From South American to Latin American Input-Output Table (2011 – 2014) and a project to build a Global IOT

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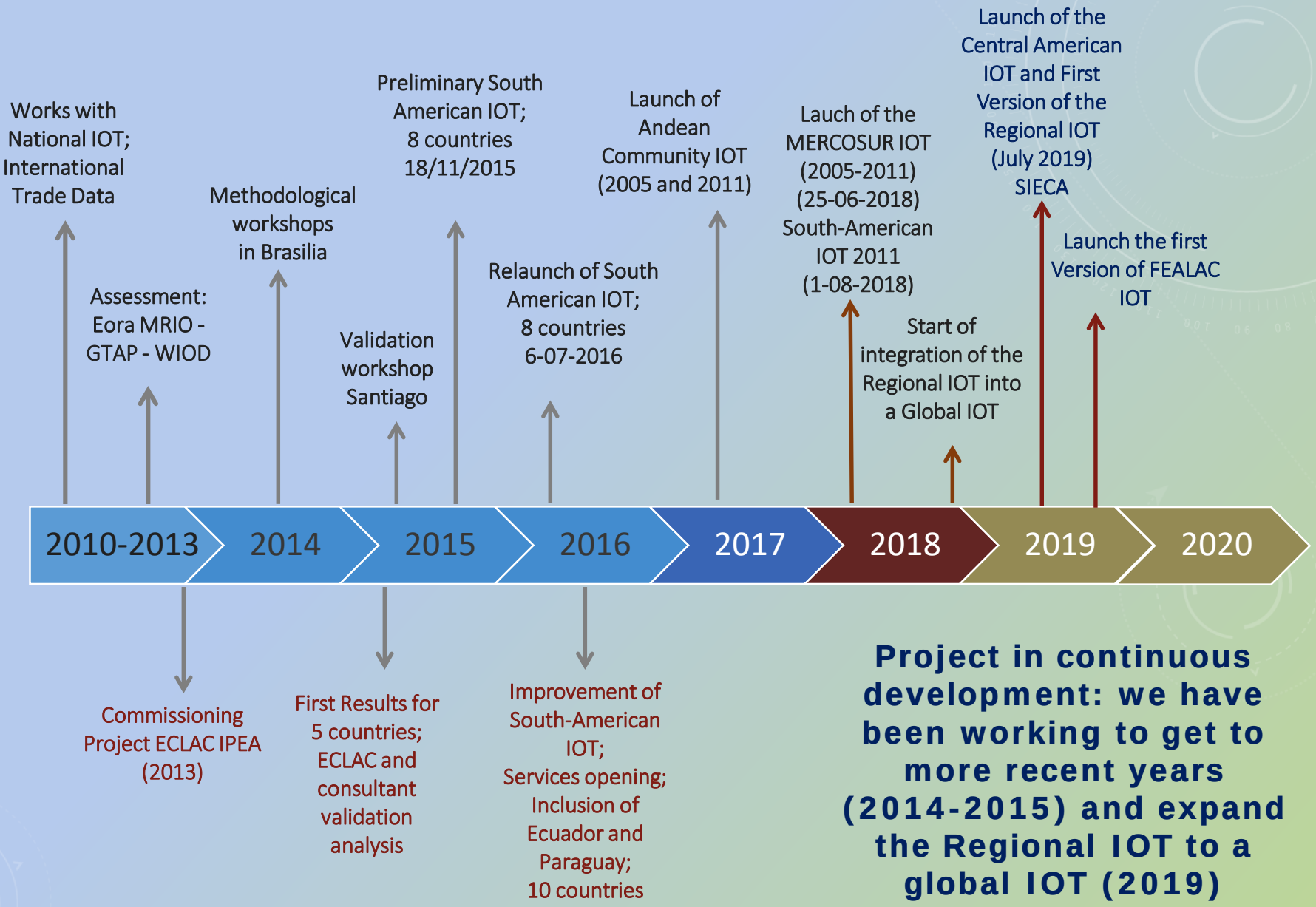
Evolution of VC analysis in ECLAC (LAC countries)

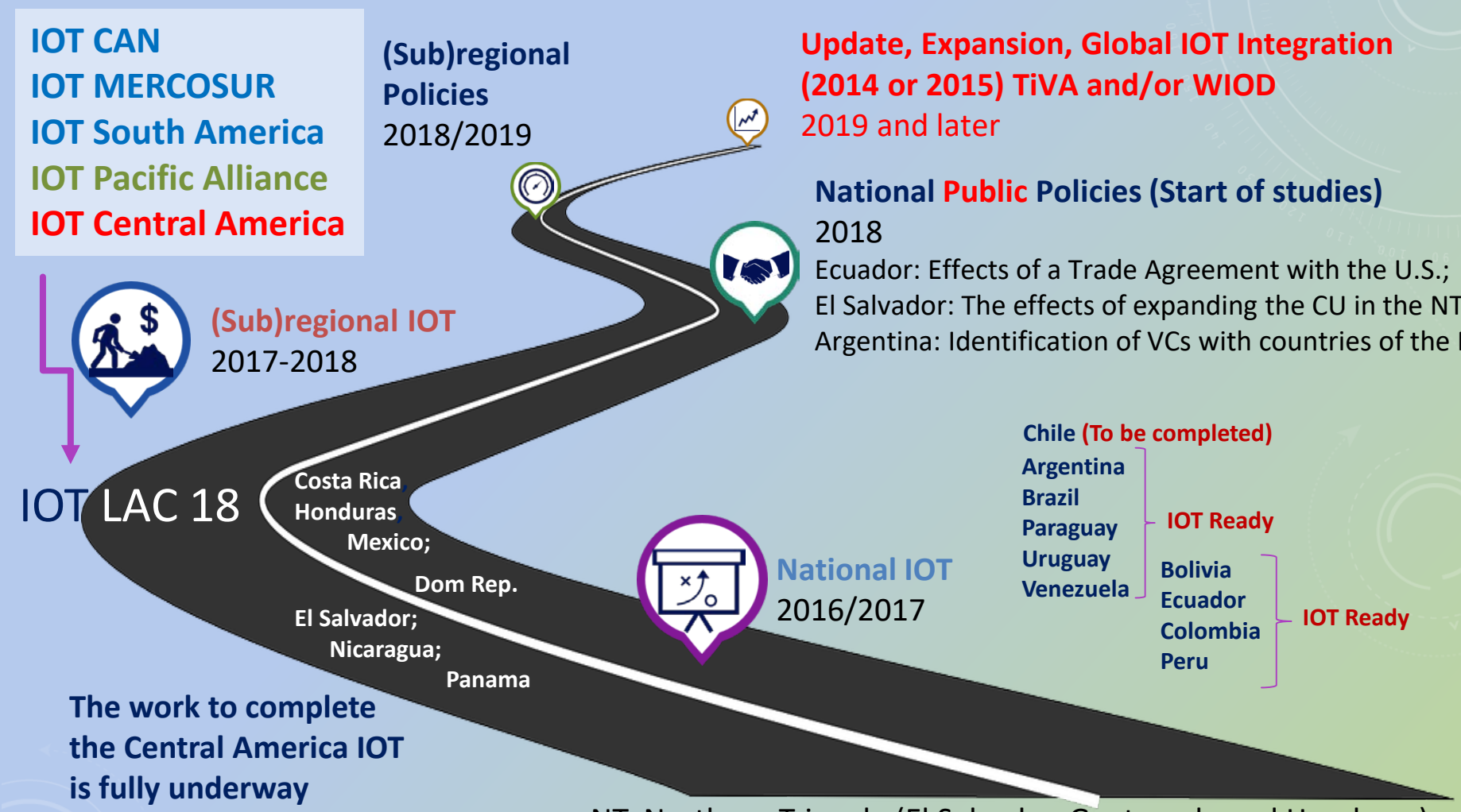
- Until 2008: Analysis of trade in parts and components COMTRADE and National databases)
- 2009-2012: Identification of sectors with potential value added (Grubel Lloyd indices and trade intensity indicators)
- 2013-2014: Employment associated with foreign trade (using National IOTs) → Different years and sectors
- 2014-2016: We moved from ~~to~~ the gross analysis of trade intensity to net value chain analysis at the request of ~~:~~ the CELAC Pro tempore Secretary of Costa Rica and the Brazilian Institute of Applied Economic Research (IPEA). In 2016, ECLAC assembled the first South American IO Table for 2005.
- **During the biennium 2017-2018 ECLAC achieved a new Key milestone: ECLAC Mexico with the support of national officials from each country compiled and assembled national matrices compatible with the South American project: same 40 sectors.**
- **The new countries were: Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.**
- **Now: we are in the process of validation of the Mexico and Central American IOT for 2011 and assembly of a new regional IOT with 18 countries.**
- **Second half of 2019: i) Conclude the FEALAC Global IOT for 2011 – joint work with ESCAP and Asian Development Bank (ADB); ii) Assemble a new LAC IOT for 2014 and also a FEALAC IOT for 2014.**

KEY MILESTONES IN LAC IOT



Project in continuous development: we have been working to get to more recent years (2014-2015) and expand the Regional IOT to a global IOT (2019)

This was the status of the work of ECLAC in July 2018 at the Second Regional Global meeting of TIVA



NT: Northern Triangle (El Salvador, Guatemala and Honduras)
PA: Pacific Alliance (Colombia, Chile, Mexico and Peru)

And this is the state now in July 2019

IOT CAN;
IOT MERCOSUR;
IOT South America
IOT Pacific Alliance
IOT Central America

(Sub)regional Policies
2018/2019

Update, Expansion, Global IOT Integration (2014 or 2015) TiVA and/or WIOD
2019 and later

National Public Policies (Studies completed)
2018
Ecuador: Effects of a Trade Agreement with the U.S.;
El Salvador: The effects of expanding the CU in the NT;
Argentina: Identification of VCs with counties of the PA;
Colombia: Complementarities between countries of PA.

(Sub)regional IOT
2017-2018

IOT LAC 18

Costa Rica,
Honduras,
Mexico;
Dom Rep.
El Salvador;
Nicaragua;
Panama

National IOTs
2016/2017

Chile (IOT Ready)
Argentina
Brazil
Paraguay
Uruguay
Venezuela
IOT Ready

Bolivia
Ecuador
Colombia
Peru
IOT Ready

The compilation of the Central America IOT is completed

We are in the process of validation and revision of the regional IOT

National and Sub-regional IOTs in Latin America (18 countries)

Mexico IOT

Central America IOT*

MERCOSUR IOT*

Andean Community IOT*

Chile IOT*

18 National Matrices
40 sectors
Years: 2005* and 2011

Selected sectors for the harmonization of Latin American IOT: 40 sectors

Forty sectors selected to join a South American input-output matrix

Sector	Description	ISIC Code (Rev. 3)	
s1	Agriculture and forestry	0111 0112 0113 0121 0122 0130 0140 0200	Agriculture, forestry, hunting and fishing (2)
s2	Hunting and fishing	0150 0500	
s3	Mining (energy)	1010 1020 1030 1110 1120 1200	Oil and mining (2)
s4	Mining (non-energy)	1310 1410 1421 1422 1429	
s5	Meat and meat; dairy milk	1511 1512 1514 1520	Food, beverages and snuff (6)
s6	Grinding, baking and pasta	1531 1532 1541 1544	
s7	Sugar and confectionery products	1542 1543	
s8	Other food products	1513 1549	
s9	Drinks	1551 1552 1553 1554	
s10	Snuff products	1600	
s11	Textiles	1711 1712 1729 1730	Textiles, apparel and footwear (3)
s12	Garments	1721 1722 1723 1810 1820 1911 1912	
s13	Footwear	1920	
s14	Wood and products of wood and cork	2010 2021 2022 2023 2029	Wood, pulp and paper (2)
s15	Pulp, paper, paper, printing and publishing	2101 2102 2109 2211 2212 2213 2219 2221 2222 2230	
s16	Coke, refined petroleum and nuclear fuel	2310 2320 2330	Chemicals and Pharmaceuticals (4)
s17	Basic chemicals	2411 2412 2413	
s18	Other chemicals (excluding pharmaceuticals)	2421 2422 2424 2429 2430	
s19	Pharmaceutical	2423	
s20	Rubber and plastic	2511 2519 2520	Rubber and plastic (1)
s21	Nonmetallic minerals	2610 2691 2692 2693 2694 2695 2696 2699	Nonmetallic minerals (1)
s22	Iron and Steel	2710 2731	Metals and metal products (3)
s23	Non-ferrous metals	2720 2732	
s24	Metal fabricated metal products (excluding machinery and	2811 2812 2813 2891 2892 2893 2899	
s25	Machinery and equipment (excluding (excluding electrical n	2911 2912 2913 2914 2915 2919 2921 2922 2923 2924 2925 2926 2927 2929 2930	Machinery and equipment (5)
s26	Office equipment (including computer equipment)	3000	
s27	Machinery and electrical appliances	3110 3120 3130 3140 3150 3190 3210	
s28	Radio, television and telecommunications equipment team	3220 3230	
s29	Optical medical equipment and precision instruments	3311 3312 3313 3320 3330	
s30	Motor vehicles, trailers and semi-trailers	3410 3420 3430	Vehicles and their parts and components (3)
s31	Aircraft	3530	
s32	Other transport equipment transport	3511 3512 3520 3591 3592 3599	
s33	Other articles: recycling, furniture and other	3610 3691 3692 3693 3694 3699 3710 3720	Other manufacturing (1)
s34	Electricity, gas and water water	4010 4020 4030	
s35	Construction	4510 4520 4530 4540 4550	
s36	Transport	6010 6021 6022 6023 6030 6110 6120 6210 6220 6301 6302 6303 6304 6309	Services (7)
s37	Post and telecommunications	6411 6412 6420	
s38	Finance and insurance	6511 6519 6591 6592 6599 6601 6602 6603 6711 6712 6719 6720	
s39	Services to businesses of all kinds	7010 7020 7111 7112 7113 7121 7122 7123 7129 7130 7210 7220 7230 7240 7250 7290 7421 7422 7430 7491 7492 7493 7495 7499	
s40	Other services	4100 5010 5020 5030 5040 5050 5110 5121 5122 5131 5139 5141 5142 5143 5149 5150 5190 5211 5219 5220 5231 5232 5233 5234 5239 5240 5251 5252 5259	
		5260 5510 5520 7411 7494 7511 7512 7513 7514 7521 7522 7523 7530 8010 8021 8022 8030 8090 8511 8512 8519 8520 8531 8532 9000 9111 9112 9120 9191	
		9192 9199 9211 9212 9213 9214 9219 9220 9231 9232 9233 9241 9249 9301 9302 9303 9309 9500 9900	

Source: ECLAC on the basis of ICM and / or national SUT, considering on the work of the respective national teams.

Primary (4)

Manufacturing (29)

Each of the National IOTs was reclassified to 40 Sectors

The First Latin American (18) Input-Output Table

Andean Community IOT
MERCOSUR IOT
Central American IOT
+
Mexico
+
Chile
+
Dominican Republic

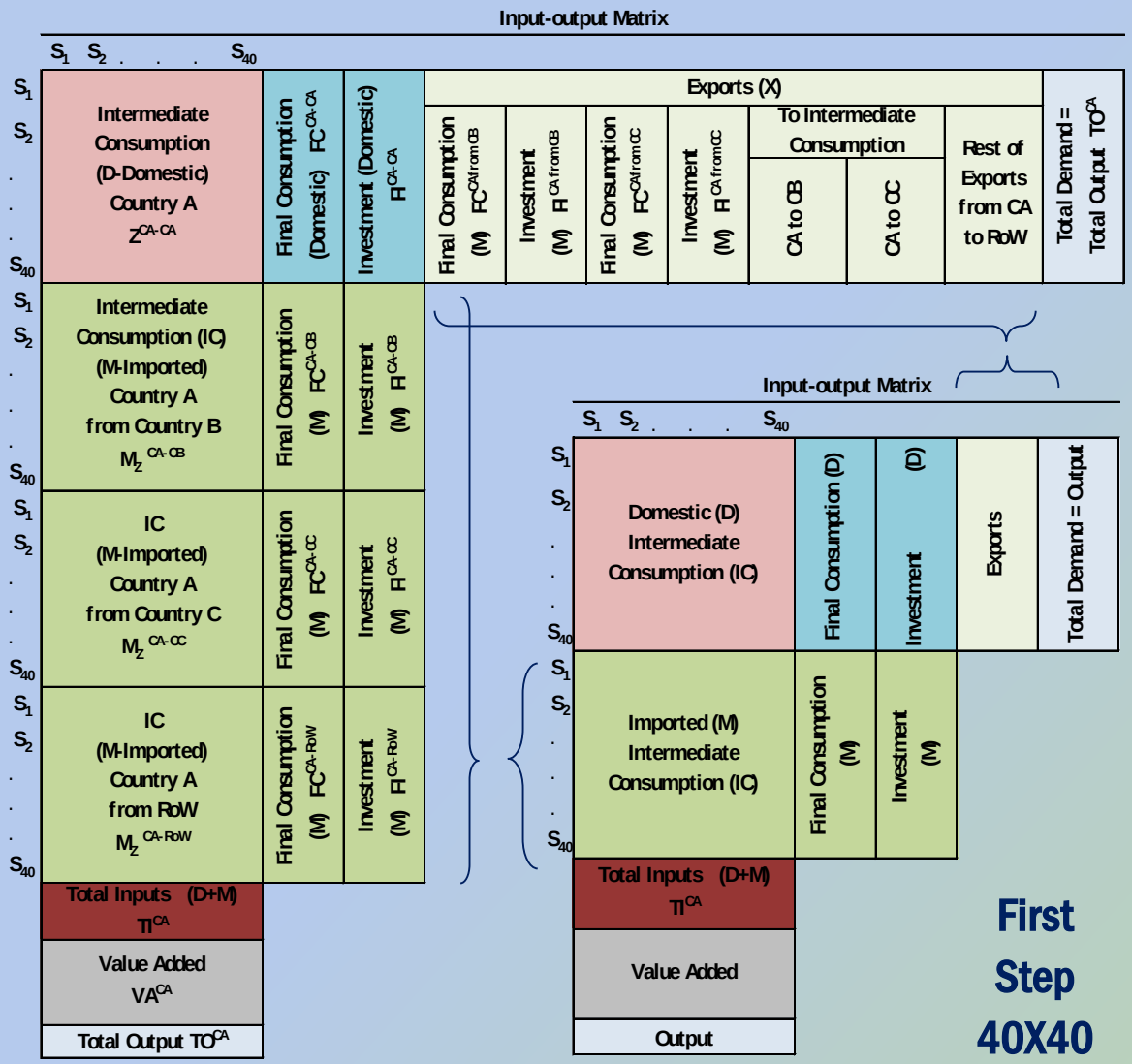
Subregional IOTs

National IOTs

18 National Matrices
40 X 40
Years: 2011 and 2014 (ongoing)

Steps followed to build the LA IOT

Second and Third Step

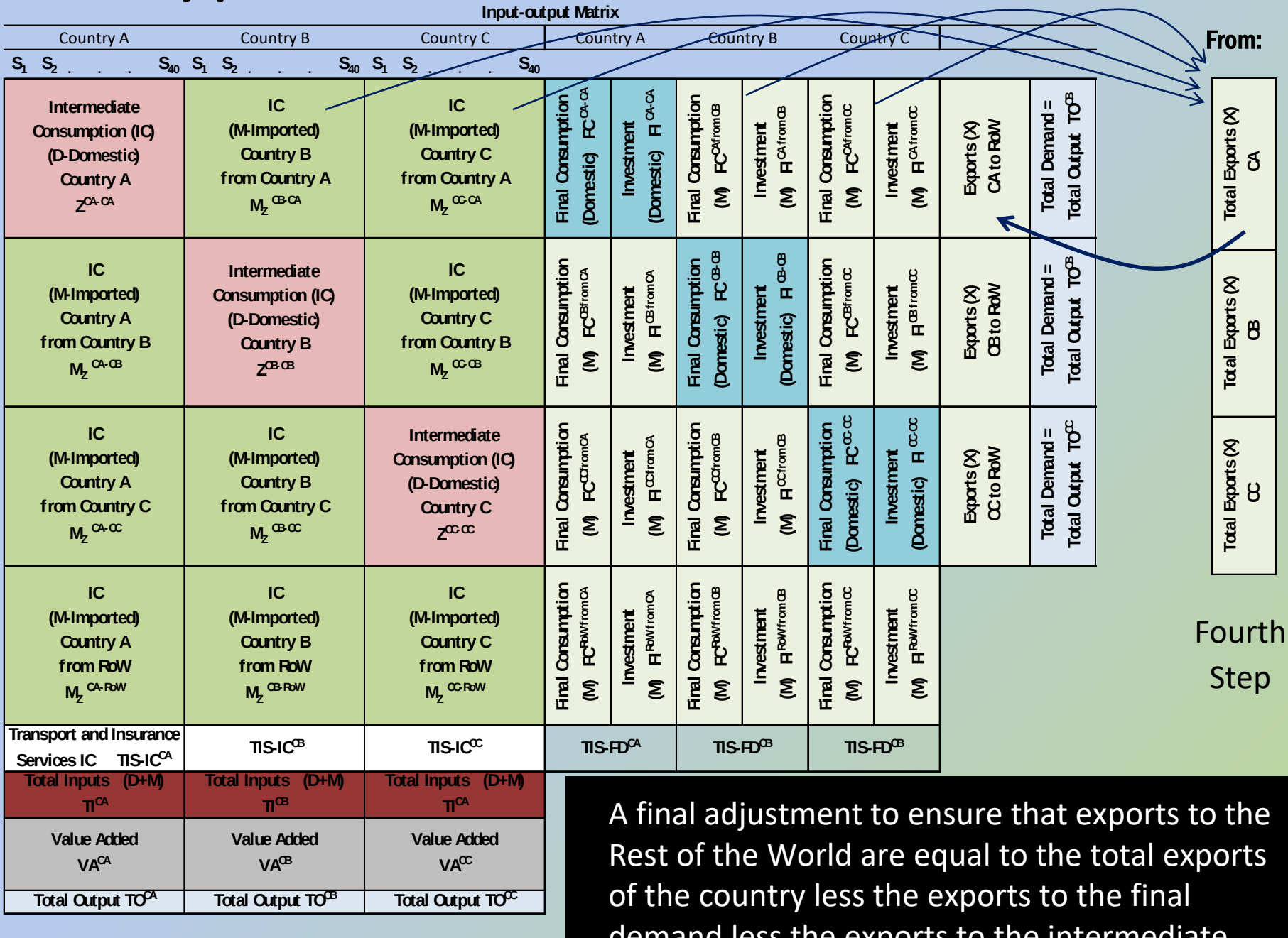


First Step 40X40

4 main steps

1. Input-output matrices from each of the participating countries (40X40) (US$ 2005 - 2011 - 2014) were used.
2. They were opened in imports of intermediate goods by the participating partners.
3. It was necessary to distinguish between intermediate and final use imports.
4. Assembly process:
   - (bilateral) trade control
   - balance check
   - vector adjustment

Assembly process:



Fourth Step

A final adjustment to ensure that exports to the Rest of the World are equal to the total exports of the country less the exports to the final demand less the exports to the intermediate

18 LAC countries with 55 partners

		Intermediate Use (18 LAC countries)								Final Use (18 LAC countries								Exports (Asia Pacific and R of World)											
		Argentina	Brazil	Costa Rica	Dom. Rep.	Mexico	...	Uruguay	Venezuela	Argentina	Brazil	Costa Rica	Dominic Republic	Mexico	...	Uruguay	Venezuela	United States	Canada	EU	India	Australia	Brunei	Cambodia	Japan	China	Thailand	...	R of World	Product Gross Value
LAC Imports	Argentina	40x40								40x2								40x1												40x1
	Brazil	40x40																												
	Costa Rica																													
	Dominican Republic																													
	Mexico																													
	....																													
	Uruguay																													
	Venezuela																													
Asian and ROW Imports	United States	40x40																												
	Canada																													
	European Union (EU)																													
	India																													
	Australia																													
	Brunei																													
	Cambodia																													
	Japan																													
	...																													
	R of World																													
	Tax	1x40																												
	Insurance and freight																													
	Value added																													

16 FEALAC extra regional partners:
Australia, Brunei, Cambodia, Japan, China, Thailand, Malaysia, Mongolia, New Zealand, Laos, Myanmar, Mongolia, Indonesia, Philippines, Singapore, Vietnam.

Heterogeneity in the compilation of South American data

- Base years and sectoral structure were different between countries
- National teams contributed to the harmonization of each national matrix to a set of 40 selected sectors

	ARGENTINA	BRAZIL	BOLIVIA	CHILE	COLOMBIA	ECUADOR	PARAGUAY	PERU	URUGUAY	VENEZUELA
ISIC	3.1	4.0	3.1	3 y 3.1	3 y 3.1	4	4	3	3	4
Year	2004	2010 (MIP) 2011 (COU)	1990	2013	2012	2010	2011	2007	2012	2007
IOT or SUT	124X95	128X68 127x67	35 X 35	111X111	61 X 61	69x69	46X46	54 x 54	50 x 50	99 x 99
Source	MECON	IBGE	INE	BCCH	DANE	BCE	BCP	INEI	BCU	BCV

SOUTH AMERICAN IOT

40X40
2011

Heterogeneity in the compilation of data from Central America, Mexico and Dominican Republic

- Base years and sectoral structure were different between countries
- Central Banks and Statistic offices contributed to match each national matrix to the set of 40 pre-defined sectors

	COSTA RICA	EL SALVADOR	GUATEMALA	HONDURAS	MEXICO	NICARAGUA	PANAMA	DOMINICAN REPUBLIC
ISIC	4	4	3.1	4	4	3	3	4
Year	2011	2014	2011	2011	2014	2009	2012	2011
IOT or SUT	40 X 40	183 X 86	225 X 134	95 X95	40 X 40	447 X 137	176 X 77	69 X 40
Currency	Colón	US$ Dollar	Quetzales	Lempiras	Pesos	Córdobas	Balboas	Pesos
Source	Central Bank of Costa Rica	Central Bank of The Republic of EL Salvador	Bank of Guatemala	Central Bank of Honduras	INEGI	Central Bank or Nicaragua	INEC	Central Bank of Dominican Republic

MEXICO, DOM. REP. AND CENTRAL AMERICA IOT

40X40
2011

Assembly adjustments were not simple and it was necessary to make several modifications

The main difficulties were:

- There was no complete information in some countries in order to update the matrix to the base year. Assistance of national experts was necessary.
- Sectors across countries were not homogeneous
  - ✓ Reallocated sectors.
  - ✓ Sectors were opened or merged
  - ✓ Intersectoral single converter (harmonization of results across countries)
  - ✓ Secondary information was necessary for the opening of sectors
- Separation of exports and imports of goods across sectors and countries was not identical
  - ✓ Single converter for all countries
- The geographical distribution of services trade flows is not yet optimal.

CONTROL: I-O Structure

Data:

Exports

Comparisons: Trade flows.

- Partners: Geographic disaggregation
- Data from National Accounts (Collapsed data to 40x40 sectors)

Similarity Index :

- Vectors of Trade Flows: Exports: Intermediate, Capital and Consumption Goods

Sources:

- IOT (34x34) – (40x40)
- Trade flows: geographical disaggregation
- UN Comtrade

Imports

Comparisons:

- Trade Flows Geographically disaggregated.
- Intermediate use in imported inputs .

Similarity Index :

- Vectors of Trade Flows: Imports of intermediate inputs and final goods

Sources:

- IOT (34x34) – (40x40)
- UN Comtrade
- Matrix of Intermediate Uses
- Trade flows: geographical disaggregation

We are now checking the consistency of the new set of IOT of Mesoamerica and Dom. Republic and we still have work to do …

Similarity index between exports of national IOT and UN-COMTRADE

Countries	Total M	Intermediate Inputs	Final Goods
Guatemala	82	76	80
Costa Rica	77	54	90
Mexico	73	74	69
El Salvador	69	36	62
Nicaragua	65	59	64
Dominican Republic	57	61	57
Honduras	33	35	42
Panama	21	24	23

Source: ECLAC based on assembly process of LAC IO Table new set of countries

Clearly the cases which require more attention are Panama and Honduras. However, the cases of El Salvador and Mexico are being reviewed to improve the similarity between imports from different sources

Similarity index between imports of national IOT and UN-COMTRADE

Countries	Total M	Intermediate Inputs	Final goods
Costa Rica	82	72	78
Dominican Republic	69	66	58
El Salvador	**61**	**64**	**51**
Guatemala	87	82	86
Honduras	47	46	48
Mexico	**62**	**53**	**65**
Nicaragua	81	66	87
Panama	40	33	43

Source: ECLAC based on assembly process of LAC IO Table new set of countries as of 24-06-2019

Bilateral trade controls help to check differences and allows to improve the quality of the assembly

SIMILARITY INDEX BETWEEN IMPORT AND EXPORT BASKETS: BILATERAL TRADE DATA

Importer / Exporter	Costa Rica	Dominican Republic	Guatemala	Honduras	Mexico	Nicaragua	Panama	El Salvador
Costa Rica		66	92	94	46	89	63	70
Dominic. Rep.	32		82	27	19	11	39	23
Guatemala	85	70		85	76	71	51	64
Honduras	73	53	54		75	73	36	66
Mexico	78	92	76	68		100	55	80
Nicaragua	66	53	80	69	11		64	79
Panama	55	26	48	78	4	17		6
El Salvador	67	51	58	61	40	50	59	

Source: ECLAC based on assembly process of LAC IO Table new set of countries as of 24-06-2019

Challenges for LAC IOT

The main challenges in the construction of the Latin American IOT 2011 and 2014 have been: i) the harmonization of sectors; and ii) the disaggregation of the imported intermediate use of services by partners.

- Only 4 countries have detailed information on services in LAC (Brazil, Chile, Colombia and Costa Rica)

In ECLAC, we have an ad hoc methodology that follows a few steps:

- First step: Use of official information of countries with data (BRA, COL, CHL, CRI)
- Second step: Build a matrix including all available mirror flows;
- Third step: Use of proxy variables in the disaggregation by partners (relative on the service subsector); and
- Fourth step: Use of information of total value of service in national SUT and the structure of the proxy variable to construct “the estimated” disaggregation by partners.

Main proxies used to open import and export services by partners, 2011 LAC IOT

SA-IO	Services sectors	Proxy for exports	Proxy for imports
34	Electricity and gas	Share of volume of intrarregional imports by partner	Share of volume of intrarregional imports by partner
35	Construction	zero or less significant	zero or less significant
36	Transport	Structure of trade of goods by partner	Structure of trade of goods by partner
37	Communications	Remittances by destination, and SITC 675 (telecommunication equipment)	Remittances by destination, and SITC 675 (telecommunication equipment)
38	Finance and insurance	Structure of FDI inflows by partner	Structure of FDI outflows by partner
39	Other business services	Structure of good exports by partner	Structure of good imports by partner
40	Other services	Structure of good exports by partner	Structure of good imports by partner

Source: ECLAC based on assembly process of LAC IO Table new set of countries as of 24-06-2019

Future steps: the new project - FEALAC (Forum for East Asia-Latin America Cooperation)

- Update the LAC IOT from 2011 to 2014
- Include all countries of FEALAC (Asia and Latin America)
- Integrate LAC countries with Asian countries in FEALAC project
- The main objective: possess a tool for regional and bi-regional VC analysis
- Difficulties to overcome in order to carry out this process:
    1. ECLAC does not have information for extra regional partners of great relevance that ADB does have: European Union, United States, Canada, India, Russia, among others.
    2. ADB MRIO has more countries than OECD TIVA in the case of Asia, but does not have information for Latin America (only Brazil and Mexico).
    3. The OECD TIVA initiative has complementary countries that ECLAC and ADB do not have.
    4. To fulfill the objective, all TIVA initiatives must converge at sector level to integrate into a Global Matrix.

Latin America and Asia Pacific members of FEALAC included in the different TIVA initiatives

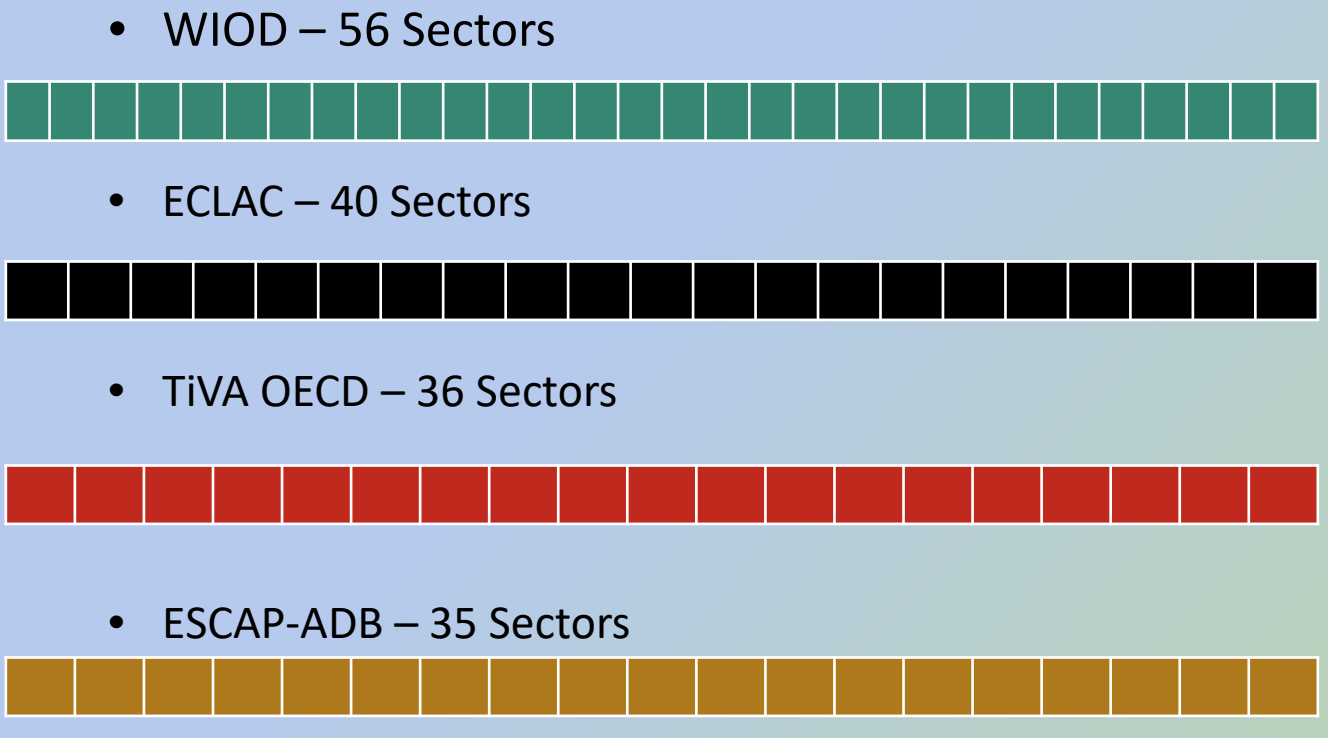
COUNTRY AVAILABILITY: COMPARISON

Source	Number of FEALAC members	FEALAC members included
WIOD	7 (19%)	Australia, Brazil, China, Indonesia, Japan, Korea, Mexico
TiVA-OECD	20 (56%)	Argentina, Australia, Brazil, Brunei Darussalam, Chile, China, Colombia, Costa Rica, Indonesia, Japan, Cambodia, South Korea, Mexico, Malaysia, New Zealand, Peru, Philippines, Singapore, Thailand, Viet Nam.
EORA	36 (100%)	All
LAC IOT	18 (50%)	Argentina, Bolivia (P.S.), Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Uruguay, Venezuela (B.R.)
ADB	16 (44%)	Australia, Brazil, Brunei Darussalam, Cambodia, China, Indonesia, Japan, South Korea, Lao People's Democratic Republic, Malaysia, Mexico, Mongolia, Philippines, Singapore, Thailand, Viet Nam.
FEALAC IOT **ECLAC / ESCAP / ADB**	**34 (94%)**	**Argentina, Australia, Bolivia (P.S.), Brazil, Brunei Darussalam, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Indonesia, Japan, Cambodia, South Korea, Lao People's Democratic Republic, Mexico, Myanmar, Mongolia, Malaysia, Nicaragua, New Zealand, Panama, Peru, Philippines, Paraguay, Singapore, El Salvador, Thailand, Uruguay, Venezuela (B.R.) and Viet Nam.**

Source: ECLAC based on WIOD, TIVA OCDE, EORA, ADB-MRIO and LAC IOT (18) for FEALAC

Sectorial harmonization of IOT for FEALAC

- WIOD – 56 Sectors
- ECLAC – 40 Sectors
- TiVA OECD – 36 Sectors
- ESCAP-ADB – 35 Sectors



FEALAC IOT

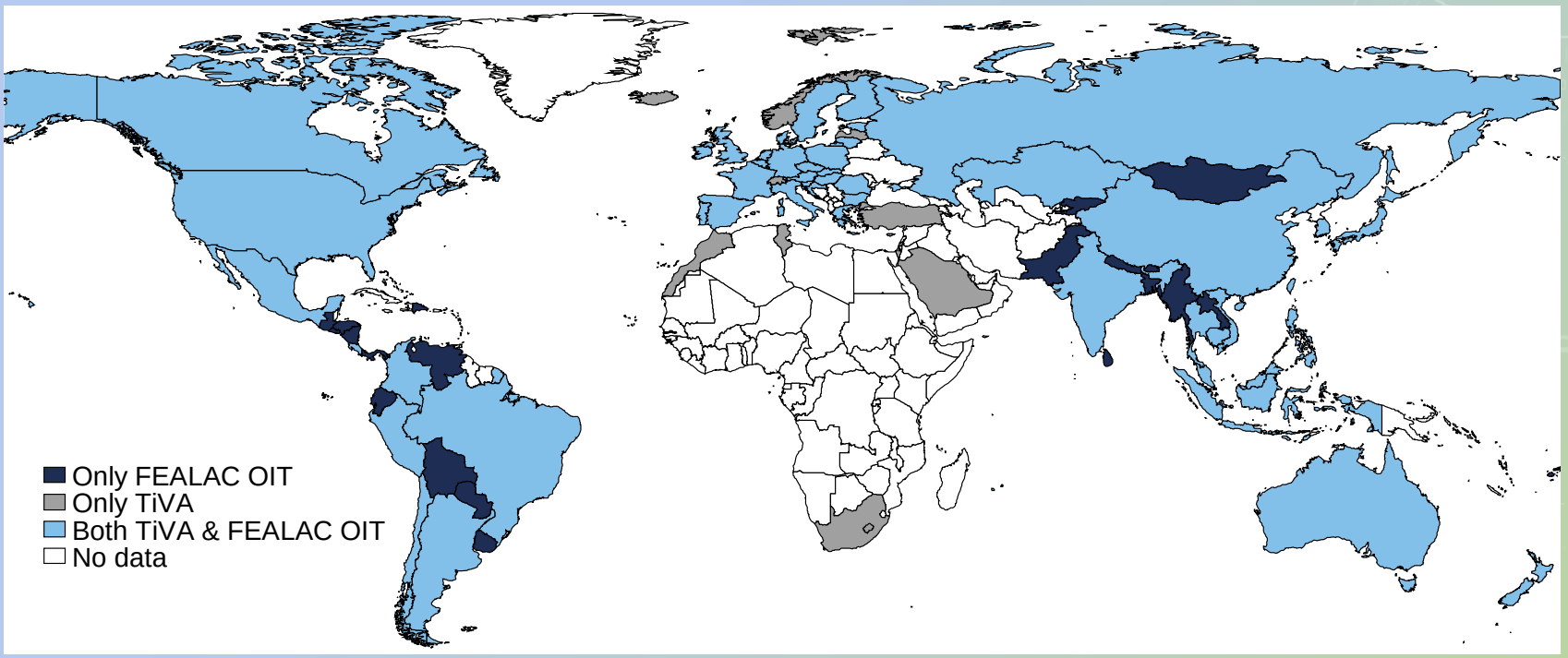
25 Sectors

These are the 25 selected sectors for the FEALAC IOT

#	FEALAC 25 sectors	Broad sectors
s1	Agriculture, hunting, forestry and fishing	Primary Products (2 sectors)
s2	Mining and quarrying	
s3	Food products, beverages and tobacco	Manufactures (16 sectors)
s4	Textiles, textile products, leather and footwear	
s5	Wood and products of wood and cork	
s6	Pulp, paper, paper products, printing and publishing	
s7	Coke, refined petroleum products and nuclear fuel	
s8	Chemicals and chemical products	
s9	Rubber and plastics products	
s10	Other non-metallic mineral products	
s11	Basic metals	
s12	Fabricated metal products	
s13	Machinery and equipment, nec	
s14	Computer, Electronic and optical equipment	
s15	Electrical machinery and apparatus, nec	
s16	Motor vehicles, trailers and semi-trailers	
s17	Other transport equipment	
s18	Manufacturing nec; recycling	
s19	Electricity, gas and water supply	Services (7 sectors)
s20	Construction	
s21	Transport and storage	
s22	Post and telecommunications	
s23	Financial intermediation	
s24	Business services of all type	
s25	Other services	

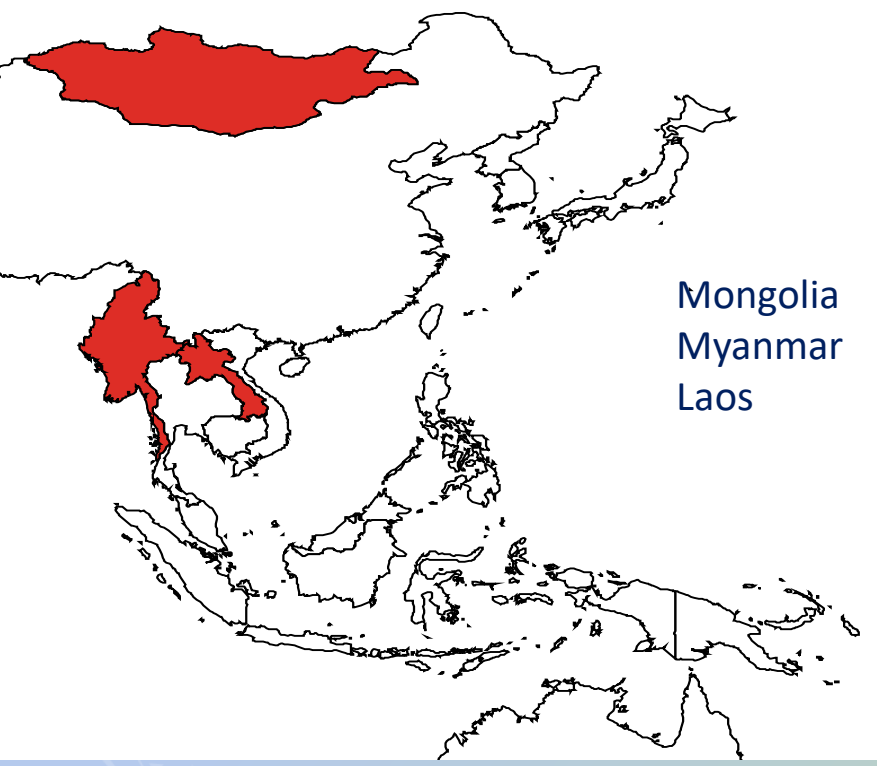
At the moment, we have a 40 X 40 LAC IOT and also a 25 X 25; ADB has additional Asian countries (35 X 35 MRIO)

INCLUSION OF ADDITIONAL COUNTRIES IN GVC ANALYSIS



Source: ECLAC based on WIOD, TIVA OCDE, ADB-MRIO and LAC IOT (18) for FEALAC

Inclusion of 15 new countries in GVC analysis: 12 from LAC, and 3 from Asia



Mongolia
Myanmar
Laos

Bolivia
Costa Rica
Dominican Rep.
Ecuador
El Salvador
Guatemala
Honduras
Nicaragua
Panama
Paraguay
Uruguay
Venezuela

Source: ECLAC based on ADB-MRIO and LAC IOT (18) for FEALAC

A comparison between LAC-IOT with OECD TIVA shows that there is great convergence between both initiatives

IOT COMPARISON: TIVA & LAC IOT
PRODUCTION (GROSS OUTPUT) OF LATIN AMERICAN COUNTRIES

YEAR: 2011	PRODUCTION TiVA OECD (a)	% Total	PRODUCTION LAC IOT for FEALAC (b)	% Total	(a)/(b)	Similarity Index
Argentina	870,938	10%	868,757	10%	1.00	90.22
Brazil	4,447,503	51%	4,410,321	52%	1.01	97.09
Chile	460,384	5%	458,655	5%	1.00	89.49
Colombia	563,733	6%	563,726	7%	1.00	95.41
Costa Rica	71,384	1%	63,819	1%	1.12	88.64
Mexico	2,023,904	23%	2,020,838	24%	1.00	82.67
Peru	305,321	3%	305,776	4%	1.00	97.53
Total	**8,743,166**	**100%**	**8,523,513**	**100%**	**1.03**	**95.41**

Source: ECLAC based on TIVA OECD MRIO and LAC IOT (18) for FEALAC

Comparison between LAC-IOT with WIOD shows a similar results, but with greater differences

IOT COMPARISON: WIOD X LAC IOT
PRODUCTION (GROSS OUTPUT) OF LATIN AMERICAN COUNTRIES

YEAR: 2011	PRODUCTION WIOD* (a)	% Total	PRODUCTION LAC IOT (b)	% Total	(a)/(b)	Similarity Index
Mexico	1,954,509	33%	2,020,838	31%	0.967	78.8
Brazil	4,001,072	67%	4,410,321	69%	0.907	85.1
Total	**5,955,580**	**100%**	**6,431,159**	**100%**	**0.926**	**83.8**

*Values from the WIOD 2013 release

What are the challenges shared by all?

Last but not least important:

- Compatibility of sectoral disaggregation between IOT projects is still necessary;
- Converters (for production and trade);
- Shared databases and methodology;
- Organization of workshops with national institutions in order to share best practices and help strengthening base data.

We have a fertile field of cooperation between our institutions and also with our member countries.

FEALAC Project opens many possibilities for cooperation.

Future initiatives and efforts

ECLAC's overall goal is to enhance the use of the **IOTs** as a **tool for** policy **decision makers and researchers** in the region and worldwide:

This requires:

1. Improving the knowledge about construction and methodology of IOTs;
2. Facilitating the use of IOTs through complementary tools and materials.

ECLAC addresses those requirements offering:

A. **Workshops and Trainings** for public and private stakeholders on **how to build and analyse data from IOT**

B. Providing digital and non-digital information as part of the LA IOT

→ **Handbook on IOT Indicators** with examples from the LA countries

→ **Online Dashboard of Indicators** allowing the selection of countries and years

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