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**Draft Chapter 3
Recording Transfers of Intellectual Property Products (IPP) Inside
Global Production Chains**

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1. Introduction

1. Intellectual property products (IPP) – the results of research and development (R&D), mineral exploration and evaluation, computer software and databases, entertainment, literary and artistic originals - are often transferred between production units and countries in the framework of global production. The difficulty in recording such transfers is due to the intangible nature of IPPs and to the organization of enterprises involved in global production. Both of these factors make it difficult to collect data and to determine the value and ownership of IPPs. The problems affect estimates of imports and exports in the national accounts, the balance of payments, estimates of capital formation and value added in the national accounts, and input-output estimates.

2. Below recommendations addressing conceptual and methodological problems are presented.

3. The conceptual recommendations include further guidance on the determination of economic ownership of IPPs, which have not been covered in the general clarifications in chapter 2.

4. The methodological recommendations include various presentations of accounting for the production, capital formation, transfer between countries, and use in production of IPPs. The recommendations take account of the SNA 2008 recommendations, and the IPP manual prepared at the OECD. Various ways of accounting for flows related to IPPs, such as charges for use of IPPs, capital transfers, and direct foreign investments are also presented. Recommendations are given for accounting in cases of missing information, to handle the difficulty of observing flows due to IPPs within multinationals.

5. Since information on use of IPPs in production is very useful for input-output tables and analysis of production, the importance of separation of cases, where it may be assumed that the IPPs owned by the principals in global production that are not part of multinational enterprises, are used in production by the suppliers without change of ownership, is also mentioned.

6. Methods of collection of data on production and transfer of IPPs are recommended, drawing on existing experience. Suitable frameworks for such data collection are proposed, such as the globalisation surveys conducted by OECD countries for multinational enterprises.

2. The problems with recording international transfers of IPPs

2.1 Problems with recording IPPs within multinational enterprises

7. Multinational enterprises divert production to countries in order to maximize revenues and reduce global tax burden. They have acted in this manner with the production of IPP products, following the development of worldwide IIP legislation, and the production of IPPs becoming more modular. Among the considerations for placing production of intellectual property products (IPPs) in a certain country are: tax discounts, the availability of capable and innovative labour, cheap wages, and good infrastructure for carrying out development of IPPs. Since there are advantages in centralizing IPP production, such as a common infrastructure, synergies between researchers/developers and proximity to major research institutions, multinational enterprises will often concentrate IPP production in centralized units.

8. However, the use of the IPPs in production in most cases will take place in production units placed in many other countries. This means that the multinational enterprises have to enable access to the IPPs across countries, and will seek to do so at minimum costs.

9. Since the IPPs themselves are intangible, and need not pass through customs, it is difficult to identify and track transactions involving IPPs, and such transactions may not be covered in administrative data in a satisfactory way.

10. Even when the transactions are covered in administrative data, there may be problems. Since many of the IPPs developed within the multinational enterprises are unique, and don't have a market price, the value of the IPP is usually determined by sum of costs plus a minimal mark-up to approximate to a market price.

11. This means that the international trading in IPPs as well as associated payments for the use of the IPPs within the multinational enterprises may not be covered in statistics, and even if they are covered, they may be undervalued.

12. An additional difficulty is that multinational enterprises may choose to place the legal ownership of IPP in one country rather than another due to variations in tax regulations or IP regulations rather than economic reasons. A NBER paper from 2005 by Branstetter, Fisman and Foley found a considerable influence of the IP legislation on transfer of IPPs. And a 2009 paper by Dischinger and Riedel from the University of Munich, using panel data on European MNEs and controlling for unobserved time-constant heterogeneity between affiliates, found that the lower a subsidiary's tax rate relative to other affiliates of the multinational group the higher is its level of intangible asset investment.

13. This means that even if an IPP is produced by the enterprise in country A, the ownership may be registered in country B, while the IPP is used in country C. The multinational enterprise may not register payments between the countries, so that it is necessary to consider how to account for the use of the IPP in the different countries.

14. It should be mentioned that the importance of this problem may decrease, if MNE's accounting records and the regulations of countries' tax authorities become aligned to the OECD transfer pricing guidelines mentioned in chapter 2.

2.2 Problems with accounting for the use of IPPs in connection with global outsourcing

15. When global production is not performed within a multinational enterprise, the principal enterprise will in many cases order production by a supplier and let the supplier use IPP's developed within the principal enterprise free of charge.

16. Again service provided by IPPs may not be identified and tracked and may not be covered through administrative data in a satisfactory way.

17. In this case ownership of the IPP is known – the IPP remains the property of the principal. Since no ownership has been transferred, in accordance with SNA recommendations there is no transaction involving the IPP itself. But for purposes of input-output calculations, it could be very useful to know the value of the service provided and used in production by the supplier.

3. Former discussions of the problems of recording international transfer of IPPs

3.1 OECD "Handbook on Deriving Capital Measures of Intellectual Property Products"

18. The OECD publication "Handbook on Deriving Capital Measures of Intellectual Property Products" related to the problems of collecting data on international trade in IPPs due to lack of proper classifications in the Balance of Payments statistics, and proposed the addition of details to classifications – a proposal that has been adopted in the latest Balance of Payments recommendations.

19. The Handbook also described the statistical challenges of measuring the movement of IPPs between affiliated enterprises in different countries in chapter 1 par. 5.2. The original paragraph is reproduced here:

"...The key difficulty reflects the fact that monetary transactions, implicit or otherwise, that are explicitly identifiable with the IPP are rarely recorded by either party. When an IPP is provided by one affiliated enterprise to another, either in its entirety or via a license to use or reproduce, a number of possibilities for recording the transaction arise:

- a. There is either a sale or licence agreement between the provider and the recipient: the provider provides access to the IPP in exchange for a fee that is observable and should be recorded in the BOP and SNA goods and services accounts.*
- b. There is a capital transfer from the provider to the recipient, i.e. the IPP should be recorded in the BOP and SNA capital accounts, but it is very likely to go unrecorded.*
- c. The IPP is provided by the parent to a foreign subsidiary without a fee but with the expectation of receiving property income in the future. In effect, the parent is providing the IPP for a fee and then using the fee to increase its foreign direct investment in the subsidiary. This, too, is likely to go unrecorded. Both this and the case below include access related to reproduction rights without explicit observable fees charged.*
- d. The IPP is provided to the parent by the foreign subsidiary without a fee but in response to previous foreign direct investment. In effect, the parent is receiving the IPP in lieu of property income. This, also, is likely to go unrecorded unless steps are taken to monitor what is happening to the output of foreign-owned units created to undertake the production of IPPs. Transactions between affiliates also impact on the valuation of the original IPP. In effect, there are two possibilities, when transactions occur:*
- e. The aggregate value of the asset has increased within the multinational: in other words the expected present value of future benefits has increased, as could occur, for example, if the multinational acquired a new affiliate and so obtained economic rights within a country that*

were not expected at the time of the original valuation. This would be recorded in the other changes in the volume of assets account of the provider. Such recordings have been rare in practice. A consequential difficulty is related to the split, if any, of the asset across the different countries where economic rights exist.

- f. The aggregate value of the asset has not changed: the provider expected to share the asset in some way at the time it was acquired. In other words the original valuation reflected the scope for its use across different countries.

Clearly significant problems related to these flows implicit or otherwise exist. Moreover, the current scope for fully articulating such flows in the accounts is restricted by the sources of information available to measure them."

20. But the publication did not present any solutions to these problems, and the last part of paragraph 5.2 says: "Evidently the national accounts should reflect economic reality, and changes in ownership of IPP assets and the associated transactions should be recorded. However, current data sources generally do not identify transactions such as (b), (c), or (d), above, and, so, it is generally not possible to record them in the accounts. Further research is needed to identify ways of obtaining the values of transactions between affiliated units and their nature. Likewise, if the aggregate value of the asset has changed it should, in principle, be recorded in the accounts but this too is stymied by a lack of information and so is also a matter for further research."

3.2 UNECE Guide "Impact of Globalization on National Accounts"

21. In the publication "*The impact of globalization on national accounts*", the problems in measuring the value of IPPs and their associated services were discussed in chapter 7, and conceptual and measurement problems were reviewed. In particular, the question of economic ownership of the IPP as opposed to the legal ownership was discussed, since the question of ownership is critical in deciding how to record the various flows in the national accounts – the ability to register the flows as directed in the OECD Handbook, presupposes a correct determination of ownership.

22. Paragraph 7.8 of the Guide related to the special character of IPPs, which complicates the measurement of ownership: "*The intangible nature of IPPs means that they can easily be registered as the property of a unit in one country when they are used in production by an enterprise located in another.*", and how this leads to problems of registration of ownership due to tax incentives: "*This characteristic creates an incentive for companies to register their IPPs as owned by a unit in a low-tax jurisdiction...This shifts value added from the parent company to the affiliate, although the global production function of the parent company remains the same.*"

23. The Guide explained that the SNA does not give explicit guidance on determining economic ownership within multinational enterprises, and said in paragraph 7.9 that: "*Developing this guidance will require further research at the international level to clarify the existing standards...*".

24. Paragraphs 7.35 to 7.41 also discussed the need to develop such guidance, and warned of a lack of comparability between national accounts in different countries until such guidance was developed – for example in paragraph 7.40: "*Some countries for example may treat unidentifiable income implicitly generated by IPPs registered in their country as property income, whilst others may take the view that it arises from production of services.*"

4. The determination of economic ownership in the case of IPP's

25. The recording of transfers linked to IPPs depends upon the ability to determine the economic ownership of the IPPs. Since a large part of IPPs are fixed assets, determining economic ownership is also important for recording capital formation and flows in future periods.

26. Chapter 2 outlines the guidance and indications given in SNA 2008 on criteria for determination of economic ownership in general, and in the special case of transactions between affiliates.

27. The criteria for determining economic ownership of an entity relate to acceptance of risks and rewards, where acceptance of risks involves responsibility for repairs and maintenance of the entity, and for the ultimate loss of the entity. As explained in chapter 2, in the case of IPPs maintenance can be taken to mean the responsibility of paying for fees for patents, copyrights or other registrations of the entity. Ultimate loss is not so relevant in the case of IPPs – value may go down, but it isn't lost in the way a tangible good is.

28. Rewards can be income received directly from sales of the entity, or income received for the use of the entity in production. Sales of an entity may be measured, but sales of IPPs are not so common. The second kind of income - from the use of IPPs in production - is more relevant in the case of IPPs, but may be difficult to measure.

29. As pointed out in chapter 2, a special treatment is required for the use of IPPs in multinationals, and it seems necessary to recommend certain conventions for registering some of the flows of IPPs within multinational enterprises.

30. It also seems necessary to define, when such conventions are needed – which minimum degree of control indicates that the units are part of one multinational enterprise, where it may be difficult to determine separate ownership.

31. In order to develop such conventions for registration of IPPs, it is also important to consider, which flows and stocks of IPPs can be measured in a reliable manner, and which other data are available that might indicate how production and external flows should be accounted for.

32. Section 3.5 below discusses the measurement of flows and stocks of IPPs, and possibilities of using the data measured for attributing economic ownership. In part 3.6 certain conventions for registering ownership in the national accounts are proposed and presented in a decision tree. The decision tree may serve as a tool supporting the recording of transactions of IPP's in the national accounts and the balance of payments, when only limited information is available. Examples of the use of the decision tree are given in section 3.7.

5. Measurement of flows and stocks of IPP's and possibilities of classification by economic ownership

33. Ideally economic ownership could be allocated on the basis of information on use of IPPs, the bearing of risk, and the receipt of benefits from IPPs. But as explained above, due to the intangible nature of IPPs, their measurement is more difficult than the measurement of tangible goods and the necessary information may be missing. However, the problems of measurement have been acknowledged for a long time, and international recommendations for measuring some of the flows have been given in various frameworks.

34. The measurement of production is perhaps the most developed. Firm recommendations for measurement of expenditure on production of R&D have been given in the OECD Frascati manual: "Proposed Standard Practice for Surveys on Research and Experimental Development" (the first edition was published in the 1960's), and internationally comparable R&D expenditure data are collected for about 90 countries by the OECD and UNESCO. Recommendations for measurement of production of all types of IPPs were given in the OECD Handbook from 2010 mentioned above. In most cases it is possible to place the production of IPPs in one establishment (and one country), if an enterprise has more than one establishment.

35. Specific surveys on multinational enterprises also include the measurement of production of R&D. The globalisation surveys recommended in the OECD handbook "Measuring Globalisation OECD Handbook on Economic Globalisation Indicators" from 2005 include such measurement, and are implemented in a number of countries – see table 1 below. The countries in the European Union are also obliged to compile similar statistics on foreign affiliates according to regulation (EC) No 716/2007 of the European Parliament and of the Council of 20 June 2007 on Community statistics on the structure and activity of foreign affiliates, and there is a Eurostat manual on FATS (Foreign Affiliate Statistics) from 2012. Although both the OECD recommendations and the Eurostat regulations include more statistics on inward activity than outward activity, which is only partially covered, the combination of data for various countries to obtain a fuller picture seems possible.

**Table 1: Inward activity of multinationals in OECD member countries
total business manufacturing (ISIC Rev 3)**

2007

Millions national currency

	Production	Turnover	Value added	Compensation of employees	R&D expenditures	Gross fixed capital formation	Total exports	Total imports	Intra-firm exports	Intra-firm imports	Gross operating surplus	Technological payments	Technological receipts
Australia	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	..	2,585	..	..	..	..	..	..	..	..
Canada	935,981	..	..	..	5,622	58,397	..	..	..	..	80,244	..	..
Czech Republic	3,972,249	5,178,954	1,165,109	459,324	18,960	313,997	..	..	..	..	535,100	44,210	33,009
Denmark	..	797,083	..	..	..	..	..	..	..	..	..	..	..
Estonia	6,981	10,892	2,495	1,309	..	606	3,707	..	..	..	..	..	..
Finland	..	79,334	17,305	10,372	..	2,181	..	..	..	..	..	..	..
France	..	873,784	214,635	119,846	5,161	36,235	205,982	..	..	..	94,789	..	..
Germany	..	..	..	..	11,208	..	..	..	..	..	..	12,167	15,152
Hungary	..	..	..	..	82,427	..	..	..	..	..	..	528,758	354,217
Ireland	..	..	..	..	1,160	..	..	..	..	..	..	..	..
Israel	104,269	..	47,295	..	16,563	..	59,700	34,083	42,081	12,574	..	..	..
Italy	..	472,420	86,401	..	2,590	16,132	76,667	138,673	33,479	86,560	..	..	..
Japan	..	29,778,702	5,079,069	2,159,069	710,480	1,009,699	5,408,192	6,296,407	1,182,931	3,108,673	1,936,632	191,096	..
Luxembourg	..	..	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	..	..	..	..	..	..	..	..
Norway	..	..	..	..	5,294	..	..	..	..	..	..	..	..
Poland	..	722,823	..	..	622	42,828	215,584	..	..	..	..	..	..
Portugal	..	..	..	..	234	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	42	..	..	..	..	..	..	..	..
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	..
Spain	..	..	..	..	..	..	..	..	..	..	..	..	..
Sweden	1,384,643	2,078,054	480,208	312,632	28,572	86,085	483,872	519,506	..	..	178,894	..	..
Switzerland	..	..	..	..	..	..	..	..	..	..	..	..	..
Turkey	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	542,769	872,788	216,411	101,882	6,164	23,598	..	..	..	..	103,102	..	..
United States	..	3,340,722	680,605	408,273	40,967	..	217,560	550,917	107,845	427,160	115,084	14,969	3,241

data extracted on 06 Feb 2013 09:51 UTC (GMT) from OECD.Stat

36. As explained above, data on international flows in connection with IPPs (trading in IPPs and services of IPPs) between establishments are difficult to obtain. Flows between unaffiliated enterprises are accounted for in financial reports in cases of sales or leasing, but due to the nature of IPPs, are not always tracked and registered in customs, banking and similar administrative data, and may not be evaluated at market prices.

37. For affiliated enterprises the data on such flows in financial reports may be partial or may be entirely missing. Even if flows are recorded, the values of the flows in the financial reports may not be evaluated at market prices, and will usually not be tracked and registered in administrative records.

38. However, measurement of international flows in connection with IPPs is under development: Recently updated international recommendations for defining/classifying services transactions have been published by in the “Manual on Statistics of International Trade in Services 2010” (MSITS 2010), UN, 2011. The recommendations include both separation of data on services of IPPs, and data related to multinational - inwards and outwards foreign affiliates.

39. Currently data on flow of services are collected in quite a few countries, and countries report details on exports and imports of R&D, software and other IPP's according to the Extended Balance of Payments of Services (EBOPS) classification presented in MSITS.

40. Data on flows of funding of R&D are also collected from enterprises in the surveys on R&D, conducted according to the Frascati framework mentioned above (see table 2 below). But as is also explained in the annex on statistics in The Netherlands, currently the classification of the flows of funding used in these surveys differs from the SNA classifications, and the data are not quite suitable for recording in the national accounts and the balance of payments. However, these problems have been discussed at recent OECD meetings, and some countries have started to collect detailed data on funding that may be used in national accounts and balance of payments.

**Table 2. Source of funds of gross domestic expenditure on R&D of business sector
2007**

Million national currency

	Total	Business enterprise	Sub-total government	Higher education	Private non-profit	Funds from abroad			
						Total	Foreign Business Enterprises	Thereof:	
								Enterprises within same group	Other business enterprise companies
Australia	15,047	14,433	423	5	1	186	..	..	..
Austria	4,846	3,214	498	2	2	1,131	1,087	718	369
Belgium	4,420	3,691	250	1	2	475	414	361	52
Canada	16,644	13,893	340	0	0	2,411	..	..	..
Chile	97,512	95,510	1,985	0	2	14	..	..	..
Czech Republic	33,620	27,669	4,502	45	0	1,404	1,233	1,167	67
Denmark	30,562	26,388	745	..	98	3,331	2,893	2,428	465
Estonia	82	68	8	0	0	6	6	..	..
Finland	4,513	4,103	156	..	5	249	233	214	19
France	24,753	19,933	2,420	2	15	2,384	1,933	1,311	622
Germany	43,034	39,427	1,936	0	74	1,597	..	..	..
Greece	384	224	18	10	1	130	79	..	..
Hungary	123,669	92,583	11,901	..	218	18,968	..	..	..
Iceland	19,169	15,956	1,037	0	0	2,176	..	..	..
Ireland	1,603	1,184	88	0	0	331	..	..	..
Israel	26,791	17,808	1,149	0	0	7,834	..	..	..
Italy	9,455	7,429	624	2	15	1,385	1,203	1,017	186
Japan	13,830,433	13,618,677	149,389	1,176	11,152	50,041	..	..	..
Korea	23,864,893	22,296,356	1,485,569	17,590	10,888	54,490	53,986	34,007	19,979
Luxembourg	495	447	20	..	..	28	..	..	..
Mexico	19,853	18,351	1,195	0	2	305	..	..	..
Netherlands	5,495	4,563	125	2	10	795	..	..	..
New Zealand	923	736	80	2	52	54	..	..	..
Norway	19,319	15,499	1,474	..	5	2,341	2,108	1,629	479
Poland	2,026	1,684	237	2	0	104	..	..	..
Portugal	1,011	905	35	0	0	71	64	63	1
Slovak Republic	112	82	11	0	0	18	17	16	1
Slovenia	299	267	24	0	0	9	4	2	3
Spain	7,454	5,596	1,218	2	11	627	472	447	25
Sweden	77,176	64,812	3,608	85	116	8,554	7,589	6,289	1,300
Switzerland	..	..	..	..	..	..	..	..	..
Turkey	2,513	2,240	243	1	6	23	..	..	..
United Kingdom	15,631	10,922	1,064	..	15	3,630	..	..	..
United States	269,267	242,682	26,585	..	..	..	..	..	..
Non-OECD Member Economies	..	..	..	..	..	..	..	..	..
Argentina	1,252	1,184	59	..	..	10	..	..	..
China	268,194	246,559	12,871	..	..	4,148	..	..	..
Romania	907	462	386	8	1	50	42	38	4
Russian Federation	238,386	87,352	131,768	617	164	18,485	..	..	..
Singapore	4,235	3,752	228	2	..	253	232	..	..
South Africa	10,738	7,134	2,327	2	96	1,180	..	..	..
Chinese Taipei	229,126	224,523	4,463	7	91	41	..	..	..

Data extracted on 06 Feb 2013 10:25 UTC (GMT) from OECD.Stat

41. For example, in one country surveys on expenditure on R&D expenditure have been conducted since the 1970's, and data on funding have been further detailed in the latest surveys, and data on multinationals have been separated. In addition, enterprise surveys on international trade in services have been conducted in this country since 2004, and specific enterprise surveys on activities of multinationals have been conducted since 2002. By combining data on multinationals from these three types of surveys, it has been possible to present more information on production and trade in IPPs in multinationals. Tables 3 and 4 below show data on production and trade of R&D of multinationals obtained from combination of data from the enterprise surveys in the country.

Table 3. R&D activity of parent companies of multinationals

Industries (1)		Expenditure on R&D (Million dollars)			Number of jobs of researchers			Exports of R&D (Million Dollars)			Imports of R&D (Million Dollars)			Expenditure of affiliates abroad (Million Dollars)		
Industry code	Name of Industry	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
14-16	Manufacture of food, beverages and tobacco products	21	10	12	195	86	114	..	0	0	..	0	0	..	0	0
17-18	Manufacture of textiles and wearing apparel	14	11	11	248	281	315	..	2	2	..	2	3	..	13	15
24	Manufacture of chemicals and chemical products	508	567	564	1,730	1,643	1,676	54	13	5	285	1,408	228	341	678	702
25	Manufacture of plastic and rubber products	24	15	14	211	161	165	..	0	1	..	0	0	..	0	0
27-28	Manufacture of basic metal and metal products	40	7	6	485	81	83	..	0	0	..	0	0	..	1	0
29-30	Manufacture of machinery and equipment, office machinery and computers	40	32	60	448	300	536	..	3	4	..	1	0	..	0	0
31	Manufacture of electric motors and electric distribution apparatus	10	18	14	101	180	146	..	0	0	..	1	1	..	0	0
32	Manufacture of electronic components	90	71	56	786	653	773	0	0	0	0	1	1	..	10	5
33	Manufacture of electronic communication equipment	521	437	358	3,661	2,743	2,447	0	4	0	31	21	18	39	16	19
34	Manufacture of industrial equipment for control and supervision, medical and scientific equipment	516	467	388	4,670	3,531	3,501	7	12	11	16	11	9	44	106	115
..	Other manufactures	135	163	165	947	1,082	1,174	0	10	12	7	0	0	0	0	0
Total Manufacturing, Extraction and Quarrying		1,919	1,799	1,647	13,482	10,741	10,930	61	44	36	338	1,444	260	423	825	857
50-52	Wholesale and retail trade	12	51	60	69	174	223	0	0	0	0	2	4	0	1	1
72	Computer and related services	480	529	478	4,099	4,498	4,535	61	48	39	66	48	39	150	110	103
73	Research and development	276	336	329	1,908	1,948	2,136	3	58	84	13	8	7	36	47	28
	Other industries	54	32	29	373	241	252	0	0	0	7	2	2	10	1	2
Total		2,740	2,747	2,543	19,932	17,601	18,076	125	150	160	424	1,504	312	619	984	991

(1) According to ISIC3

Table 4. R&D activity of foreign controlled enterprises

Industries (1)		Expenditure on R&D (Million dollars)			Number of jobs of researchers			Exports of R&D (Million Dollars)			Imports of R&D (Million Dollars)		
Industry code	Name of Industry	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
14-16	Manufacture of food, beverages and tobacco products	8	6	5	102	47	47	..	0	0	..	0	0
17-18	Manufacture of textiles and wearing apparel	3	8	8	61	251	289	..	2	2	..	2	3
24	Manufacture of chemicals and chemical products	59	35	27	401	249	221	22	33	24	9	3	1
25	Manufacture of plastic and rubber products	3	5	5	55	37	44	..	0	1	..	0	0
27-28	Manufacture of basic metal and metal products	48	35	32	418	247	259	..	0	1	..	0	0
29-30	Manufacture of machinery and equipment, office machinery and computers	105	95	112	655	527	705	..	76	75	..	2	2
31	Manufacture of electric motors and electric distribution apparatus	7	8	6	99	104	108	..	8	4	..	1	1
32	Manufacture of electronic components	26	20	30	564	453	694	13	16	12	..	0	0
33	Manufacture of electronic communication equipment	334	304	253	2,088	1,791	1,655	22	3	0	29	63	100
34	Manufacture of industrial equipment for control and supervision, medical and scientific equipment	283	335	222	1,727	1,810	1,260	61	107	92	6	11	4
..	Other manufactures	17	7	12	83	101	82	69	13	16	3	0	0
Total Manufacturing, Extraction and Quarrying		892	857	713	6,251	5,618	5,363	187	258	228	46	81	111
50-52	Wholesale and retail trade	108	250	270	900	1,450	1,578	87	178	199	4	3	6
72	Computer and related services	1,116	1,484	1,354	8,952	10,279	10,429	696	1,081	1,020	50	30	27
73	Research and development	1,850	1,771	1,725	10,409	9,360	9,900	1,611	1,700	1,590	45	35	37
	Other industries	65	74	62	391	643	611	13	52	40	9	1	1
Total		4,032	4,436	4,125	26,903	27,350	27,881	2,595	3,270	3,078	155	150	182

(1) According to ISIC3

42. Another promising initiative currently under development in the European Union is the Euro Group Register (ERG) covering European multinational enterprises – a register intended to provide updated information on the structure of European multinational enterprises to compilers of statistics in the European countries. Together with this initiative efforts to improve definitions and classifications are made in the framework of the ESSnet on profiling, and consistency. The ESSnet on profiling analyses the legal, operational, and accounting structure of enterprise groups in order to identify enterprise units within groups (and their links to legal units). The project explores ways to determine the most efficient structures and statistical/reporting units for the collection of statistical data. The objectives of the ESSnet project on consistency are to create consistent concepts, definitions and methodologies because practices vary to some degree over the various statistical domains and how concepts, definitions and methodologies are applied in various countries.

43. Given the current limitations to measurement, the possibilities of recording IPP in the context of global production could range from entirely ignoring the flows of IPP that are not recorded, and only recording ownership of IPP's in the countries, where they are produced - to imputing all flows of IPPs according to information about the structure of the multinational enterprise or transactions of outsourcers and factory-less enterprises. Since measurement is making a gradual progress, it seems important to take this progress into account and propose methods of deciding economic ownership, which rely on information, which is commonly available, aiming for maximum comparability.

44. In the future, when statistics on flows of IPPs have improved further, it will be necessary to update the guidance given.

6. The identification of economic owners and registration of economic ownership of IPPs in the national accounts

45. IPPs connected to global production may be observed either when data on enterprise activity are collected – general business surveys, innovation surveys, R&D surveys, administrative data from financial reporting to tax authorities etc. - or when data on international transactions are collected from administrative sources or from surveys.

46. If the data are from collections of data on enterprise activities, information is mostly available about the control/ownership of the unit, where the IPP is observed, and the production of the IPP, so that a decision about economic ownership may take its starting point in these variables. Additional variables connected to IPPs that may be available are:

- Flows related to the IPP, such as income from royalties and licenses to use.
- Information that the unit, where the IPP is observed, is a producer of goods and services, who may use the IPP in production, and not a unit engaging only in development of IPPs or holding IPPs.
- Registration of patents/copyrights for the IPP. However, in many cases registration of patents/copy rights is not used extensively – for example in the software industry, where secrecy of research and development is rather used than registration of patents. It also seems that after the first registration of patents, the subsequent changes in ownership of the patents are not always updated in registers, so that it may be difficult to link administrative data on patents to enterprise data. It seems that at this stage this variable may not be as helpful as expected.

47. Figure 1 below shows a decision tree for economic ownership of IPPs in a situation, which is probably common in many countries, where information about the control/ownership of the unit, the type of production of the unit, and flows of income is available.

48. The units that are parts of a multinational enterprise may be either majority controlled affiliates – subsidiaries - or parents. An enterprise is taken to be a subsidiary of a multinational enterprise, if more than 50% of its voting power is held by a foreign enterprise. A parent is an enterprise holding more than 50% of the voting power in a foreign enterprise. There may be more complicated cases, where an enterprise is held by a foreign enterprise, and also holds a foreign enterprise. In order to show a relatively uncomplicated tree, only decisions for a subsidiary are shown. A decision trees for parents would mirror the decisions for a subsidiary.

49. For the MNE subsidiaries it has been assumed that if an IPP is not produced by the unit, and may not be used in production by the unit, registration with the unit is for tax benefit or similar reasons. In the cases, where such a unit receives income from IPP services, it is proposed to classify this income and connected flows in a separate category (the name of the category could be "SPE income and expenditure related to IPPs"). This is proposed, since the assumption is that the unit serves as a "brass plate", and that the income received is in theory a return to the parent for the economy ownership of the IPP. Separating such flows will allow the users to analyze statistics while excluding these flows.

50. The units that are not part of MNE's shown in the decision tree are principals in global production.

51. The decision tree has been simplified in the sense that it is assumed that units that are not part of a multinational enterprise, but engage in production and use the IPP, do not have income from the use of the IPP by others.

52. Some of the decisions about registration of external transactions, related to the decision about ownership, are also shown. In the decision tree it has been assumed that the IPP observed is of a type that is capitalized, and the decision about inclusion in fixed capital formation is also shown. If the IPP is of another type (such as software produced to be embedded in goods), the related decisions will differ in accordance to the recommendations of SNA 2008 on income related to the economic ownership of the relevant IPP.

53. It could be added that for input-output tables and analysis of production, the information on use of IPPs in production is very useful. This means that it is important to separate cases, where IPPs have been used without any change in ownership taking place, or payment for use of IPP services have been made. For example, the cases (such as cases 2.1.2.2. or 2.2.2.2.) where it may be assumed that the IPPs owned by the principals in global production that are not part of multinational enterprises, are used in production by the suppliers without change of ownership, could be separated for input-output purposes. Chapter 9 presents recommendations related to input-output tables and analysis of production.

54. Some examples of the use of the decision tree for recording transactions in the national accounts and balance of payments in practice are outlined in section 3.7

55. The decision tree may be simplified, since the decision about "brass plate" units is the same, whether income is observed or not, and for the global producer the decision is only dependent upon income or payments linked to the IPP. Such a simplified decision tree is shown in fig. 2.

Fig. 1: Decision tree for determining economic ownership of an IPP observed in a unit engaging in global production

Control/ownership of unit	Production of the IPP	Type of producer	Income and expenditure related to the IPP	Decision about economic ownership of the IPP	Related decisions
1. The unit is part of a multinational enterprise (MNE)	1.1 The unit produced the IPP	1.1.1. The unit is a producer of goods and services and may use the IPP in production	1.1.1.1. The unit received payment for cost of producing the IPP from MNE parent	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register exports of the IPP to the MNE parent. Register imports of IPP services representing the value of the use of the IPP by the unit. If data available impute use in proportion to the unit's share in total relevant MNE production
			1.1.1.2. The unit did not receive payment for cost of producing the IPP from MNE parent, finances the IPP from sales of products	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.
			1.1.1.3. The unit received payment for cost of producing the IPP from MNE parent	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register exports of the IPP to the MNE parent.
		1.1.2. The unit is not a producer of goods and services, who may use the IPP in production	1.1.2.1. The unit receives income from royalties or licences to use	Attribute economic ownership to the unit	The IPP is fixed capital formation of the unit. If income is from abroad register exports of IPP services
			1.1.2.2. The unit did not receive payment for cost of producing the IPP from MNE parent, and does not receive income from royalties and licences to use	Attribute economic ownership to the unit - the assumption is that the unit will receive payments in the future	The IPP is fixed capital formation of the unit.
			1.2.1.1. The unit pays royalties or licences to use	The unit does not own the IPP	Don't include the IPP as fixed capital formation of the unit. If payment to abroad register imports of IPP services
			1.2.1.2. The unit does not pay anything in connection with the IPP (not royalties or licences to use, nor for a purchase of the IPP)	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register imports of IPP services representing the value of the use of the IPP by the unit. If data available impute use in proportion to the unit's share in total relevant MNE production
	1.2. The unit did not produce the IPP	1.2.1. The unit is a producer of goods and services and may use the IPP in production	1.2.1.1. The unit receives income from royalties or licences to use the IPP	Attribute economic ownership of the IPP to the unit, but classify it separately - the unit is a "brass plate" for the MNE parent	Classify the fixed capital formation, income and expenditure related to the IPP separately to allow analysis excluding "brass plate" units
			1.2.2. The unit is not a producer of goods and services, who may use the IPP in production		
		1.2.2.1. The unit does not receive income from royalties or licences to use the IPP	Attribute economic ownership of the IPP to the unit, but classify it separately - the unit is a "brass plate" for the MNE parent	Classify the fixed capital formation, income and expenditure related to the IPP separately to allow analysis excluding "brass plate" units	

Fig. 1: Decision tree for determining economic ownership of an IPP observed in a unit engaging in global production (continued)

Control/ownership of unit	Production of the IPP	Type of producer	Income and expenditure related to the IPP	Decision about economic ownership of the IPP	Related decisions		
2. The unit is a global producer, but not part of a multinational enterprise (MNE)	2.1. The unit produced the IPP	2.1.1. The unit is a producer of goods and services and may use the IPP in production		Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.		
			2.1.2.1. The unit receives income from royalties or licences to use	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit. If income from abroad register exports of IPP services		
		2.1.2. The unit is not a producer of goods and services, who may use the IPP in production					
			2.1.2.2. The unit does not receive income from royalties or licences to use the IPP. But since the unit engages in global production, the assumption is that IPP used by others and value added from the global production finances the IPP	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.		
	2.2. The unit did not produce the IPP			2.2.1.1. The unit pays royalties or licences to use	The unit does not own the IPP	Don't include the IPP as fixed capital formation of the unit. If payments to abroad register imports of IPP services	
		2.2.1. The unit is a producer of goods and services and may use the IPP in production					
				2.2.1.2. The unit purchased the IPP	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit. If purchased from abroad register imports of the IPP	
		2.2.2. The unit is not a producer of goods and services, who may use the IPP in production			2.2.2.1. The unit receives income from royalties or licences to use the IPP	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit. If income from abroad register exports of IPP services
					2.2.2.2. The unit does not receive income from royalties or licences to use the IPP. But since the unit engages in global production, the assumption is that IPP used by others and value added from the global production finances the IPP	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.

Fig. 2: Simplified decision tree for determining economic ownership of an IPP observed in a unit engaging in global production

Control/ownership of unit	Production of the IPP	Type of producer	Income and expenditure related to the IPP	Decision about economic ownership of the IPP	Related decisions	
1. The unit is part of a multinational enterprise (MNE)	1.1 The unit produced the IPP	1.1.1. The unit is a producer of goods and services and may use the IPP in production	1.1.1.1 The unit received payment for cost of producing the IPP from MNE parent	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register exports of the IPP to the MNE parent. Register imports of IPP services representing the value of the use of the IPP by the unit. If data available impute use in proportion to the unit's share in total relevant MNE production	
			1.1.1.2 The unit did not receive payment for cost of producing the IPP from MNE parent, finances the IPP from sales of products	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.	
			1.1.1.3 The unit received payment for cost of producing the IPP from MNE parent	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register exports of the IPP to the MNE parent.	
		1.1.2. The unit is not a producer of goods and services, who may use the IPP in production	1.1.2.1 The unit receives income from royalties or licences to use	Attribute economic ownership to the unit	The IPP is fixed capital formation of the unit. If income from abroad register exports of IPP services	
			1.1.2.2 The unit did not receive payment for cost of producing the IPP from MNE parent, and does not receive income from royalties and licences to use	Attribute economic ownership to the unit - the assumption is that the unit will receive payments in the future	The IPP is fixed capital formation of the unit.	
			1.2.1.1 The unit pays royalties or licences to use	The unit does not own the IPP	Don't include the IPP as fixed capital formation of the unit. If payment to abroad register imports of IPP services	
	1.2. The unit did not produce the IPP	1.2.1. The unit is a producer of goods and services and may use the IPP in production	1.2.1.1 The unit does not pay anything in connection with the IPP (not royalties or licences to use, nor for a purchase of the IPP)	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register imports of IPP services representing the value of the use of the IPP by the unit. If data available impute use in proportion to the unit's share in total relevant MNE production	
			1.2.2. The unit is not a producer of goods and services, who may use the IPP in production	Attribute economic ownership of the IPP to the unit, but classify it separately - the unit is a "brass plate" for the MNE parent	Classify the fixed capital formation, income and expenditure related to the IPP separately to allow analysis excluding "brass plate" units	
		2. The unit is a global producer, but not part of a multinational enterprise (MNE)		2.1. The unit receives income from royalties or licences to use	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit. If income from abroad register exports of IPP services
				2.2. The unit does not receive or pay income from royalties or licences to use the IPP.	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.
2.3. The unit pays royalties or licences to use	The unit does not own the IPP			Don't include the IPP as fixed capital formation of the unit. If paid to abroad register imports of IPP services		

56. However, not all information required for the decisions in fig. 2 may be available. In order to see how decisions will be affected, if only partial information is available, an additional decision tree is shown below.

57. Fig. 3 shows a proposal for a decision tree for cases, where only the following information is available:

Control/ownership of the unit where the IPP is observed;

Type of production characteristic for the unit where the IPP is observed;

Such minimal information is available in almost all cases, where enterprise statistics are collected.

58. As can be seen, even with such minimal information the cases of "brass plate" units can be separated.

59. For software or R&D, the knowledge about a unit being a producer specializing in production of software or R&D serves as an indicator that the IPP was produced by the unit.

60. There are some differences between the decision trees in the cases under 1.1.1 and 1.1.2: when no information about payment received is available, it is not possible to make separate decisions for cases with payment from the parent. The assumption is that when the subsidiary is a producer using the IPP in production (1.1.1), the MNE will mostly not pay separately for the development of the IPP. On the other hand, when the subsidiary does not use the IPP in production (1.1.2), payment by the parent will be most common, so that the differences may not be very significant. The assumption is that decision tree 2 will be used in most cases, since enterprise data will usually include some information on income.

Fig. 3: Decision tree for determining economic ownership of an IPP observed in a unit engaging in global production without information on production of the IPP or on the international transactions recorded

Control/ownership of unit	Type of producer	Decision about economic ownership of the IPP	Related decisions
1. The unit is part of a multinational enterprise (MNE)	1.1.1. The unit is a producer of goods and services and may use the IPP in production	Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.
	1.1.2. The unit is not a producer of goods and services, who may use the IPP in production, but a type of producer producing IPP's (software industry or R&D industry f.ex.)	Attribute economic ownership of the IPP to the MNE parent	Don't include the IPP as fixed capital formation of the unit. Register exports of the IPP to the MNE parent.
	1.1.3. The unit is not a producer of goods and services, who may use the IPP in production, and not a type of producer producing IPP's .	Attribute economic ownership of the IPP to the unit, but classify it separately - the unit is a "brass plate" for the MNE parent	Classify the fixed capital formation, income and expenditure related to the IPP separately to allow analysis excluding "brass plate" units
2. The unit is a global producer, but not part of a multinational enterprise (MNE)		Attribute economic ownership of the IPP to the unit	The IPP is fixed capital formation of the unit.

61. It is perhaps a bit disturbing that the decisions about economic ownership of the IPP will depend upon information about the control/ownership of the unit. Information on control/ownership can change quite rapidly between periods, and statistics on control/ownership may not be updated.

62. But alternative proposals seem even more problematic:

- 1) Leaving registration as it is currently with all the problems mentioned above: always attributing economic ownership of an IPP to the unit, where it is observed (usually it will be observed in a financial report, but since business accounting differs from national accounting, it will not always be recorded as an asset in the financial reports) without investigating any further.
- 2) A proposal considered in the past: placing all economic ownership at the units producing the IPPs, and not recording any exports of IPPs or IPP services. The proposal took its starting point in the assumption that existing information on transfers of IPPs is entirely unreliable – such an assumption would probably be

exaggerated, taking into account the progress in data collection. The proposal involved treating income connected to IPPs as property income, which would mean not adopting the SNA 2008 recommendations. The treatment proposed would also lead to relatively large distortions in analysis of production and production structure.

- 3) Another solution that could be proposed: for global producers in all cases economic ownership could be linked to the use in production of the IPP. That is – for all global producers (even those that are not parts of a MNE) the economic ownership would be according to use in production. Although such a recommendation could be based upon the quite solid information about types of production and would perhaps lead to more stable series, it would mean that the treatment of global producers would differ substantially from the treatment of similar enterprises outsourcing production within the country.

7. Registration of the international flows of IPPs and IPP services

63. Whenever IPP's are observed (and the information on the value - cost or market price - of the IPP is available), the decision trees may be used as a basis for deciding which unit is the economic owner of the IPP observed. After economic ownership is decided upon, international flows of IPP's and flows of IPP services can be registered – the recommendations for registration are given in the last column of the decision tree.

64. Within multinational enterprises, when the economic ownership of the IPP observed in a subsidiary is attributed to the parent, and the IPP is an asset (a software or R&D for example) used by the subsidiary in production, it is recommended that the flow of IPP services be registered according to share of the subsidiary in total production.

65. As explained above, when the subsidiary of a multinational is a "brass plate" (that did not produce the IPP, and cannot use it in production), it is proposed to classify the IPP and the income and expenditure connected to IPP of the unit separately, so that it will be possible for any users of the data to analyze the accounts excluding the "brass plate" unit.

66. In box 1 below two examples of the use of the decision tree are presented.

Box 1. Examples of the use of the decision tree

Example A: *R&D center "Comp" in domestic country A, is a subsidiary of a multinational "Multicomp" with a parent in country B and other subsidiaries in countries C and D. "Comp" engages only in R&D production, and has developed a prototype of a new kind of computer chip "ChipM". In the business accounts it may be observed that "Comp" has received financing of all costs of development in the last two years from parent in country B – this means that the development of "ChipM" has also been financed. It may be assumed that now that the prototype is finished, it will be patented in the name of "Multicomp", and the subsidiaries in countries C and D start producing computers with "ChipM" components. It is known that "Comp" only engages in R&D.*

From the point of view of "Comp" in country A:

This is the case 1.1.2.1 in the decision tree in fig.2.

The development of "ChipM" should be registered as production of "Comp" in country A, which is sold to "Multicomp" in country B. Since it is sold immediately (financed as cost+) the financing

should also be registered as exports to country B, rather than as fixed capital formation, which is later exported. The parent in country B is the economic owner of the new asset, and in country B there will be imports of fixed capital.

"Comp" has an operating surplus from the exports to "Multicomp", since tax authorities will require that the price of the development will include operating surplus. The net operating surplus will either be undistributed dividends, which are additions to FDI in "Comp", or be transferred to the parent of "Multicomp" as dividends.

From the point of view of "Multicomp", the parent in country B:

This is the mirror case to case 1.1.2.1 in the decision tree in fig.2.

The financing of "ChipM" should be registered as imports, as fixed capital formation in IPPs, and as IPP assets in the balance sheet (After the development of "ChipM" is finished, there will be depreciation of the asset). As explained there may be additional FDI or transfers of dividends from country A to the parent of "Multicomp"

If no transfer of "ChipM" is registered to country C or D, there will be a larger operating surplus from production using "ChipM" by the subsidiaries in those countries, and the net operating surplus transferred to the parent will include income from use of "ChipM".

From the point of view of the subsidiaries in country C and D:

If there is no registration of transfer of IPPs to the subsidiaries in country C or D, the IPP cannot be observed in these countries, and nothing should be accounted for there.

Example B: In the small company "SwiftC" in country A, which is the subsidiary of a multinational company "Bigcomp", a patented software "SoftPat" is observed. "SwiftC" has income from royalties from "SoftPat" received from subsidiaries of "Bigcomp" in countries C and D, while the parent is in country B. It is known that "SwiftC" has very few employees, and does not engage in development of software or in production that may use software such as "SoftPat".

From the point of view of "SwiftC" in country A:

This is the case 1.2.2 in the decision tree in fig.2.

Since the unit is a "brass plate" according to the decision tree, all income and expenditure linked to "SoftPat" should be registered separately – royalties received from the subsidiaries of "Bigcomp" will be registered separately under a subcategory labelled "SPE income and expenditure related to IPP's". On the other hand, transfer of net operating surplus as dividends to the parent B will be registered separately as well under a subcategory labeled "SPE income and expenditure related to IPP's", to enable analysts to separate these flows, and notice that the net impact on the domestic economy is small.

From the point of view of the parent of "Bigcomp" in country B:

This is the mirror case to the case 1.2.2 in the decision tree in fig.2.

The accounts in country B will not reflect that the flows are in a separate category, since the flows to the parent are not "inflated": The parent will on the one hand receive a smaller net operating surplus from the subsidiaries in countries C and D, since they had to pay royalties to "SwiftC", but

will on the other hand receive a net operating surplus from "SwiftC" which reflects income from these royalties.

From the point of view of the subsidiaries in country C and D:

The accounts in countries C and D will not reflect that the royalties are in a separate category, since the flows are not "inflated" - the royalties are deducted from the flows to the parent in country B.

8. The need for improvement of data collection on IPPs

67. As explained above, statistics on production and international transfers and use of IPP's have developed over time in many countries, but at this stage are still far from adequate, and are still under development.

68. As illustrated in annex 1 below, there is a need for improvement of the data collection in a way that ensures that the data are reported in a consistent way, and that the transactions in IPPs are detailed in accordance with recommendations in the national accounts and the balance of payments.

69. For example it would be an important step forward to harmonize the data collection on sources of funding in the framework of OECD/UNESCO R&D surveys with SNA 2008 and BPM6, since these surveys are performed in a large number of countries. Among other things, data are needed to distinguish between sales of IPPs, income from royalties and licences, funding in connection with joint production, and unrequited transfers.

70. Another direction explored in a number of countries is the collection of data for large enterprises. Due to the difficulty of data collection on IPPs, it may be more efficient to focus on collection of data of a good quality in the largest enterprises, accounting for the major parts of activity connected to international transfers of IPPs.

71. As described in section 3.5, international cooperation in collection of data on activity of multinationals has already begun. It is important that this cooperation will not only focus on structural data, but also include collection of data on international transactions in IPPs according to the SNA 2008 and BPM6 recommendations.

72. In the framework of balance of payments statistics, it is important to implement the detailed EBOPs classification recommended in MSITS 2010. The main relevant variables in this classification are:

- 8. Charges for the use of intellectual property n.i.e.
 - 8.1 Franchises and trademarks licensing fees
 - 8.2 Licences for the use of outcomes of research and development
 - 8.3 Licences to reproduce and/or distribute computer software
 - 8.4 Licences to reproduce and/or distribute audio-visual and related products
 - 8.4.1 Licences to reproduce and/or distribute audio-visual products
 - 8.4.2 Licences to reproduce and/or distribute other products
- 9. Telecommunications, computer, and information services...
 - 9.2 Computer services...
 - 9.2.1 Computer software
 - Of which: 9.2.1.a Software originals
- 10. Other business services
 - 10.1 Research and development services
 - 10.1.1 Work undertaken on a systematic basis to increase the stock of knowledge
 - 10.1.1.1 Provision of customized and non-customized research and development services
 - 10.1.1.2 Sale of proprietary rights arising from research and development
 - 10.1.1.2.1 Patents
 - 10.1.1.2.2 Copyrights arising from research and development
 - 10.1.1.2.3 Industrial processes and designs
 - 10.1.1.2.4 Other
 - 10.1.2 Other

9. Conclusion

73. The problems with statistics on production, transfer and uses of IPPs in connection with global production, especially within multinational enterprises, have been recognized by many national statistics offices, as well as statistical offices of international organizations. Collection of detailed data has been added to enterprise surveys on production and international transactions, and specific surveys and business registers dealing with data for multinational enterprises have been developed.

74. However, information is still very limited, and it is important to express the specific needs for data on international transfers of IPPs for national accounts and balance of payments purposes to ensure an adequate quality of data on production, income and capital formation. The international cooperation in collection of data on activity of multinationals should take these specific needs into account.

75. Taking into account the current limited availability of information in most countries, some guidance in the form of a decision tree for attributing ownership of IPPs has been given. The attribution of ownership leads to recommendations for accounting for international transactions.

76. The guidance relies upon information on control/ownership and activity of the unit, where the IPP is observed. For subsidiaries in multinationals the ability to use the IPP in production is taken into account.

77. On the other hand, for units that are principals in global production, but not part of multinationals, it is recommended to attribute the economic ownership of IPPs to the unit, even in cases where it may be assumed that they are used in production by suppliers/subcontractors. However, the data on use of IPPs in production are of importance for construction of input-output tables and analysis of production, and it may be proposed to separate the statistics on such cases for input-output table purposes.

78. When statistics on flows of IPPs have improved further, it will be necessary to update the recommendations given in the chapter.

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