

Satellite Extensions for Supply and Use Tables

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- Harmonized Supply and Use Table
- Firm Heterogeneity: SUT extensions through SBR
- SUT extensions examples
 - Symmetric Input Output tables
 - Multi country SUT
 - Satellite account for Global Value chains
 - based Handbook on Accounting for Global Value Chains (GVCs)
 - System of Environmental Economic Accounting
 - based on SEEA central framework 2012 and SEEA experimental ecosystem accounts 2012
 - Tourism Satellite Account (TSA)
 - based on TSA: Recommended Methodological Framework
 2008



Harmonized Supply and Use Table

Supply table

Industries		Indu				
Products	Agriculture, forestry, etc.	Mining and quarrying	Imports	Total		
Agriculture, forestry, etc.						
Ores and minerals; etc.	(Output by prod	uct by industry	<i>'</i>	Imports by product	Total supply by product
					product	by product
Services						
Total		Total Output	Total imports	Total supply		

Use table

Industries		Indus	stries			Final uses		
Products	Agriculture, forestry, etc.	Mining and quarrying		Services	Final Gross capital Exports			Total
Agriculture, forestry, etc.								
Ores and minerals; etc.	Intermediate	consumption	hy product and	l hy industry	Final uses b	Total use by		
	Intermediate	consumption	by product unc	a by maasa y	Tillar ases b	y product and	by category	product
Services								
Value added	Value a	dded by comp	onent and by i	ndustry			Value added	
Total		Total Output	by industry		Total fi	nal uses by ca	itegory	

Empty cells by definition



Harmonized Import and Domestic Use Tables

United Nations Statistics Division

Import Use table

Industries		Industries					Final uses				
Products	Agricul- ture	Manufac- turing		Services	Total	Final Consumption	Gross capital formation	Exports	Total	at basic prices	
Agriculture					T				-		
Manufacturing	Importe	ed products	for inter	mediate	Total imported	Imported prod	lucts for final use	es at CIF	Total imported	Imported	
		consun			products for	importou prou	values		products	total use	
		at CIF v	alues		intermediate consumption				for final uses		
Other Services					Consumption				u3C3		
Total	Intermediate consumption by Industry			To	otal final uses by	category					

Domestic Use table

Industries		Industries Final uses							Total use at	
Products	Agriculture	Manufacturing		Services	Total	Final Consumption	Gross capital formation	Exports	Total	basic prices
Agriculture										
Manufacturing	Do	mestic products	for intermedia	ate consumpt	ion	Do	mestic products	for final uses		Total use by
		at basic prices at basic prices						product		
Other Services										
Total at basic prices		Domestic interme	diate inputs a	t basic prices	3		Final uses at ba	asic prices		
Imports, CIF	Total in	mported products	s for intermed	iate consump	otion	Total	imported product	s for final use	es	
Taxes less subsidies on products	Net to	Net taxes on products for intermediate consumption					Net taxes on products for final use			
Total at purchasers' prices	Intermediate inputs at purchasers' prices Final uses at purchasers' prices									
GVA	Total value added by industry									
Total Inputs at basic prices	Total input by industry									



Firm heterogeneity: SUT extensions through SBR

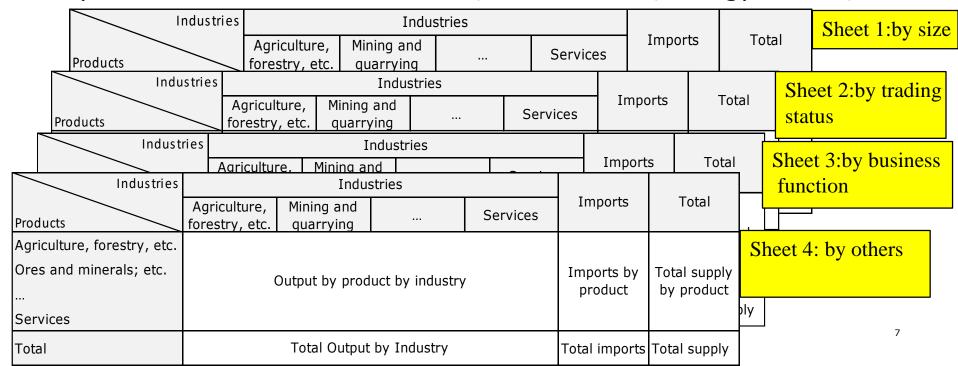


Firm heterogeneity in SUT by type of enterprises

United Nations Statistics Division

Separate sheets for SUT for different type of firms in SUT compilation:

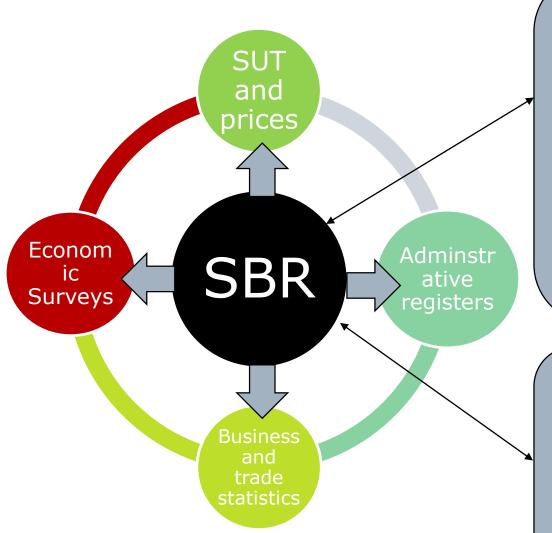
- by size: large, medium and small and household enterprises,
- by ownership/control: domestic (public and private sector) owned/controlled and foreign owned/controlled
- by trading status: trading (exports/imports) and non-trading enterprises
- by business function: domestic and international sourcing
- by other features: tourism related, water related, energy related, etc.





Profiling in Statistical Business Register (SBR)

United Nations Statistics Division



Enterprise characteristics:
by ID, location and YoE
by activity and inst. sector
by size
by trading status
by ownership
by business function
by satellite – GVC, TSA,
SEEA, non-profit (NPI), etc.

Sources:

from tax records
from company registers
from customs declarations
from economic census/surveys
from electricity/water agencies



SUT – enterprise type embedded by industry to obtain more homogenous SUT frame

Foreig	n Owned	Domestically	owned MNE	Domesti	ic Owned		
With high Export orientation 'Exporters'	With low Export orientation 'Non-Exporters'	With high Export orientation 'Exporters'	With low Export orientation 'Non-Exporters'	With high Export orientation 'Exporters'	With low Export orientation 'Non-Exporters'		
Low import orientation High import orientation	Low import High import orientation	Low import High import orientation	Low import High import orientation	Low import High import orientation	Low import orientation High import orientation		
S M L S M L	S M L S M L	S M L S M L	S M L S M L	S M L S M L	S M L S M L		



SUT extension: Symmetric Input-Output Table



Harmonized Symmetric Input-Output Table

United Nations Statistics Division

Integrated Supply and Use framework

	Domestic products	Industries	Final use	Total
Domestic products		U_d	Y_d	Х
Imported products		U_m	Y _m	m
Industries	V			g
Gross value added		W		W
Total	\mathbf{x}^T	g^{T}	У	

Input-Output Table - product by product

	Products	Final use	Use
Domestic products	S_d	Y_d	Х
Imported products	S_{m}	Y _m	m
Gross value added	E		W
Output	\mathbf{x}^T	У	

Input-Output Table - industry by industry

	Industries	Final use	Output
Domestic industries	B_d	F _d	g
Imports from industries	B_m	F _m	m
Gross value added	W		W
Output	g^{T}	У	

Through a series of transformations, such as:

Model A: Product by Product IOTs based on product technology assumption

Each product is produced in its own specific way, irrespective of the industry where it is produced.

 $T = (D^T)^{-1}$ Transformation matrix $S_d = U_d T$ Domestic intermediates $S_m = U_m T$ Imported intermediates E = W T Gross value added $Y_d = Y_d$ Final use of domestic properties of the state of the state

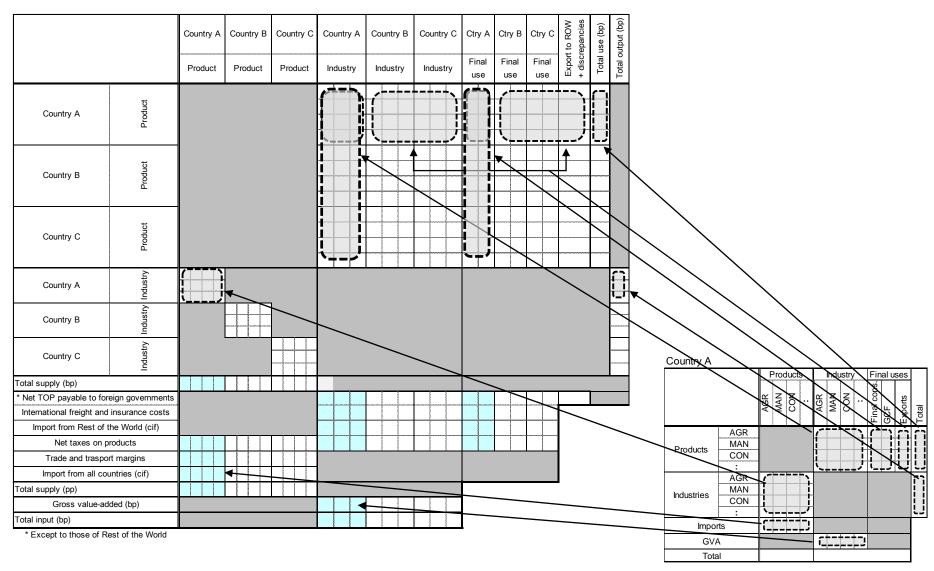
 $Y_d = Y_d$ Final use of domestic products $Y_m = Y_m$ Final use of imported products



SUT extension: Multi country SUT



Multi-country SUTs based on Harmonized national SUT





SUT extension: System of Environmental Economic Accounting (SEEA) Satellite



Environmental accounts - Physical SUTs

Simp	olified structure of the phy	sical su	pply table	е							_
	Industries	Agricul-	Indus Manufac-	stries 	Services	Imports	Final consumption	Gross capital formation/Accu mulation	Environment	Total	
Natural inputs	Mineral and energy resource Water 								Flows from the environment	Total supply by natural inputs)
Products	Agriculture, forestry, etc. Ores and minerals; etc Services	Outpo	ut by produ	uct by In	dustry	Imports by product				Total supply by product	
Residuals	Solid waste Wastewater 	Residu	ıals genera	ated by I	industry	Residuals received from the RoW	Residuals generated by final consumtpion	Residuals from scrapping and	Residuals recovered from the environment	Total supply by residuals	
Total	Supply										
Simp	olified structure of the phy	sical us	e table								
	Industries		Indus	stries			Final	Gross capital			
		Agricul-	Manufac-		Services	Exports	consumption	formation/Accu mulation	Environment	Total	
Natural inputs	Mineral and energy resource Water 		action of N	Natural in	nputs					Fotal use by natural inputs	
Products	Agriculture, forestry, etc. Ores and minerals; etc Services		mediate co			Exports by product	rinai consumption by product and by category	Gross capital formation/Accu mulation		Fotal use by product	
Residuals	Solid waste Wastewater 		ion and tre and other			Residuals sent to RoW		Accumulation of waste in controlled landfilled	Residual flows direct to the enviornment	Fotal use by residuals)
Total	Use										15

Core Account 1: Physical Supply and Use Table for energy

PHYSICAL SUPPLY TABLE (unit:PJ)	Production (incl. household own account) & generation of residuals								Accumula- tion	the rest of	Flows from the	TOTAL
	Industries (by ISIC) Households								the World	environ-		
	Agriculture Forestry & Fishery		Manufacturing	Electricity, gas, steam & air condition- ing supply	Transport- ation & Storage	Other Industries	Total Industry			(Imports)	ment	
	(ISIC A)	(ISIC B)	(ISIC C)	(ISIC D)	(ISIC H)							
1. Energy from natural inputs:	l- 44	//-			- / - : L .	/		/	'£: /			
Natural resource inputs								n.org/			1166	116
Inputs of energy from renewable sources	a te	echni	ical r	otes	ener	av a	april	_2017_	draft	.pdf	124	124
Other natural inputs			<u></u>		_	3/_	<u>-</u>				2	
2. Energy Products:												
Production of energy products by SIFC class:												
Coal										225		22
Peat and peat products												
Oil shale / oil sands												
Natural gas		395		369			764					764
Oil		721	347	,			1068			930		199
Biofuels	5			2			7					
Waste	39		55)			94			17		11
Electricity				212			212			22		23
Heat				79			79					79
Nuclear fuels and other fuels					300 000 000 000 000 000 000 000							
3. Energy Residuals:												
Total energy residuals	50	48	432	307	632	96	1565	240				180
4. Other Residual Flows:												
Residuals from end-use for non-energy purposes			51									5
Energy from solid waste									94	1		9
5. TOTAL SUPPLY	94	1164	885	969	632	96	3840	240	94	1194	1292	6660

Core Account 1: Physical Supply and Use Table for water

PHYSICAL SUPPLY TABLE			Inc	dustries (by IS	ic)				House-	Flows	Flows from	TOTAL
	Agriculture, Forestry & Fishery	Mining and Quarrying	Manufactur- ing	Electricity, gas, steam & air conditioning supply	Water collection, treatment & supply	Sewerage	Other Industries	Total Industry	holds	from the Rest of the World	the Environment	SUPPLY
	(ISIC A)	(ISIC B)	(ISIC C)	(ISIC D)	(ISIC 36)	(ISIC 37)				(Imports)		
1. Sources of Abstracted Water:												
Inland Water Resources	htt	tns://	1500	a.un.o	ra/sit	PS/SE	262	in o	ra		967	967
of which: Surface water		•						u11.0	9		441	441
of which: Groundwater	/fi	les/w	ater	note	final	27-	10-				476	476
Other Water Sources	•		-	=							202	202
TOTAL SUPPLY ABSTRACTED WATER	1/	clea	ın U.	pat							1 169	1 169
2. Water:												
For distribution	0	0	0	0	378	0	0	378		0		378
For own use	108	34	80	404	14	100	2	743				743
3. Wastewater and reused water:												
Wastewater to treatment	18	35	82	6	1	0	49	191	236			427
Own treatment of wastewater	0	0	0	0	0	0	0	0	0			0
Reused water produced (for distribution)	0	3	7	0	0	43	0	53	0			53
TOTAL WASTEWATER AND REUSED WATER	18	38	89	6	1	43	49	244	236			479
4. Return flows of water:												
To inland water resources	65	7	16	300	47	228	1	664	5			668
To other sources	0	2	5	100	0	256	0	363	0			363
TOTAL RETURN FLOWS	65	9	21	400	47	484	1	1 026	5			1 031
of which: losses in distribution	0	0	0	0	47	0	0	47	0			47
5. Evaporation of abstracted water	er, transpi	ration and v	vater inco	porated into	products:							
TOTAL WATER EVAPORATED, TRANSPIRED AND INCORPORATED INTO PRODUCTS	76	13	30	3	2	1	4	128	10			138
6. TOTAL SUPPLY	268	94	220	812	443	627	56	2 520	250	0	1 169	3 939



SUT extension: Global Value Chain (GVC) Satellite

Global Value Chain (GVC) Satellite accounts

- In order to develop a satellite account for a GVC, we have to elaborate in SNA concepts and classifications the following:
 - Type of GVC (e.g. automotive, textiles, electronics, oil and gas, etc.)
 - GVC relevant geographical boundary (e.g. what are the main partners in the specific GVC)
 - GVC governance (e.g. identification of `lead firms', `affiliated firms' etc.)
 - GVC-relevant industry breakdown (e.g. mapping to ISIC)
 - GVC-relevant product breakdown (e.g. mapping to CPC)
 - GVC-relevant additional information (e.g. employment, capital, etc.)

GVC concept	BOP/IIP and FDI	National Accounts
Lead Firm	Ultimate controlling parent Classified in S11 when it concerns corporate groups	Ultimate controlling parent Classified in S11 (Head Office) when it concerns corporate groups S.11UP
Affiliated firm Affiliated firms are defined on the basis of control that the lead firm has directly or indirectly on the affiliated firm. This control derives from direct or indirect ownership and management control and is similar to the concept used in FDI.	Direct Investment Enterprise, Subsidiary (controls > 50% of share votes)	Foreign Controlled Non-Financial Corporation S.11FC
Non-affiliated firms are defined as being closely (if not uniquely) devoted to the production of goods and services needed in the GVC. They are not owned or controlled directly or indirectly by the lead firm. In order to identify non-affiliated firms a criterion is needed to define the close relationship to the production in a GVC, such as the share of output provided to a single GVC.	Direct Investment Enterprise Associate (influences 10%< <50% of share votes) Other enterprises No influence < 10% of share vote. Unrelated firms are enterprises that fall outside any FDI relationship, either as investor or as investment enterprise.	Foreign Associate Non-Financial Corporation S.11FA Nationally Controlled Non-Financial Corporation S.11NA
Dedicated Financial Institution	Foreign Controlled Captive Financial Institution These are direct investment enterprises that are foreign controlled, e.g. subsidiaries.	Foreign Controlled Captive Financial Institution S.127FC

- GVCs are characterized by a sequence of business production processes that bring a product to its final consumers from its conception.
- Business functions are the activities carried out by an enterprise; they can be divided into core functions and support functions

Core business functions are activities of an enterprise yielding income: the production of final goods or services intended for the market or for third parties.

Need correspondence to ISIC

Support business functions are supporting activities carried out by the enterprise in order to permit or to facilitate the core business functions, its production activity.

- distribution and logistics
- marketing, sales and after-sales services
- information and communication technology (ICT) services
- administrative and management functions
- engineering and related technical services
- research & development (R&D)



Mapping business functions to ISIC for the automotive GVC

Core Business function	ISIC Rev.4 code
Production of automotive	ISIC 291- Manufacture of motor vehicles
Support Business function	ISIC Rev.4 code
Distribution and logistics:	ISIC H - Transportation and storage
Transportation activities, warehousing and order processing.	ISIC 49 - Land transport and transport via pipelines
	ISIC 50 - Water transport
	ISIC 51 - Air transport
	ISIC 52 - Warehousing and support activities for transportation
	ISIC 53 - Postal and courier activities
Marketing, sales and after-sales services:	ISIC 73 - Advertising and market research
market research, advertising, direct marketing services (telemarketing), exhibitions, fairs and other marketing or sales services; also included are call-centre services and after-sales services such as help-desks and other customer support services.	
Information and communication technology (ICT) services:	ISIC 62 - Computer programming, consultancy and
information technology (IT) services and telecommunication (IT services including hardware and software consultancy, customised software data processing and database services, maintenance and repair, web-hosting, as well as other computer-related and information services, but excluding packaged software and hardware).	related activities ISIC 63 - Information service activities
Administrative and management functions: legal services, accounting, book-keeping and auditing, business management and consultancy, human resources (HR) management (e.g. training and education, staff recruitment, provision of temporary personnel, payroll management as well as health and medical services), corporate financial and insurance services; also included are procurement functions.	ISIC 70 - Activities of head offices; management consultancy activities ISIC 69 - Legal and accounting activities
Engineering and related technical services:	ISIC 71 - Architectural and engineering activities;
engineering and related technical consultancy, technical testing, analysis and certification; also included are design services.	technical testing and analysis
Research & development (R & D):	ISIC 72 - Scientific research and development
research and experimental development.	

- GVC products are those products (goods and services) that are inputs into the production process.
- The product mapping depends on the specific GVC: the product mapping for the GVC for automotive is very different than the product mapping for the GVC for textiles or electronics.

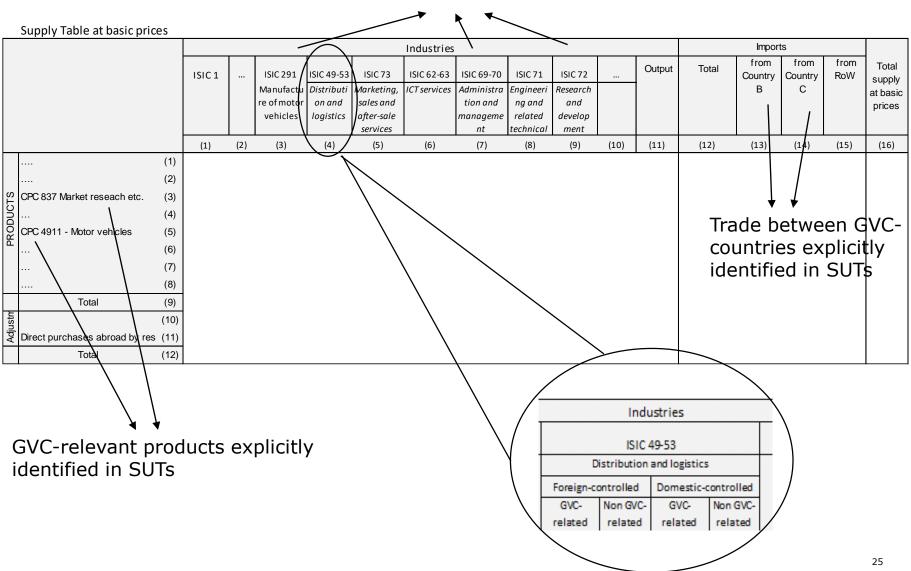


Mapping of products to HS/CPC for the automotive GVC

VC Stage/ Subassembly	HS Codes (2002)	HS Code Descriptions	VC Sector
Passenger vehicles	870321 870322 870323 870324 870331 870332 870333	870321, 870322, 870323, 870324: Other vehicles, with spark-ignition internal combustion reciprocating piston engine <1000cc, 1000 – 1500cc, 1500 – 3000cc, > 3000cc 87033: Other vehicles, with compression-ignition internal combustion piston engine (diesel or semi-diesel) <1500cc, 1500 – 2500cc, >2500cc	
Body system	870600	8706: Chassis fitted with engines, for the motor vehicles of headings 87.01-87.05	Chassis
Drive train	840733 840734 840820	Reciprocating piston engines used for the propulsion of vehicles of Chapter 87; of a cylinder capacity: > 250 cc ≤ 1,000 cc > 1,000 cc Compression-ignition internal combustion piston engines (diesel or semi-diesel engines); of a kind used for the propulsion of vehicles of Chapter 87	Engine
Body system (suspension)	401110 401211 870831 ⁺ 870839 ⁺ 870870 870880 870894	401110: New pneumatic tires, of rubber; of a kind used on motor cars 401211: Retreaded tires; of a kind used on motor cars (including station wagons and racing cars) Brakes and servo-brakes and parts thereof; 870831: Mounted brake linings 870839: Other 870870: Road wheels and parts and accessories thereof 870880: Suspension systems and parts (incl. shock absorbers) 870894: Steering wheels, columns and boxes	Tires Brakes^ Wheels Suspension systems and parts (incl. shock absorbers) Steering wheel



Business functions explicitly identified in SUTs





	Use Table at basic prices																								
			Industries													FINAL USE									
		ISIO	01		ISIC 291	ISIC 49-53	ISIC 73	ISIC 62-63	ISIC 69-70	ISIC 71	ISIC 72		Output				Exports				Total				
						Distributi	Marketing,	ICT services		_	Research			Final G	Gross		to	to	to	Total	use				
					re of motor vehicles	on and logistics	sales and after-sale		tion and manageme	ng and related	and develop			consumption	capital	Total	Country B	Country C	RoW						
						. 3	services		nt	technical	ment			expenditure	formation										
									functions	services															
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)				
		1)																							
		2)																							
PRODUCTS		3)																							
DOC		4)																							
PRC		5)																							
		6)																							
		7) 8)																							
		9)																							
stn		10)																							
Adjustn	Direct purchases abroad by res (1																								
		12)																							
	Compensation of employees (1	13)																							
	Other taxes less subsidies on production (1	14)																							
<	Consumption of fixed capital (1	15)																							
GVA	Net operating surplus/net mixed income (1	16)																							
	Gross operating surplus/gross (1 mixed income																								
		18)																							
	Total input at basic prices (1	19)																							

		Industries														
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)				
Gross capital formation by asset type	(1)															
Capital stock by asset type	(2)															
Labour by relevant breakdown	(3)															
TEC Indicators (??)	(4)															
number of enterprises	(5)															
size enterprises by size class	(6)															



SUT extension: Tourism Satellite Account



Integration of Supply and Use

Supply

"Tourism Industries"?

(Non-visitors take lunch in a restaurant, visitors are buying non-tourism characteristic goods and services, i.e. clothes)

"Tourism and non-tourism Consumption" Use

"Tourism consumption"?

(Visitors, non-usual environment, main motivation of the trip, expenditure)

Tourism consumption

Ratio/share of tourism consumption related to total consumption

Every good and service receives a tourism ratio/share, which is applied to the respective industry (GVA)

Tourism Value Added (TVA) per industry, sum result in total TDGVA which is applied to total GDP



Elaboration of the products

(1) Tourism characteristic products:

Internationally comparable tourism characteristic products

- Accommodation services for visitors
 - Accommodation services other than vacation homes
 - Vacation homes
- Food and beverage serving services
- Railway passenger transport services
- Road passenger transport services
- Water passenger transport services (coastal and inland)
- Air passenger transport services
- Transport equipment rental services
- Travel agencies and other services (margin only)
- Cultural services (theater, museums, etc.)
- Sports and recreational services (entry fees to sport events, casino, etc.)

Country-specific tourism characteristic products

- Country-specific tourism characteristic goods
- Country-specific tourism characteristic services
- (2) Other consumption products (tourism connected and non-tourism related)
- (3) Valuables (purchases exceeding the custom's threshold within merchandise trade)

Total Supply and Internal Tourism Consumption by Products



Tourism Satellite Accounts: Table 6

United Nations Statistics Division

	TOURISMINDUSTRES																		Ta mes focus						
Parket.		f - Accommodation for visitors		f- a. ecces modelion sendow for violators except in f-ib		1-b. sacons distilon sarvices sacodetedwith sii types of vacation home ownership				12-County specific busine industries		TOTAL.		Other industries		Output of domestic producers at basic prices		rts*	subsides on products netionally produced and imported		framegort		Domestic supply est purchasers' prices	Internal tourism comsumption	Tourism ratios (%)
	(A. \$	food an alway (n value)	- E	share (h v stop	(5.5b)	therine a terr (in mates)	(5)	drawn drawn de velog	2 2 4	diversion altern (in volum)	edpar (f. 13)	tourian share (in veta)	(5. N)		(6,10) = (6,10) = (6,10) = (6,14)	footoe share (n velog	(8.1)	trates shire (it vets)	(6.2)	tourian share (in unite)	(4.2)	torion alere (trostes)	(6.4) = (5.15) + (6.1) + (6.2) + (6.3)	(4.3)	(6.5)= (6.5) × 100 (6.4)
A. Consumption products (*) A.1 Tour bin characteristic products (d) 1 - Accommodation services for visitors 1 - Accommodation services the visitors other than 10- 10 - Accommodation services associated with all types of viscation home cenerality 2 - Focat and home egy serving services 3 - Retire up passegre the report services 4 - Road passegre the report services 5 - Water passegre transport services 5 - Water passegre transport services 7 - Transport equipment ratial services 8 - Trainsport equipment ratial services 9 - Cuttur as services 10 - Sports and recreational services 11 - County specific tourism characteristic services A2 Other consumption products (a) (d) B. Hen consumption products (d) B. Visibables B.2 Other non consumption products (**) (b) (d)		×		×		×		×		×		×		×		×		×			X X X X X X X X X X X X X X X X X X X	** * * * * * * * * * * * * * * *			
I. TOTAL CUTPUT (at basic prices)																									
II. TOTAL INTERMEDIATE CONSUMPTION (at purchasers price) (c)																									•
(I - II) TOTAL GROSS VALUE ADDED (at basic prices)																									
Compensation of engliquee Other taxes less subsidies on production Gress milixed recorse Gross operating surplus																									

X does not apply

- *** Mean sthat all tourism industries of the proposed list have to be considered one by one in the enumeration
- * Imports excludes direct purchase of re-sidents abroad
- (*) The value of A. Communption products, is net of the gross service charges paid to travel agencies, but operators and other reservation services.
- (**) Includes all other goods and services that droub is in the economy of reference.
- [48] If relevant and feealths, countries should separately identify both components (fourters connected products" and "non-tourism related consumption products"). In both cases, goods and services should be separately identified, if possible (see e.g., and "non-tourism related consumption products").
- (b) Goods and services should be separately identified, if possible (see para. 4.16.)
- (c) Elesidown should be provided, if possible (see pails, 4.17.)
- (d) For goods, the tourism share is to be established on the retail trade margin only (see Annex 4)