New-New Trade Theory. By assuming a fixed cost of entering export activities, the model considers the mechanism of a firm's endogenous selection on market entry or exit and thereby provides a powerful explanation for the coexistence of heterogeneous firms within an industrial sector.

30. A third wave of reconstructing classical theory is now under way, and the literature on GVCs is generally linked to this development strand. With the dramatic advance of transportation modes and information and communication technology, production processes can now be "sliced" into several production segments, each corresponding to a particular task or business function - such as design, parts procurement, assembly, and distribution. These segments are relocated, often across national borders, to the places where the tasks or business functions can be performed most efficiently. Thus, the core subject of the literature today is not only the movement of final products, as classical theories have focused on (under the third premise), but also the production and international trade of intermediate goods and services with the cross-border transfer of tasks or business functions, and the distribution of value added generated by these tasks or business functions.

31. In principle, economists' analytical focus on GVCs has been on three issues: the mechanism of the fragmentation of production processes,[10] the impacts of offshoring on domestic factor incomes and welfare, and the firm's choice of an organizational form of GVCs.

32. GVC studies, therefore, consider the generation and transfer of value within the system because of firm efforts to optimize production networks and, conversely, the mechanism of how the value distribution structure affects the firm's choice of the organizational form of international production networks. Further, the main objective of GVC studies is to explore the interplay between value distribution mechanisms and organization of the cross-border production–consumption nexus.

[10] Deardorff (2001, p. 122) defines fragmentation as "the splitting of a production process into two or more steps that can be undertaken in different locations but that lead to the same final product."

D. Analytical and Policy Framework for Global Value Chains

33. Following the new theoretical insight in what drives economic growth, productivity and international trade, a new GVC analytical and policy framework has emerged in which imports matter as much as, if not more than, exports. This new policy paradigm takes a holistic view on economic development and international trade and in which the flows of goods, services, people, ideas, and capital are interdependent and must be assessed jointly.

34. Trade policies are increasingly informed with data on value-added contributions to better target trade policy in addition to bilateral gross trade flows. Specifically, bilateral trade balances measured in gross terms hide significant import content from in the production of goods and services, including their foreign and domestic value added. Protectionist pressures based on bilateral gross trade balances could misguide their impacts as: (i) higher import taxes lower the competitiveness of domestic lead firms that rely heavily on imported inputs and, for various reasons, cannot switch to domestic suppliers. (ii) raising import tariffs would also tax domestic value-added portions that are embodied in those imports from third countries. (iii) increasing import taxes would likely result in higher consumer prices if lead firms pass-through the additional costs they incur to the final consumers. Therefore, effective trade liberalization goes beyond the tariff rate on final goods.

35. The new GVC policy framework for economic development and trade goes beyond simple tariff cutting and involves legal commitments on laws and regulations. Recently, Preferential Trade Agreements (PTAs) have proliferated and have proved a more congenial setting for the economic integration of groups of like-minded countries. Economic integration often involves opening and leveling the playing fields in terms of investment, intellectual property and competition policy and seems to be an effective way to expand involvement in GVCs. New areas are covered in these agreements that facilitate the operations of complex production structures that span multiple borders.

36. The competitiveness of upstream sectors, especially services, shapes a country's success in GVCs. Upstream sectors contain both (i) foreign value added, and (ii) domestic value added that are supplied to exporting sectors. Typically, countries entering manufacturing GVCs start as buyers of foreign technology and know-how which enables them to increase their domestic value added that is exported. In order to become manufacturing sellers, countries need to increase the share and quality of domestic services value added.

37. Most countries have increased their dependence on foreign inputs, measured by the share of foreign value added as a percentage of their gross exports, as they increasingly rely on imported inputs that are processed and subsequently exported. But the competitiveness of the domestic segment of the value chain is as important as that of the international segment.

38. Furthermore, in a world dominated by complex and fragmented production processes, economic development can occur through economic upgrading and densification. Economic upgrading is largely about gaining competitiveness in higher value-added products, functions, and sectors via skills, capital, and process upgrading. Densification involves engaging more local actors (firms and workers) in the GVC network. In some cases, this could mean that performing lower value-added activities (or functions and

tasks) on a larger scale can generate large value addition for the country. Raising domestic labor productivity and skills contributes to the overall goal to increase a country's value added because of GVC participation

39. This new GVC analytical and policy framework depends critically on economic statistics classified into business functions rather than aggregated industrial sectors along the value chain. For instance, with a focus on upstream value-added services sectors in a value chain for economic development, the analytical and policy perspective shifts to the country's domestic value added that is exported. The traditional industrial sectoral data can cover aspects of inter-sectoral upgrading and, to a lesser extent product upgrading (due to the high aggregation of sectors in the data). However, providing evidence of functional upgrading requires an explicit recognition in the economic statistics of the integration of domestic production structure along the business functions of the GVCs, that is for understanding of the interrelationships of goods and value-added services of the business functions of the GVCs. In an aggregated classification of national SUT, the aggregated industrial sectoral data mask which types of value-added activities a country truly specializes in and what value-added shares of the GVC are associated with them. Such value-added activities range from research and development (R&D), design, input sourcing, processing, marketing, distribution, to customer support.

40. The detailing in the classification of business functions of the cross border GVC structures will offer new statistical insights in support of the policy framework for GVCs. It will allow for the policy focus to shift to the business functions that a country is able to carry out, those it wishes to carry out in the future in its consideration of policy measures to achieve functional upgrading. Moreover, it will allow for the attention to shift to tasks emphasizing the role of workers and skills. For GVC entrants, the focus on tasks means to lower barriers to knowledge, including to foreign skilled personnel and individual services, and also includes establishing strong intellectual property rights to attract technology-intensive foreign investors. At the same time, prioritizing business functions requires countries to match talents and services with the necessary infrastructure (physical, digital, and institutional) and cutting-edge technologies. GVC participation allows countries to absorb valuable foreign technology and know-how via imports and foreign direct investment. Increased connectivity—global and within a country—opens opportunities for economic upgrading and ensures that the development potential of technologies reaches a large fraction of the world population.

E. Key Features of Global Value Chain Accounting and Integrated Business Statistics

41. As described earlier, one way to better illustrate and therefore understand the role that GVCs play within the economy is to rearrange and expand the information found in standard macroeconomic accounting frameworks. In the context of national accounting, this is referred to as satellite accounting.

42. The foundation of the GVC satellite account is the System of National Accounts. These statistics are constructed using *The System of National Accounts* (SNA), an internationally recognized framework used to measure economic and financial activity within a country or region; and, it includes a county's

relationships with non-residents. This framework is used by countries throughout the world to record production, incomes, investment, consumption, saving, financial transactions as well as stocks of non-financial and financial assets, liabilities and net worth. The data are organized into a sequence of accounts that articulate the change in wealth from one period to another by tracing the activities of economic agents (industries, households, governments, corporations). The SNA provides a set of concepts, definitions, classifications and accounting rules for compiling and integrating data to give a comprehensive picture of the economy and how it works. Some key measures that emerge from this framework include gross domestic product (GDP), household disposable income, investment, capital stock, productivity, the international balance of payments, government debt and national net worth.

43. One of the strengths of the System of National Accounts lies in its flexibility. While the system lays out the concepts, component accounts and accounting rigor required to produce a set of integrated and internally consistent set of accounts it also affords the compiler the flexibility to vary and in a sense 'extend' (expand or reformulate) the framework to address a specific/emerging need. At the limit this 'extending' is referred to as satellite accounting. There are essentially two types of satellite accounts that can be produced.

44. One type of satellite account involves a rearrangement of the classifications or data (e.g. more detail or alternative aggregations) and possible addition of complementary information to the existing core accounts. These satellite accounts do not change the underlying concepts of the core System of National Accounts but provide an expanded perspective on a particular sector, group of products or activity. The second type of satellite account seeks to change the underlying concepts of the core System of National Accounts. This would involve, for example, changing the concept of production (e.g. including volunteer activities or household work as production), consumption or capital formation. The GVC satellite account is based on the first type of satellite account, where the concepts and boundaries are consistent with the core SNA but additional detail, classifications and presentational changes are used to better identify and articulate GVCs.

45. Because such satellite accounts would be an extension of the existing System of National Accounts and Balance of Payments, they can provide an integrated, consistent, and comprehensive accounting framework that ties new globalization measures, such as trade in value-added from goods and services, and links them to the existing macroeconomic accounts and business statistics. With the further experimentation and testing of national GVC accounts for specific GVC industries with the partner countries in the GVCs, it is expected that analytical value of the extended global accounts will significantly improve. The strength of compiling GVC satellite accounts with a national perspective consistent with partner countries in the network of GVC specific firms will be that countries are able to establish their benchmarks for trade in value added derived from global accounts.

46. One of the most important features of satellite accounts is that they are designed in such a way that they are consistent across economic territories, are consistent through time and are consistent with the greater system of national accounts. It is envisioned that a GVC specific satellite account can be produced by a single country or that countries can collaborate to create a multi-country and GVC specific satellite account. A multi-country GVC satellite account will contain a richer set of information, but the

cost of the additional detail must be considered against the complexity of joint international compilation and timeliness. This concept of geographic boundary is further elaborated in part II.

47. As described in part II, the GVC SUT accounts for specific industries would be compiled from national SUTs with a common breakdown of industries and products among the partner countries involved. In addition, to reflect the governance structure of the GVC, the accounts would include a further breakdown on whether the lead, affiliated and non-affiliated enterprises in the GVC network are foreign- or nationally-controlled and/or a foreign- or national-associate. In a similar way, the list of products explicitly identified in the SUTs reflects the GVC-related products which includes the final product of the GVC and the intermediate goods and services that are used for the production of the final product. Finally, because of the multi-country nature of the SUTs, the trade of these products between the GVC-partner countries would also be explicitly shown.

48. Furthermore, this Handbook outlines the creation of extended institutional sector accounts also organized around industry specific GVCs. The extended institutional sector accounts are the sequence of national accounts (e.g. production, generation of income etc.) with a breakdown of the sectors to reflect the governance structure of the GVC. They would include the following tables (as further presented in part II):

- Extended current account: transformation of value added to income
- Extended accumulation account: foreign controlled non-financial corporations (affiliates)
- Extended balance sheet: foreign controlled non-financial corporations (affiliates)

and potentially the following

- From whom to whom matrix for FDI
- From whom to whom matrix on other investment, derivatives, portfolio investment and official reserves
- Non-financial assets and net worth matrix
- From whom to whom matrix for balance sheet totals