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For discussion and recommendations
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Item 3(b) of the Provisional  
Agenda

## **IN-DEPTH REVIEW ON GLOBAL MANUFACTURING**

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### **I. BACKGROUND**

1. In 2007 the Conference of European Statisticians (CES) established an Expert Group on the Impact of Globalisation on National Accounts. This group was asked to examine how globalisation affects economic statistics and national accounts in particular. By the end of 2011 the findings of the expert group will be published in a Guide *The Impact of Globalisation on National Accounts*, covering a wide range of aspects of globalisation. It also provides recommended solutions and best practices on how to improve the design, processing and use of source data in the compilation of national accounts statistics.

2. In the course of drafting the chapters on industrial processing (chapter 5), merchanting (6) and international transactions in intellectual property (7) quite some attention was paid to the phenomenon of global manufacturing. At a rather late stage in the drafting process it was decided that the issue of global manufacturing would deserve a chapter (8) on its own. Although in a short period of time many aspects of global manufacturing were discussed and presented in this chapter, some important issues were not sufficiently dealt with and needed further attention. On this background the CES Bureau requested Statistics Netherlands to further elaborate on the issue of global manufacturing.

3. This paper summarizes the main findings of the 'in-depth review' of the treatment of global manufacturing. Indeed the review covers broader range of issues related to global production processes and is not restricted purely to manufacturing. Section II gives an introduction to the complexity of the phenomenon. Section III provides a brief overview of existing international manuals, classifications and activities that address issues related to global manufacturing. Section IV highlights the main unresolved conceptual and measurement challenges and suggests future work. Section V includes a proposal to the Bureau to consider establishing an expert group to develop guidance on the unresolved issues related to global manufacturing.

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4. The technical annex attached to this paper provides an overview of examples of global manufacturing as introduced in chapter 8 of the *Guide on the Impact of Globalisation on National Accounts* and further details on the outstanding conceptual issues identified in section III of this paper.

## II. THE ISSUE OF GLOBAL MANUFACTURING

5. Driven by vertical de-integration and outsourcing of non-core activities, and by the desire to enter overseas markets, enterprises are increasingly transferring parts of their production processes to other countries. This phenomenon, also referred to as global manufacturing, is characterised by the increasing economic importance of multinational enterprises. With the growing free trade and, as a result of this, a more globalized economy, cross-border production arrangements have become more common and influence the economies of most countries.

6. Global manufacturing complicates the compilation of national accounts, balance of payments, and other economic statistics. It combines many different international activities of enterprises such as sending semi manufactured goods abroad for processing, merchanting, and the transferring of rights in intellectual property products. For statistical purposes, ideally, a breakdown of globally organized production chains on a country-by-country basis would be needed. In reality, business reporting does not always provide the required information to do so. An additional complexity is that, due to transfer pricing, profit records on a country basis may be tax driven and, therefore, not represent the output and value added of an economy.

7. The lack of a complete and internationally agreed typology of global manufacturing arrangements as well as the missing guidelines on how to treat them cause a lot of confusion among official statisticians around the world. The following points could be highlighted in this regard:

(a) Further clarity is needed on the principles to determine the economic owner of the inputs, outputs and intellectual property products, particularly in the case of affiliated enterprises.

(b) Where production is outsourced, it is important to properly distinguish between “goods for processing” and “merchanting” treatment. This choice may have major implications for recorded trade in goods and services, and uncertainty about the underlying nature of the transactions may introduce discrepancies between national statistics.

(c) Another point that needs follow up is the statistical measurement of the domestic economic activities of multinational enterprises. Recently, several national statistical institutes installed ‘large and complex cases units’ to determine in a customised fashion the economic activities of multinational enterprises carried out in the domestic economy. International exchange of experiences would certainly help to improve the effectiveness of these dedicated units.

8. As global manufacturing has notable economic and social implications it should be carefully treated in statistics and sound and comprehensive international guidance is essential. The new accounting standards, the *System of national Accounts 2008* (2008 SNA) and the *Balance of Payments manual* (BPM6), are better aligned to the economic reality of global manufacturing than their predecessors (1993 SNA and BPM5) and they provide some recommendations on global manufacturing. However, these international guidelines need further clarification on how to treat global manufacturing in practice.

9. The newly endorsed guide *The Impact of Globalisation on National Accounts* discusses in more detail the typology of global manufacturers and the implications of international accounting standards. It underlines a number of important issues to be carefully examined.

### III. PROGRESS MADE

10. According to the new international guidelines, **the 2008 SNA and BPM6**, the recording of import and export of goods is strictly based on the transfer of economic ownership. This has led to simplifications, for example, foreign affiliates engaged in industrial processing are no longer expected to report the value of inputs and outputs they do not own. They merely have to report the processing fee, received from the principal, for the industrial service provided. However, the guidance of the 2008 SNA and the BPM6 on treating complicated cross-boarder corporate structures, such as multi-territory enterprises, special purpose entities and major construction projects carried out abroad, is less clear-cut.

11. The new revision 4 of the **ISIC classification** provides guidance on the classification of global manufacturers. They are to be classified solely based on ownership of input materials. The ISIC considers a unit that outsources physical production activities but owns inputs a manufacturer, while a unit that outsources production without owning the inputs is a trader. The classification based on ownership of materials is consistent with the 2008 SNA, which recommends goods sent abroad for processing, without change of ownership, to be recorded as import of services.

12. In 2007, the Conference of European Statisticians (CES) established an Expert Group to develop a **Guide *The Impact of Globalisation on National Accounts***. The Guide was endorsed by the CES in June 2011 and will be published by the end of the year. Chapter 8 on global manufacturing examines the issue and draws threads from the previous three chapters on industrial processing (chapter 5), merchanting (6) and international transactions in intellectual property (7). Although many aspects of global manufacturing are discussed and presented in this chapter, some important issues are not sufficiently dealt with and need further attention.

13. **The International Merchandise Trade Statistics manual** (IMTS 2010) requires the value of materials sent abroad for processing to be recorded as exports of goods whether change in ownership takes place or not, and the processed goods subsequently returned to be recorded as imports of different goods. The cross-border recording of imports and exports differs from the recommendations of 2008 SNA and BPM6. A recent Global Forum on Trade

statistics recommended further integration of trade and other economic, environmental and social statistics. The Global Forum website is dedicated to the linking of International Trade and Global Business Statistics, including best practices in linking customs data to business registers.

14. In the spring of 2011, Eurostat set up a **Task Force (TF) on Goods for processing**. The TF will take as a starting point the main findings and recommendations of the Guide *Impact of Globalization on National Accounts*. It will go into further details to study the main consequences of the implementation of the new treatment of goods sent abroad in ESA 2010; to identify the need for new data sources; to promote the exchange of experiences and; to propose some practical solutions to the main difficulties encountered.

15. **The 2012 IARIW Conference** will have a parallel session (8A) on ‘how to capture multinationals in the national accounts’, organized by Mark de Haan and Alice Nakamura.

16. There appears to be demand for using national accounts statistics to analyse global value chains. The **OECD database of input-output tables** is currently used for analyses of global structural change based on value added. Another example is the **World Input-Output Database (WIOD)** initiative to develop databases, accounting frameworks and models to increase our understanding of the relationship between economic growth and social cohesion. It goes without saying that eventually this kind of research will substantially benefit from the consistent and internationally harmonised recording of economic activities of multinational enterprises.

#### **IV. OUTSTANDING ISSUES AND PROPOSALS FOR FURTHER WORK**

17. The described developments have advanced the understanding of the accounting aspects of global manufacturing activities and brought international accounting standards closer to the economic reality of businesses. Progress has been made in addressing some of the practical measurement issues. There are, however, **a number of conceptual and measurement challenges that need further attention**. Many of these challenges are identified as major research priorities in the Guide *Impact of Globalization on National Accounts*. A brief summary of the challenges is provided below. For further explanations, please see the Annex.

##### **A. Conceptual issues**

18. Currently, **there is no common typology of global manufacturing arrangements**. More guidance in this area would certainly help to strengthen the international comparability of economic statistics such as statistics on international trade in services (and particularly the recording of intellectual property products) and subsequently the national accounts and balance of payments. Global manufacturing arrangements may vary in respect to concrete output specifications and the ability or willingness of the principal and supplier to take responsibility for the production process. Important aspects to be taken into account are the role of technology along the value chain and knowledge management.

19. Guidance is needed on **identifying the economic ownership of material inputs, intellectual property and outputs** for understanding global value chains. Ideally, the economic engagement of all players in the global production chain should be characterized. The 2008 SNA provides only rough guidance on how to determine economic ownership of products and assets, including intellectual property, within the various establishments belonging to one multinational enterprise. To correctly interpret the transfer of economic ownership, more substantial guidance on how to record intra-company movement of products is required. Transfer of risk is considered an important precondition, but the kinds of risks are not explained, i.e. the risk of bankruptcy, liability of product failure and catastrophic events such as oil spills. Also the distinction between legal and economic ownership needs clarification. In many cases economic ownership will coincide with legal ownership. However, the distinction may become particularly important in trying to understand the nature of transactions taking place within multinational enterprises.

20. According to the current international guidelines, **ownership of material inputs** is the one decisive factor to determine the kind of economic activity of an enterprise outsourcing its production abroad. When owning the inputs the enterprise is supposed to be engaged in **manufacturing**. If not the enterprise is considered a **merchant**. Particularly for the so-called factoryless producers, this distinction based on material inputs seems inappropriate. Enterprises that are generally acknowledged as producers of high-tech consumer products will be considered as traders, despite the fact that they may substantially contribute to the value of consumer products. The criterion currently used does not take into account the increasing importance of intellectual property in global value chains.

21. More careful interpretation of the guidelines on **defining the economic ownership of inputs (and outputs) within multinational enterprises** is needed. Purchasing the inputs is an important indication but not a decisive one. The producing unit may be purchasing its inputs on own account, while the parent ultimately controls the amounts to be purchased and chooses the provider. The ownership of material and other inputs could also be shared between the unit responsible for the processing and the principal. The exchange of experiences between national accountants on how to apply these guidelines in practice is considered highly needed.

22. **Recording of intra-company transfers of intellectual property products (IPP)** and their capital services is very complex and requires further practical guidance. From a conceptual viewpoint determining the **economic ownership of IPP**, especially within multinational operating companies, is particularly a point of concern. When multinational enterprises carry out R&D in centralised units, and do not apply direct invoice methods to recover costs, headquarters or parent companies may by default be considered the economic owner. For the largest business R&D performers with centralised R&D units and several (foreign) affiliates, making supplementary (rough) estimates in the supply-use framework for intra-company R&D capital services flows may be worthwhile undertaking, especially when statistical sources fail to support mapping these (international) intra-company flows of R&D. The intangible nature of intellectual property also means that the ownership could be assigned to a unit in a low tax country while being used in production somewhere else. This may give

rise to the appearance of so-called phantom imports and subsequently distort valued added figures.

23. **Statistical treatment of multi-territory enterprises** requires more consideration and further guidelines. Multi-territory enterprises operate their activities on a temporary or permanent basis over more than one economic territory. Typical examples of such enterprises are airlines, shipping lines and the creation and operation of cross border infrastructure (e.g. bridges, tunnels). Activities abroad may be run as indivisible operations with no separate accounts or management, so that no separate branches can be identified. The creation of so-called notional units is considered useful to allow valued added and employment to be recorded in the national accounts of the country in which substantial construction projects are carried out. However, **splitting the economic activities of multi-territory enterprises into countries** on the basis of ‘prorating’ or the creation of ‘notional units’, does not match very well with the general national accounting principles of economic ownership. It may require a range of imputed transactions which are often difficult to account for in practice. For **large international construction projects**, the presence of local site offices that are in command of local operations and with separate accounts is an important precondition for identifying in an appropriate way a separate foreign establishment. In other less obvious cases, identifying separated units for production activities abroad is not advisable. Anyway, the approach followed by tax authorities may give guidance on how to assign the output of these enterprises to individual countries.

## **B. Measurement issues**

24. A number of **data and measurement issues** have to be carefully considered in respect to recording global manufacturing. The Guide *Impact of Globalization on National Accounts* provides undoubtedly useful guidance and suggests procedures for improving source data, i.e. by direct coverage of multinational activities of a domestic parent company, bilateral or multilateral cooperation in improving business registers and establishing special units on large enterprises within national statistical offices. Several other international initiatives, mentioned in *section II* of this paper will also improve our understanding and measurement capacity in the area of global manufacturing. However, there are still many areas to be studied.

25. Analyzing **data sources** (e.g. business surveys, international trade statistics, R&D statistics, balance of payments statistics, statistics on foreign direct investment) potentially affected by globalization in close correlation with each other preferably at enterprise level would be useful. Several countries have installed special units to consistently observe the largest and most complex multinational enterprises. One important issue to consider is that individual source statistics are not necessarily based on similar kinds of observation units or concepts. This may complicate their mutual comparability.

26. Another issue to be considered is how to **identify companies engaged in international processing and merchanting**. A recent study in Netherlands tried to detect companies either engaged in active processing on the territory of the country or outsourcing production abroad. The results showed that the first group of companies substantially outnumber the second one, which leads to the expectation that the latter are less easily

identified. This gives rise to concerns about understated exports of companies outsourcing parts of their production may subsequently create unbalances in the supply-use framework.

27. The strict ownership based recording of product transactions implies that observations techniques need to be broadened in order to capture product transactions abroad (particularly those connected to merchanting trade) and assets held abroad (such as inventories). Exchange of experiences between national statistical institutes in this area is undoubtedly crucial.

## V. PROPOSAL TO THE BUREAU

28. As shown in the paragraphs above more work has to be done to achieve better understanding of global manufacturing and its impact on the quality of official statistics, and to agree on common statistical treatments for different global manufacturing arrangements. This work needs to be carried out in close international cooperation.

29. **The CES Bureau is invited to consider the creation of an expert group to develop conceptual and practical guidance on the unresolved issues related to global manufacturing as described in section IV.** Draft terms of reference for the group are provided in document ECE/CES/BUR/2011/NOV/3/Add.1.

30. In doing so, the expert group should study the existing practices of countries in relation to the different types of global manufacturing arrangements. The group should also take into account the work of other international initiatives. Continuing to focus too strictly on manufacturing may leave the impression that services and, more importantly, IPPs have a less important role to play in global production arrangements. Therefore it is recommended that the expert group takes a broader view than is suggested by the title of this in-depth review.

## TECHNICAL ANNEX

### A.I. INTRODUCTION

A1. This technical annex provides further background information, especially on the outstanding conceptual issues identified in section III of the main text.

A2. The annex starts with a brief overview of examples of global manufacturing as introduced in chapter 8 of the Guide *The Impact of Globalisation on National Accounts* (the Globalization Guide). This is followed by a more conceptual discussion on key characteristics of global manufacturing arrangements. In the subsequent section a range of accounting issues are addressed that evolve from this conceptual discussion.

### A.II. CHAPTER 8 OF THE GLOBALISATION GUIDE

A3. In chapter 8 of the Globalisation Guide the international accounting recommendations (2008 SNA, BPM6) are reviewed for several cases of global manufacturing. Strictly speaking these examples are not restricted to manufacturing but also address aspects of international construction projects.

A4. The main examples of global manufacturing introduced in chapter 8 are the following.

(a) A company (an oil refinery plant) processes goods while the raw material inputs (crude oil) and product outputs (oil products) are owned by a foreign parent. This example reflects the standard case of industrial processing, as more generally discussed in chapter 5 of the Globalisation Guide. According to the 2008 SNA the output of the processor represents the processing fee while the output of final products is recorded in the production account of the foreign owner. From a conceptual viewpoint this example does not seem to contain any ambiguities.

(b) The second example is a more complicated case of industrial processing in which a production chain is physically stretched between two countries. Semi-manufactured goods are shipped to a foreign affiliate responsible for assembly. Although from a measurement point of view this case is more challenging than the first one, conceptually they differ less significantly. Since also in this case economic ownership of inputs and outputs remain in the hands of the parent company, the industrial processing solution equally applies.

(c) A third case concerns so-called 'factoryless' production. Its accounting treatment is less straightforward and that is probably why this case is presented in an annex (8.2) of chapter 8. Factoryless production differs from industrial processing in a sense that the producer and not the principal purchases (and is considered the economic owner of) the inputs of production. According to the International Standard Industrial Classification

(ISIC)<sup>2</sup>, a unit that outsources physical production activities but owns inputs is a manufacturer while a unit that outsources production without owning inputs is treated as being engaged in trade. As a logical consequence the unit responsible for physical production cannot be an industrial service provider. In other words a relatively insignificant organisational difference of the global value chain completely changes the projected view on the nature of the principal's business (being a merchant instead of a manufacturer). As such the classification and associated accounting treatment of factoryless producers are subject to further discussion. The issue is picked up later on in this annex.

(d) A fourth example in chapter 8 concerns the so-called turnkey projects delivered by project vendors. A project vendor's own contribution to a (large construction) project may be confined to the production technology and project management, product development, contact with the principal and with public authorities in the country which is host to the project, and sales and marketing. The project vendor's output is usually more akin to engineering services or other business services. Many or all of the components may be manufactured by contractors. In many respects the project vendor resembles a factoryless producer. International manuals do not specify precisely how foreign project deliveries should be treated in the national accounts and balance of payments. There are however many similarities to construction projects, for the treatment of which there are guidelines. BPM6 (§4.29) advocates identifying separate branches for substantial construction projects operated abroad and lasting longer than one year. In practice it may not be easy to breakdown the accounts on a territory basis. Other accounting difficulties may be of a more practical nature. The allocation of all project related economic activities to individual countries may be complex and highly data demanding. Another outstanding issue is that ISIC Rev.4 does not seem to give guidance on how project vendors should be classified.

### **A.III. THE ORGANIZATION OF GLOBAL VALUE CHAINS**

A5. A paper by Gereffi et al. (2005) provides useful guidance on how multinational enterprises govern their global value chains. This guidance is helpful in sketching a more comprehensive picture of global manufacturing arrangements. A value chain can be understood as 'the process by which technology is combined with material and labour inputs, and then processed inputs are assembled, marketed and distributed'.

A6. Globalisation implies that value chains are increasingly stretched beyond the borders of one country. This is partly caused by multinational enterprises redefining their core competencies to focus on innovation and product strategy, marketing and the highest value added segments of manufacturing and services, while reducing their direct ownership over 'non-core' functions such as ancillary services and volume production. In this process these enterprises usually benefit from the growing industrial capabilities in developing countries.

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<sup>2</sup> In this regard ISIC is in line with similar recommendations found in the 2008 SNA and in the BPM6. Particularly BPM6 indicates that a global manufacturer who buys goods from an affiliate or other entity abroad and sells them to another affiliate or other entity without significant change in them is engaged in merchanting.

Key in this process is the choice of activities and technologies that are kept in-house and those that are found suitable for outsourcing.

A7. Gereffi et al. (2005) identify three decisive factors which together determine how global value chains are organised:

- (a) The *complexity* of information and knowledge required to sustain a transaction, particularly with respect to product and process specifications;
- (b) The extent to which this information and knowledge can be *codified* and therefore transmitted efficiently without transaction-specific investment between the parties of the transaction; and
- (c) The *capabilities* of suppliers in relation to the requirements of the transaction.

A8. On the basis of these factors two opposite ends of a value chain structure can be identified. The first end represents the straightforward arrangements by markets. Markets work well when product specifications are simple and suppliers are well equipped to make the product in question without the need of specific product information from sellers. Since information exchange along the value chain does play a crucial role, transactions take place without much explicit coordination. Prices are the main decisive factor.

A9. On the other end, fully integrated chains are needed when products are complex, their specifications are not easily codified and competent external suppliers cannot be found. In this situation enterprises will be forced to completely develop and manufacture products in-house. This type of governance is particularly needed when the exchange of tacit knowledge along the value chain is considerable (codification of product specifications is not an option) and the management of inputs and outputs is considered too complex to outsource. At the same time integrated chains may be a way to keep control of resources, particularly protecting secrecy of intellectual property.

A10. Between these two extremes several other forms of value chains are imaginable. When product specifications are easily codified it is practically possible to hand over production to so-called contract manufacturers. Codification of product specifications may be feasible for rather simple products, like apparel, but also for high-tech products, such as consumer electronics. Obviously, the supplier's capabilities, also in terms of rapidly adapting to changing consumer demands or just in time delivery, are a decisive factor.

A11. Suppliers who are flexible in changing product specifications are able to serve a wider range of customers (i.e. factoryless producers). In these situations, suppliers may take full responsibility of production, using often generic machinery that limits transaction-specific investments (the electronics example).

A12. On the other hand when switching costs are high, suppliers (and their principals) may become 'captive'. These situations are characterised by principals that are forced to hold a high degree of monitoring and control (quality management of food chains).

#### **A.IV. ACCOUNTING IMPLICATIONS**

A13. The value chains typology of Gereffi et al. explains that industrial processing type of arrangements, especially when carried out by (foreign) affiliated firms, are particularly conceivable in situations in which the lead firm needs to stay in control. This may be caused by the product complexity, the need to exchange tacit knowledge supplementary to the exchange of codified knowledge, the need to protect intellectual property or to effectively manage complex webs of inputs and outputs.

A14. Handing over full production to external producers corresponds more closely to factoryless type of value chain arrangements. Possibilities of codifying product specifications may lead to situations in which firms hand over production to others, specifically when there is a lesser need to stay in full control. This outsourcing, often to low labour cost countries, is in most cases cost driven.

A15. One important aspect of value chains governance underlined by Gereffi et al. is the crucial role of technology and knowledge management. This is why global value chains constitute much more than simply a sequence of interlinked markets. Value chains are importantly characterized by the information streams required to connect principals and suppliers. This knowledge aspect of global value chains has clearly a linkage to management and exchange of intellectual property.

A16. In a national accounting context the value chain characteristics highlighted in figure 1 may be relevant to distinguish to obtain a better understanding of the nature of transactions that take place between the principal and supplier. The figure reflects the most likely combinations of economic ownership of inputs, including those derived from intellectual property products, and outputs. The figure is based on the assumption that there is a clear view on how economic ownership is assigned to either the principal or supplier. In reality this picture may be quite blurred.

A17. Figure 1 shows the various possible engagements of a principal and a supplier in global production arrangements. The figure indicates the extent to which principal and supplier are participating in the global production chain in terms of production and does not necessarily designate direct investment relationships. The supplier may, or may not, be owned by the principal. The figure provides at least two important messages. Firstly, it stresses that economic ownership of material inputs does not necessarily coincide with economic ownership of outputs. Secondly, while figure 1 shows a variety of value chain arrangements in terms of ownership of material inputs, intangible inputs and outputs, the international guidelines consider ownership of material inputs the single decisive factor in determining the economic engagement of supplier and principal. Both issues are further discussed in this section.

A18. However, this section starts off with a discussion on affiliation. Since in the case of intra-company movement of products, imputation of ownership change is no longer the

standard, the possible consequences of affiliation between supplier and principal need to be reconsidered and well understood.

A19. The role of intellectual property in global value chains is picked up in the last part of this section.

**Figure 1**  
**2008 SNA/BPM6 based typology of value chains**

		Economic ownership of			Economic engagement in terms of production
		a) material inputs	b) intellectual property	c) outputs	
1.	Principal	+	+	+	Manufacturer
	Supplier				Industrial service provider
2.	Principal		+	+	Merchant
	Supplier	+			Manufacturer
3.	Principal		+		Principal acts as parent and is not engaged in production of goods. Parent is responsible for supply of knowledge inputs.
	Supplier	+		+	Supplier is as an independently operating branch engaged in manufacturing.
4.	Principal				Principal is not connected to the value chain and may act as (foreign) direct investor.
	Supplier	+	+	+	Supplier is an independently operating company or branch.

### *Affiliation*

A20. The fact that a supplier is affiliated to the principal is not a decisive factor in classifying their mutual transactions. However, when supplier and principal are affiliated, at least two issues need to be taken into consideration. Firstly, economic ownership of inputs, outputs and intellectual property may be difficult to determine and this may complicate a sound interpretation of source statistics obtained from these enterprises. In the 2008 SNA economic ownership is leading (§3.27), in contrast to legal ownership. Economic and legal ownership may not coincide when considering the various establishments of one multinational enterprise. The legal owner of fixed assets and inventories is the institutional unit entitled in law and sustainable under the law to claim the associated benefits. This will usually be the parent company. The economic owner is the institutional unit entitled to claim the benefits associated with the use of the entity in question in the course of an economic activity by virtue of accepting the associated risks.

A21. Transfer of economic ownership coincides with transferring risks and benefits of holding an asset. The 2008 SNA (§6.86) mentions that when the establishments involved in the transfer of a commodity belong to the same enterprise, there is no change of (legal)

ownership since both establishments have the same owner. However, the principle of transferring risk, which accompanies change of economic ownership, can still apply. Also discretion about the use of inputs in production is an indication that economic ownership has been transferred. Determining the economic ownership of intellectual property is particularly a point of concern.

A22. Secondly, intra company transfer of goods and services may be subject to transfer pricing. The SNA mentions (§3.132) that replacing book values (transfer prices) with market-value equivalents is desirable in principle but difficult to do (and not without risk of making wrong judgments) in practice. The goods exchanged between affiliated enterprises may be unique, for example, specialized components, management services, services related to intellectual property. For that reason equivalent market prices may be hard to find. Perhaps one comfort is that many governments have adopted transfer pricing rules for income tax statements as laid down in the OECD transfer pricing guidelines for multinational enterprises and tax administrations (OECD, 2010). These rules may assure that prices charged are not too far from an arm's length range.

### ***Ownership of inputs***

A23. Following the international guidelines, specifically ISIC Rev.4 (Introduction – Section 5) and BPM6 (§10.42), the economic ownership of material inputs is the main decisive factor. When the principal is the owner, the supplier provides to the principal an industrial service and the turnover of the completed output will be shown in the books of the principal. The latter is considered being engaged in manufacturing. Examples given in BPM6 (§10.63) of processes that are often undertaken under arrangements for manufacturing services on physical inputs owned by others include oil refining, liquefaction of natural gas, assembly of clothing and electronics, assembly, labelling, and packing.

A24. When the supplier purchases all material inputs, and is considered the economic owner of inputs, its output can no longer be considered a processing fee. Instead it is supposed to reflect the full value of its product output. The principal company represents logically the purchaser of this output. This makes the principal company being engaged in trade and not in manufacturing.

A25. In some cases identifying economic ownership of inputs may require a careful judgement. Purchasing the inputs is an important indication but not a decisive one. Especially within multinational enterprises a producing unit may be purchasing its inputs on own account, while the parent ultimately controls the amounts to be purchased and chooses the provider. Under such conditions the parent probably acts as the economic owner of inputs.

A26. In national accounting terms one should be aware that any inventories of inputs or outputs held at the location of the processor abroad must be added to the inventories of the principal in the domestic economy. In other words, changing from SNA 1993 to 2008 SNA implies among other things that the observation of inventories much be stretched to those held abroad.

***Factoryless production***

A27. It is somewhat regrettable that this typology of economic activity solely based on economic ownership of physical inputs does not take into consideration aspects such as economic control of manufactured output or inputs from intellectual property. This apparent deficiency becomes particularly clear in the discussion on factoryless producers. Enterprises that are generally acknowledged as producers of high-tech consumer products should, according to these recommendations, be considered as merchants and their main output will be accounted for as trade services. Enterprises that outsource only a limited part of their production to (foreign) contract manufacturers may, according to ISIC Rev.4, still be classified as manufacturers. However, any activity (e.g. management, logistics, R&D, marketing) they carry out in connection to production abroad will, according to international guidelines, be reflected in the national accounts as trade services.

A28. One may argue that representing the contribution of factoryless enterprises to global production chains in terms of trade services provides a distorted picture of their economic significance in national accounting. One may argue that the international guidelines tend to disguise the economic importance of companies that are generally acknowledged of being highly knowledge intensive. The value creation of factoryless companies may represent a large share of consumer product values. The classic 'iPod' case shows that a large part of the wholesale value represents the reward of intellectual property, design, marketing assets in the hands of the well-known US factoryless company (cf. Linden et al. 2007).

A29. This aspect of value creation based on intellectual property inputs also brings into question the meaning of economic ownership. ISIC Rev.4 claims that a unit outsourcing physical production activities without owning inputs is treated as being engaged in trade. However, the factoryless enterprise may own the blue prints of production and the trademarks leading to consumer trust. It may also control the channels of delivering products to consumers. It may to some extent determine consumer prices. The contract manufacturer does not do anything than delivering predefined products at predetermined prices. It is unlikely that its output can be sold to other parties. Although contract manufacturers may independently purchase the material inputs of production, they will not necessarily become the economic owners of their output.

A30. One may conclude that ISIC Rev.4, 2008 SNA and BPM6 follow in this regard a rather obsolete notion of production. According to the international guidelines ownership of material inputs is decisive in classifying a producer and its principal, irrespective of who controls the required intangible inputs. As such one may conclude that ISIC Rev.4 fails to bring properly into the picture the growing role of intellectual property in global production chains.

A31. BPM6 indicates that a manufacturing service fee could include the cost of materials purchased by the processor. This suggests that ownership of the physical inputs may in reality to some extent be shared between the unit responsible for transformation and the principal. There appears to be a grey area. It will rarely be the case that all material inputs will be directly purchased by the principal. For example an oil refinery plant processing crude oil

under the authority of a principal may still, on own account, purchase the required additives needed to produce particular oil products. In such cases, the processing fee is indeed likely to include the value of these additives in addition to labour and capital costs.

### *Intellectual property*

A32. Chapter 7 on international transactions in intellectual property of the Globalisation Guide covers at least two important issues. Especially in the context of the new guidelines on R&D capitalisation, one should carefully classify income streams from intellectual property either as property income (in the case of non produced assets such as trademarks and franchises) or as services (in the case of fixed assets such as R&D, computer software and artistic originals).

A33. A second issue concerns identifying the economic ownership of IPP within multinational operating companies. Intellectual property can be exchanged by pushing the button of a computer and this may complicate the statistical observation of intellectual property product flows. The intangible nature of IPPs means that they can easily be registered as the property of a unit in one country while being used in production by another enterprise located somewhere else. In chapter 7 this issue of ownership is particularly discussed in the context of subsidiaries (brass-plate companies) situated in countries with low-lax rates that are given the legal ownership of intellectual property. Lipsey (2010) introduces in this context the notion of “phantom imports” which are services that are domestically produced but attributed by multinational enterprises to the foreign affiliates in low tax countries.

A34. As also concluded in chapter 7 a legitimate question arises about who the economic owner of intellectual property is, as opposed to the legal owner. The 2008 SNA does not provide much guidance in this regard. The issue of economic ownership is not only relevant in the context of tax driven brass-plate companies, but more broadly for measuring the intra-company flows connected to the creation and economic use of IPPs.

A35. Differences in the organisation of R&D programs of multinational enterprises, as for example observed by Van Rooijen-Horsten et al. (2007), are illustrative in this respect. Some enterprises may concentrate their R&D in specific units which are responsibly for R&D on demand of intra-company users or external clients. In addition these units may receive funding (from headquarters) for basic research, not directly initiated by (intra company) “customers”.

A36. In contrast, decentralised models may also be applied in which R&D is closely connected to the beneficiary business units. Van Ark et al. (2008) observe a tendency of enterprises to shift particularly the development part of R&D towards business units, combining the efforts of researchers, marketers, designers and production engineers in ensuring the commercial success of newly developed products. Basic research, crucial for a firm’s longer term innovation strategy, may still be carried out in the close neighbourhood of headquarters.

A37. Other models exist as well. Some enterprises maintain worldwide interconnected research programs. Under such circumstances identifying economic ownership of intellectual property on a country-by-country basis becomes particularly complex.

A38. The R&D cost redistribution methods may also differ considerably between multinational enterprises. These may either be based on a direct invoice principle (pay on demand), on the (expected) benefits obtained by particular business units, or may be totally unrelated to expected benefits. The applied internal R&D funding mechanisms largely determine the feasibility of statistically observing intra-company R&D flows. Surveying intra company R&D service flows on a country-by-country basis seems most promising when multinationals use direct invoice methods. Other (indirect) cost recovery methods may less easily provide possibilities to survey intra-company R&D flows. Therefore the information multinational enterprises may be providing in response to questions in the R&D survey on funding of R&D received from abroad, or to questions in the international trade in services statistics, may not necessarily address actual cross-border (intra-company) transfers of R&D assets or capital services, and should therefore be interpreted with caution. Generally, one may expect the international trade in services statistics to underreport on intra-company R&D imports and exports. When multinational enterprises carry out R&D in centralised units, and do not apply direct invoice methods to recover costs, headquarters or parent companies may by default be considered the economic owner.

A39. However, this R&D is likely to support innovation in various affiliated companies of the multinational enterprise. Scientific knowledge may be provided by the parent to a (foreign) subsidiary without a direct fee, but in the expectation of receiving higher profits. In effect, the parent provides a capital service to its affiliates without receiving any direct compensation. As explained in chapter 7 of the Globalisation Guide this delivery of R&D may be understood as an increase in foreign direct investment of the parent in the foreign subsidiary.

A40. For the largest business R&D performers with centralised R&D units and several (foreign) affiliates, making supplementary (rough) estimates in the supply-use framework for intra-company R&D capital services flows, and corresponding direct investment flows in the institutional sector accounts, may be worthwhile undertaking. However, this can only be done properly on a case-by-case basis. Without such supplementary estimates, R&D in the balance sheets of parent companies may omit any linkage to its use in production.

A41. Such calculations are only meaningful in cases in which headquarters is not directly involved in production abroad other than providing R&D and is not identified as the economic owner of the associated output (i.e. example 3 in figure 1). In cases in which headquarters is identified as the economic owner of the output generated abroad, the corresponding R&D services are expected to be consumed (as consumption of fixed capital) by headquarters itself, and not by its foreign affiliate. In addition, in this case headquarters is expected to consume (as intermediate consumption) the industrial services provided by its foreign affiliate.

A42. One should be cautious not to create asymmetries in the R&D balance of trade by neglecting the possible transfers of R&D from foreign parents to their affiliates in the domestic economy. The possible supply of intra-company R&D services to foreign affiliates is expectedly easier to observe than the reverse situation, i.e. the use of R&D services obtained from foreign parent companies by affiliates in the domestic economy.

#### **A.V. MULTI-TERRITORY ENTERPRISES**

A43. Another case of global manufacturing, or perhaps one should say global enterprising, resembles those enterprises that operate their businesses on a temporary or permanent basis over more than one economic territory. Examples given in the 2008 SNA are airline companies, hydroelectric schemes on border rivers, operators of bridges, tunnels etc. Activities abroad may be run as indivisible operations with no separate accounts or management, so that no separate branches can be identified. When separate accounts cannot be identified, their economic activities should be 'prorated' (2008 SNA, §26.35) with the purpose of splitting and assigning their economic activities between the various economic territories in which they operate.

A44. Concerning temporary production activities 2008 SNA (§26.11) and BPM6 (§4.29) indicate that major construction projects (e.g. bridges, dams, power stations) carried out abroad that take a year or more to complete, and that are managed through a local site office, satisfy the criteria for identification of a branch. If this is the case the output of the construction project should be recorded in the accounts of the country in which this project is carried out. Smaller short-term construction operations may not satisfy these conditions. In those cases, the work provided to customers resident in the territory of those operations is classified as international trade in construction and included in services. It is unclear whether these guidelines equally apply to project vendors responsible for substantial turnkey projects carried out abroad.

A45. The European System of Accounts (ESA Draft version of 20 December 2010, §2.07) more generally recommends identifying separate (notional) units for all entities with substantial operations in two or more countries. This logically applies to project vendors, and construction companies alike, that operate substantial projects in more than one country.

A46. However, assigning the project's output to notional units does not seem to correspond very well to the general national accounting principles of economic ownership. For example, it is difficult to imagine these notional units being engaged in negotiations with customers about contracts. This is usually the responsibility of the foreign parent. The foreign parent will equally be held responsible for project risks, not the domestic notional unit. The latter exists only for statistical purposes.

A47. The creation of notional units is quite likely considered useful to allow valued added and employment to be recorded in the national accounts of the country in which substantial construction projects are carried out. But this recommendation has a price. It requires not only the creation of artificial establishments. It will also lead to a series of imputed transactions such as product imports/export (including those related to movements of capital goods)

between the foreign legal entity and the domestic notional unit and imputed returns on direct investment. In other words, the introduction of notional units in these cases seems an unfortunate exception to the general rule of not imputing import or export flows.

A48. The 2008 SNA and BPM6 are more prudent in advocating the use of notional units for large construction projects. As indicated, the presence of a local site offices and separate accounts are mentioned as precondition for identifying separate branches. But even under these conditions the principles of economic ownership may still be unclear. One may question the extent to which these branches truly operate independently from the foreign parent abroad. Also one may question whether exchange of intermediate and capital goods between parent and branch can be understood, and accounted for, as economic transactions.

A49. More broadly this issue seems closely related to research item 2 in Annex 4 of the 2008 SNA. This item suggests conducting research in national accounts based on consolidated enterprise groups as it becomes increasingly complex, and less meaningful, to define the outputs, inputs and intellectual property of its individual member companies.

## References

- Ark B., van, S.M. Dougherty, R. Inklaar & R.H. McGuckin, (2008) The structure of business R&D: recent trends and measurement implications, *International Journal of Foresight and Innovation Policy*, 4:1-2.
- European Commission, International Monetary Fund, Organisation of Economic Cooperation and Development, United Nations & World Bank (2009) System of National Accounts 2008, United Nations (New York)
- Gereffi, G., J. Humphrey & T. Sturgeon (2005) The governance of global value chains, *Review of International Political Economy*, 12:1.
- International Monetary Fund (2009) Balance of Payments and International Investment Position Manual (BPM6), IMF (Washington D.C.)
- Linden, G., K.L. Kraemer, & J. Dedrick (2007) Who Captures Value in a Global Innovation System? The case of Apple's iPod. UC Irvine: Personal Computing Industry Center (<http://escholarship.org/uc/item/1770046n>)
- Lipsey (2010) Firm globalization, intangible assets, and the measurement of national output and trade, paper prepared for the general conference of the international association for research in income and wealth (St. Gallen).
- OECD (2010) OECD transfer pricing guidelines for multinational enterprises and tax administrations, OECD (Paris).
- Rooijen-Horsten, M. van, M. Tanriseven & M. de Haan (2007) R&D satellite account for the Netherlands: a progress report, Paper prepared for the OECD Working Party on National Accounts, 3-5 October 2007 (Paris)
- United Nations Economic Commission for Europe (2011) The Impact of Globalisation on National Accounts, UNECE (Geneva)

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