MIT INDUSTRIAL PERFORMANCE CENTER

A European framework for measuring globalisation

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Europe in a Globalised World
Conference on economic globalisation, global value chains, trade and enterprise policy. and statistical data underpinning future policy shaping

Eigtveds Pakhus, Copenhagen

Global Value Chains and Economic Globalization

Towards a New Measurement Framework

Report to Eurostat by Dr. Timothy J. Sturgeon,
Industrial Performance Center, Massachusetts Institute of Technology

Today's presentation

- From internationalization to economic globalization
- Enablers of economic globalization
- Global Value Chains – a conceptual map to assess needed data resources
- The challenges of economic globalization for statistical measurement
- Assessment of current situation in Europe
- Filling the data gaps
- Taking micro-data mainstream
- International integrated data platform (IIDP)
- Europe's "natural" leadership in internationally integrated statistics
- The priorities for Eurostat
- What's in it for member states?
- Opportunities for leadership

* • The Problem

* • Assessment of current situation and recommendations

* • Commentary

From Internationalization to Economic Globalization

Internationalization

- Largely driven by two mechanisms:
  - 1) the spatial expansion of markets through arms-length trade, and
  - 2) an expansion of the internal structures of multinational enterprises (MNEs), mainly through:
    - foreign direct investment (FDI) and
    - the intra-firm trade that results between parents and foreign affiliates.

Economic Globalization

- An additional mechanism:
  - Global sourcing
    - ★ Sourcing to non-affiliated offshore business partners
    - ★ "Non equity ties"
    - ★ Sourcing with explicit coordination
    - ★ An "unmeasured" 3rd form of international trade
      - Cannot be differentiated from arms-length and affiliated trade in current statistics
    - ★ Lowers barriers for global integration

Globalization Enablers (I)

- Value Chain "Modularity"
  - Computerization
    - Design
    - Production
    - Distributed business processes
  - Standardization
    - Design software
    - Production equipment
    - Enterprise software
    - Logistics and RFID
    - The Internet

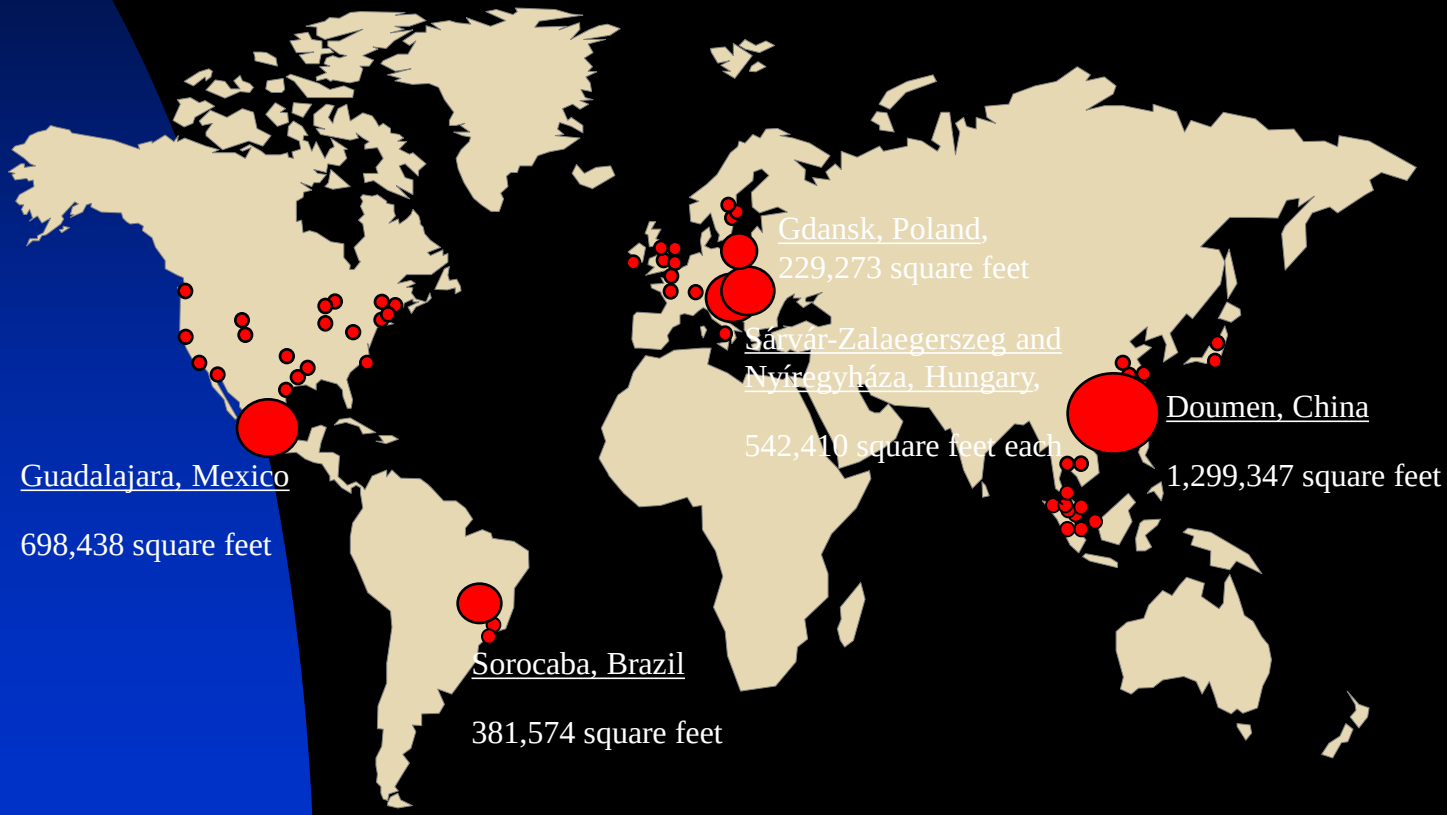
Globalization Enablers (II)

- Outsourcing in the 1990s
  - The great unbundling
  - Focus on core competence
  - Ideas from business school “gurus”
  - Shed fixed costs, keep variable costs
  - Pressure from financial markets
- The new global supply base
  - Fewer, larger suppliers in more locations

Global suppliers and the new global supply-base:

Flextronics International example, global electronics contract mfgr:

- 88 facilities, seven huge industrial parks with full package capabilities



Globalization Enablers (III)

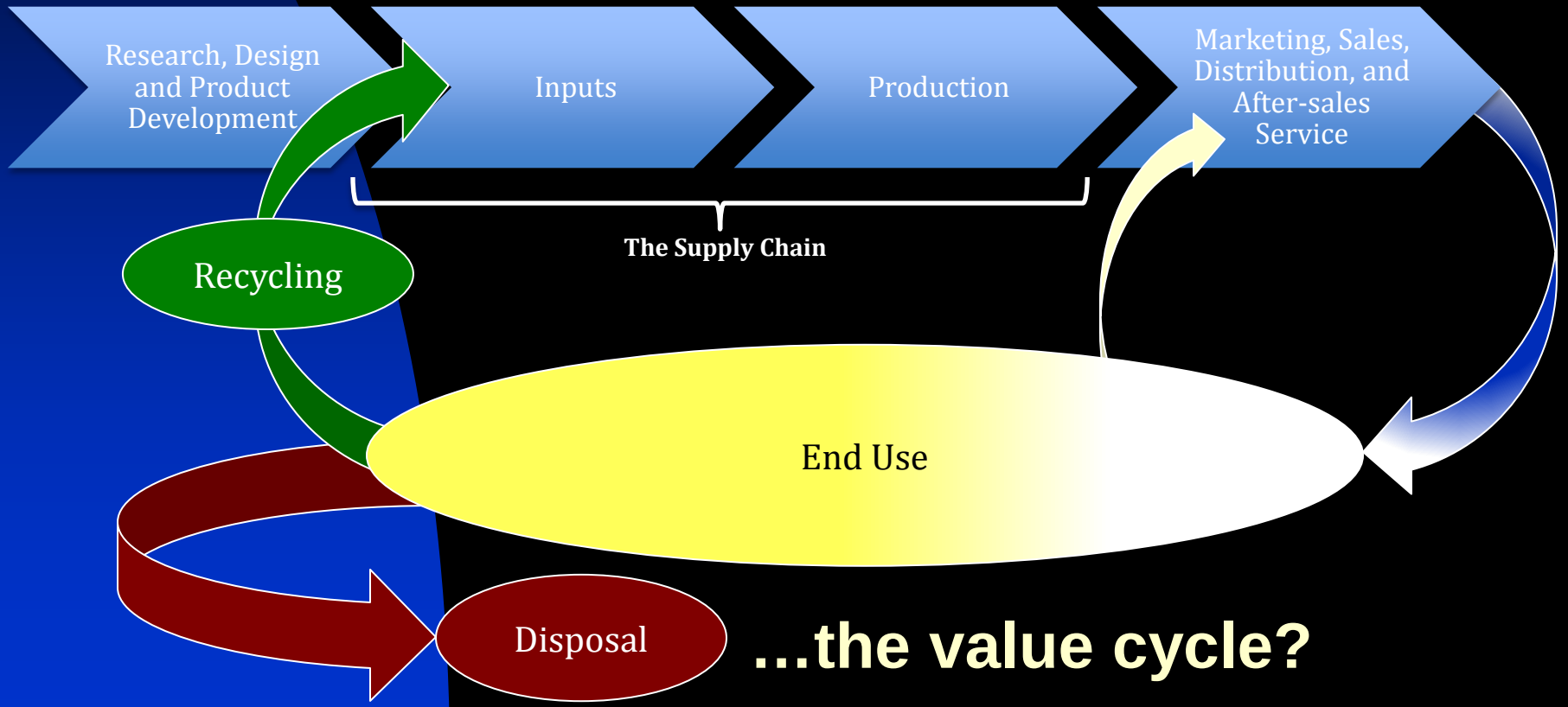
- Capabilities increasing in low cost geographies
  - Enterprise capabilities
  - Trade infrastructure
  - Finance
  - Government capabilities (the return of industrial policy)
- INCLUDING SERVICES! (another doubling?)

Why are better statistics on economic globalization needed?

- To develop a full set of enterprise characteristics, including the enterprise's global engagement.
- To gauge how pervasive global engagement is and what the trends are.
- To better understand the impact of global engagement on the quantity and quality of employment
- To better understand the impact of global engagement on innovation

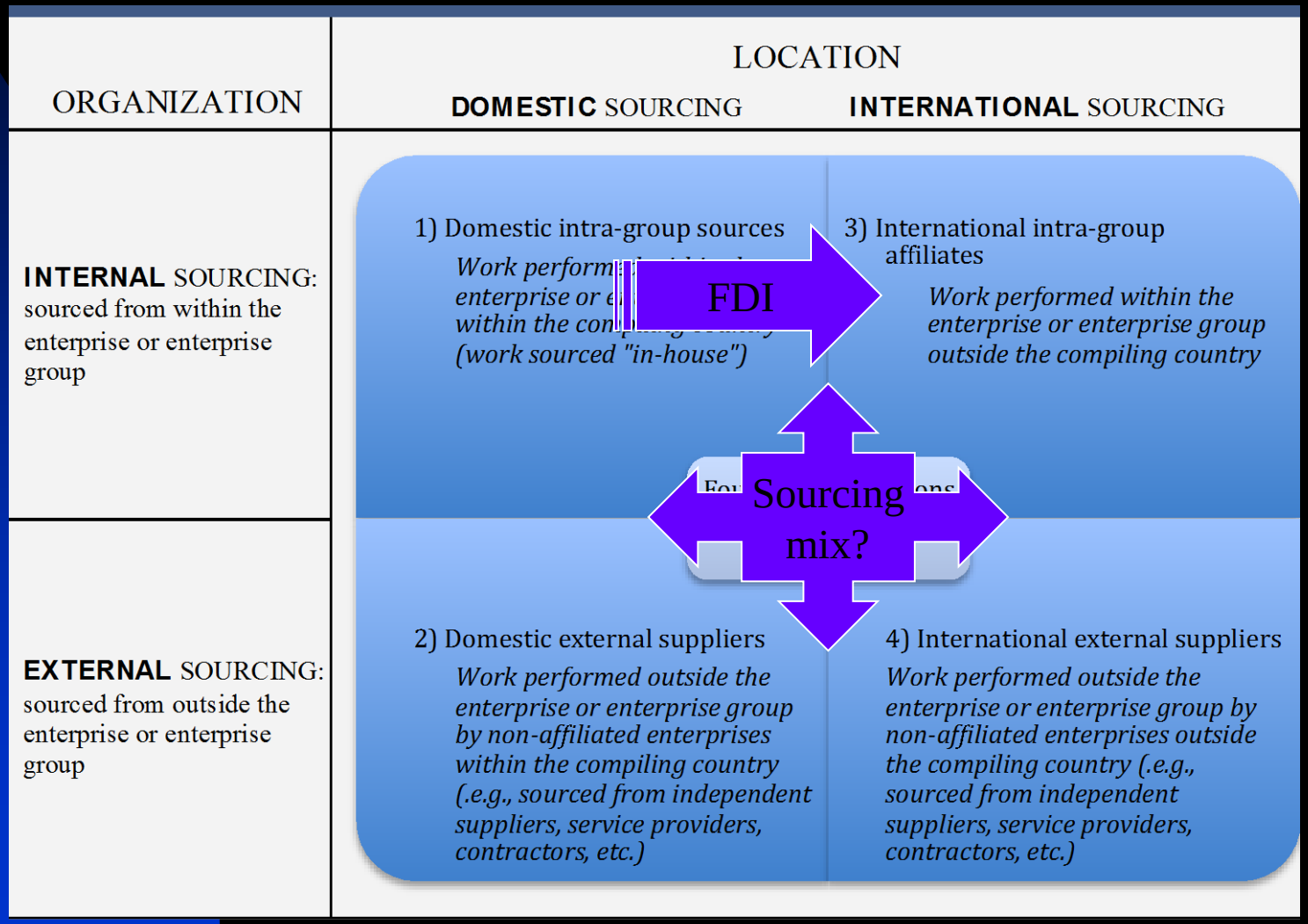
Global Value Chains – a conceptual map to assess needed data resources

A simple value chain

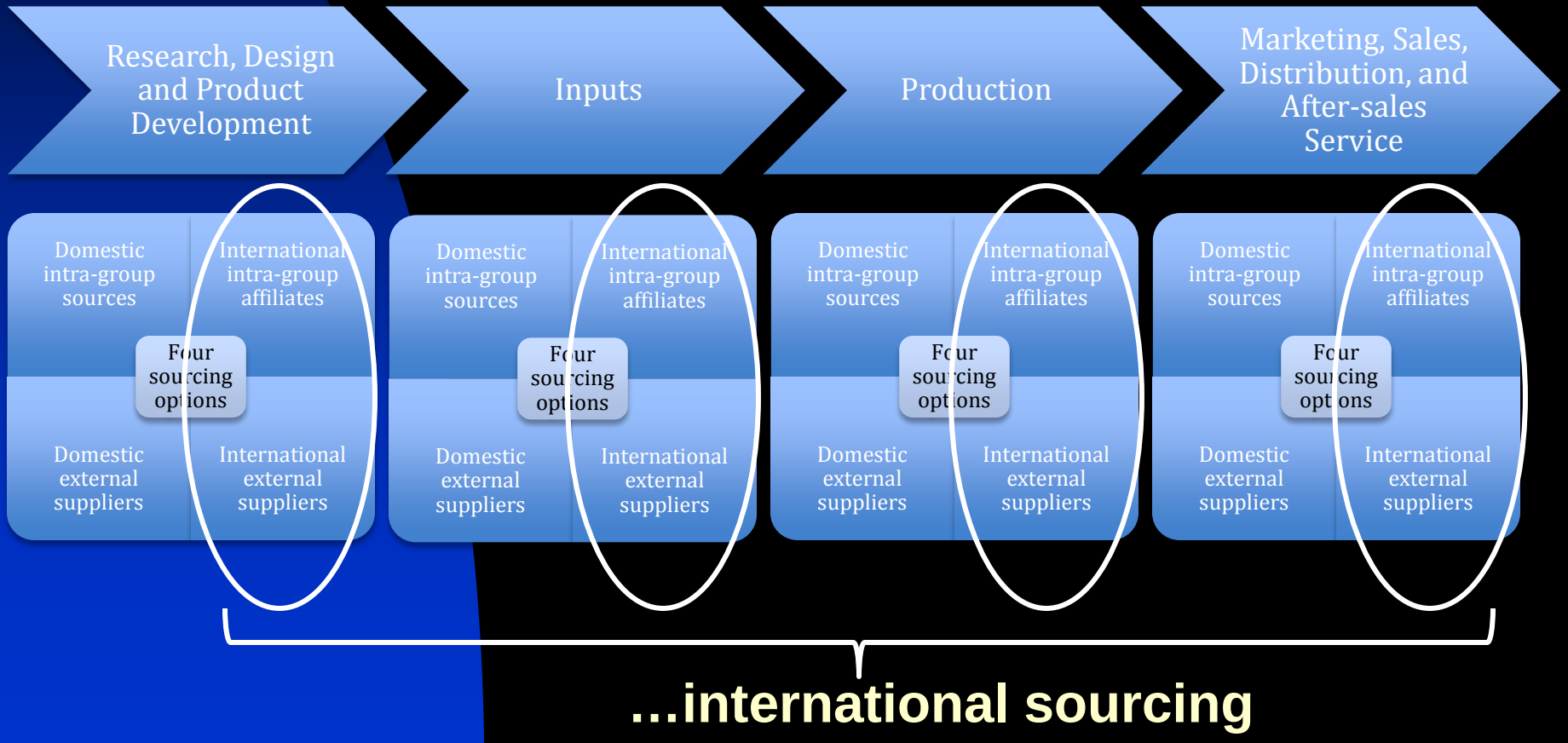


…the value cycle?

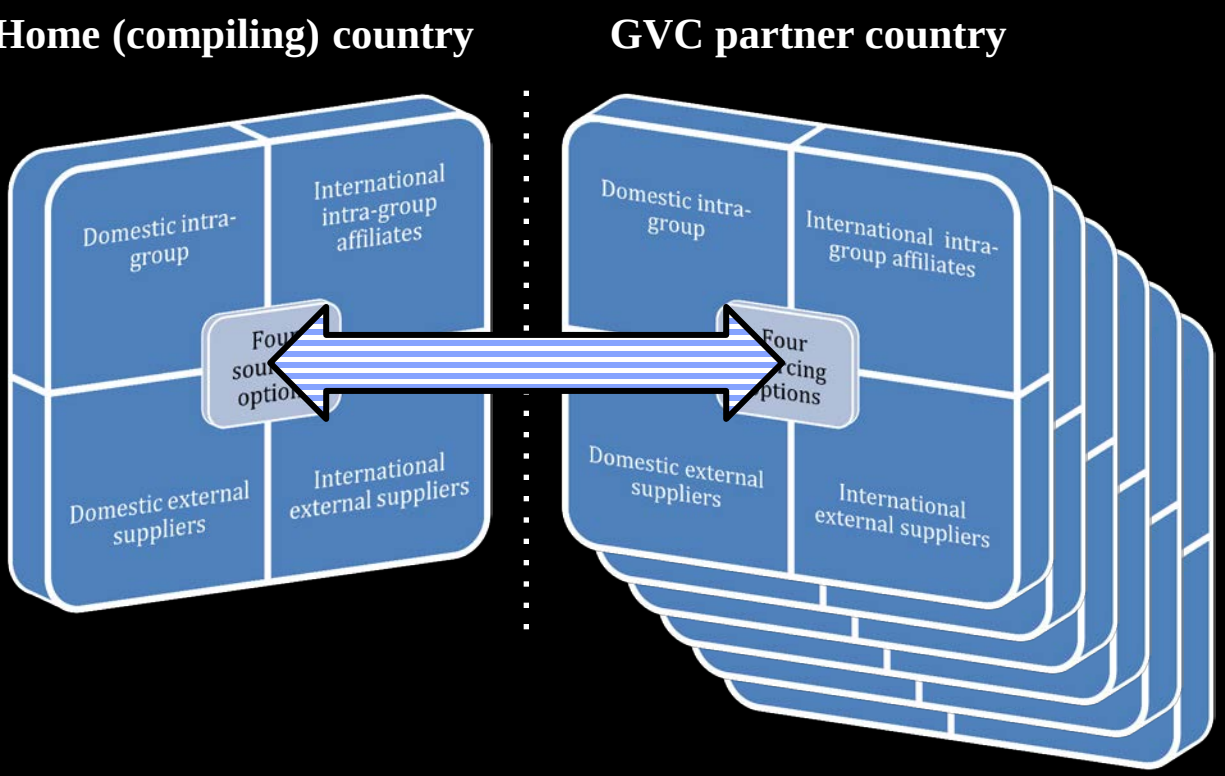
International flows in four sourcing options



A simple value chain with four sourcing options



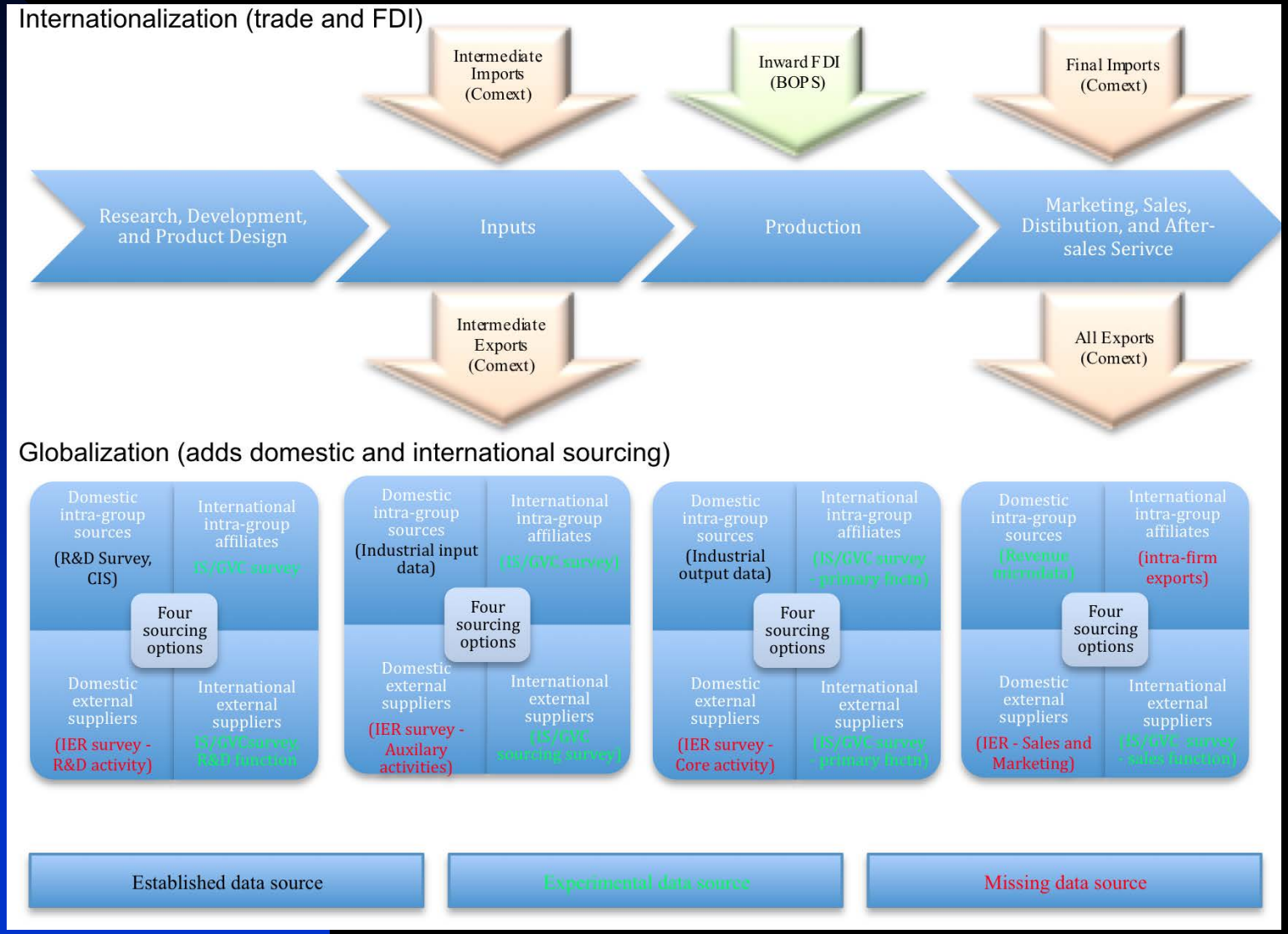
International flows in four sourcing options



…economic globalization involves a complex web of flows and business linkages

Assessing the Data Gaps in Europe

Mapping Europe's data resources



Information required for measuring the GVC engagement of enterprises (inward and outward flows)

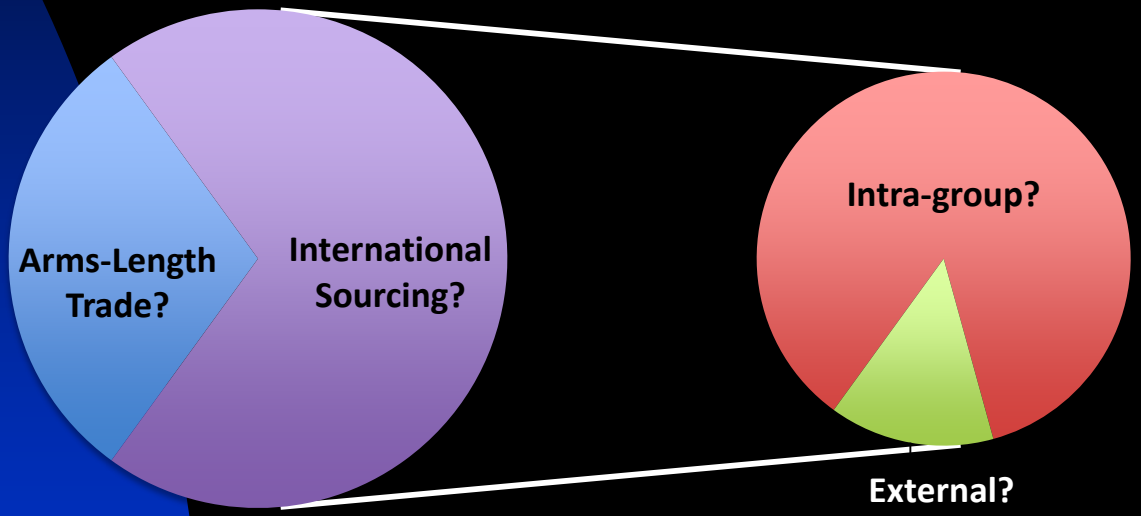
Variable	Measure	Available?
Inward flows		
Arms-length imports	Value by product and trading partner	No. Not differentiated in COMEXT or BOPs international services transactions data
Intra-firm imports	Value by product and trading partner	No. Not differentiated in COMEXT or BOPs international services transactions data
Inward sourcing	Value of intermediate goods and services sold to foreign customers by business function (including R&D services)	Partially. GVC survey question on inward sourcing, but not quantified
Outward FDI	Value of FDI by industry and recipient country	Yes.
Outward flows		
Arms-length exports	Value by product and trading partner	No. Not differentiated in COMEXT or BOPs international services transactions data
Intra-firm exports	Value by product and trading partner	No. Not differentiated in COMEXT or BOPs international services transactions data
Outward sourcing	Value of sourcing by business function (including R&D)	Partially. IS/GVC survey, but sourcing is not quantified
Outward FDI	Value of FDI by industry and recipient country	Yes.

Existing data sources and missing variables

Topic	Eurostat data set	Useful GVC variables	Missing GVC variables
Existing data sources			
International Trade in Goods	COMEXT	Value of trade by: – Product – Industry – Trading partner	– Intra-group trade – International sourcing of intermediate and final goods
International trade in services	BOPS services trade	Value of trade by: – Product – Industry – Trading partner	– Intra-group trade – International sourcing of services
Outward foreign direct investment	BOPS outward FDI	Value of outward FDI by: – Industry – Trading partner	– Links to parent – Affiliate characteristics
Inward foreign direct investment	BOPS inward FDI	Value of outward FDI by: – Industry – Trading partner	– Links to parent – Affiliate characteristics
Activities of European MNEs abroad	SBS outward FATS	Affiliate turnover Number employed	– Parent characteristics – Intra-group trade
Activities of foreign MNEs in Europe	SBS inward FATS	Affiliate turnover Number employed …many others	– Intra-group trade
R&D	R&D survey	R&D spending, employment, etc.	– Links to enterprise characteristics – Links to trade in R&D services – International sourcing of R&D
Experimental data sources			
International sourcing	IS/GVC survey	Sourcing by: – Business function – Affiliate or independent supplier – Geographical location	– Value of sourcing (cost of goods and services) – In-house costs by function – Domestic sourcing by function
Domestic sourcing	Inter-industry relations survey	Domestic sourcing by: – Core activity – R&D – Sales and marketing – ICT services	– Value of sourcing (cost of goods and services) – Missing business functions (management and admin, transport and logistics, facilities maintenance, etc.)

What we don’t know about international trade

Some data we would like to see (these are made up!)



Why data on affiliated trade is important (Europe example)

Concentration of exporters in total manufacturing exports (percent), selected European countries, 2003

Country of origin	Top one percent	Top five percent	Top ten percent
Germany	59	81	90
France	44 (68)	73 (88)	84 (94)
United Kingdom	42	69	80
Italy	32	59	72
Hungary	77	91	96
Belgium	48	73	84
Norway	53	81	91

Source: Mayer and Ottaviano, 2007, p. 8.

Note: France, Germany, Hungary, Italy and the UK provide figures on large firms only; Belgian and Norwegian data is exhaustive. Numbers in brackets for France are percentages from an exhaustive sample

Why data on affiliated trade is important (U.S. Example)

Contributions of MNEs the US Economy, 2006

Performance of U.S. Parents of U.S.-Based Multinational Firms			
	Parent Share	Parent Value	
Employment	19.1%	21.7	million
GDP	24.9%	$2.5	trillion
Capital Investment	26.7%	$308.7	billion
Imports of Goods	33.9%	$628.2	billion
Export of Goods	48.0%	$495.1	billion
Research and Development	75.8%	$187.8	billion
Performance of U.S. Affiliates of Foreign-Based Multinational Firms			
	Affiliate Share	Affiliate Value	
Employment	4.6%	5.3	million
GDP	6.1%	$0.6	trillion
Capital Investment	11.3%	$160.2	billion
Imports of Goods	26.0%	$482.4	billion
Exports of Goods	18.9%	$195.3	billion
Research and Development	13.8%	$34.3	billion
Combined Performance of Multinationals in the United States			
	Affiliate Share	Affiliate Value	
Employment	23.7%	27.0	million
GDP	31.0%	$3.1	trillion
Capital Investment	38.0%	$468.9	billion
Imports of Goods	59.9%	$1,110.6	billion
Exports of Goods	66.9%	$690.4	billion
Research and Development	89.6%	$222.1	billion

Source: Slaughter, 2009, p. 9.

Progress on Filling the Data Gaps

- The Eurostat International Sourcing Survey (GVC/IS)
  - International sourcing by business function
- Trade by Enterprise Characteristics (TEC)
  - Importers, Exporters, Two-way traders, Enterprises with foreign affiliates, Foreign affiliates
- European Statistical System Network (ESSnet) on Profiling
  - Identification of “most important” enterprises at the EU level
- Nature of Transactions (NoT)
  - e.g., contract assembly and goods for processing

The Challenges of Economic Globalization for Statistical Measurement

- Barriers to international and inter-agency data sharing
  - Europe, by necessity, is better at sharing data than other places, and
  - Europe has Eurostat…
  - A European system of business registers (ESBRs) is under development…
- Information on intra-group trade is missing
  - Eurostat is developing the EuroGroup Register (EGR)…
- External international sourcing
  - Eurostat is fielding GVC/International Sourcing surveys (2007, 2012)…
- Data on traded services is weak
  - Eurostat publishes far more product detail in traded services than others…
- The vastly expanded trading system has brought in countries with poorly developed statistical resources
  - More could be done…NOT simply altruistic!

But, only filling gaps will not provide full answers to questions such as these:

1. How pervasive is global engagement is and what are the trends?
2. What impact does global engagement on the quantity and quality of employment?
3. What Impact does global engagement have on innovation?

To get policy-relevant answers…

…enterprise level data on economic globalization…

- Data on economic globalization
  - Is the enterprise domestic or foreign-owned?
  - Is the enterprise part of an MNE or non-equity business network?
  - What products and services does the enterprise make itself or and what does it source domestically or internationally?
  - What is the volume and character of intra-firm trade?
  - What is the volume and character of global sourcing?

…need to be linked to a full set of enterprise characteristics

- Firms births and deaths (business demographics)
- Employment (hiring and firing)
- Turnover
- Wages paid
- Occupational employment
  - Skills
  - Education and training requirements
- Performance
  - Growth
  - Profits
  - Market share (Not in any public dataset!)
- R&D and Innovation
  - R&D spending and employment
  - % of revenues from new products
  - Patents

These enterprise-level data are generally confidential and reside in administrative systems: micro-data!

Taking Micro-data Mainstream

Confronting the challenges of micro-data use

- Disappearing data
- Incompatible data
- Time series data are difficult to construct
- Confidentiality blocks usage across agencies and borders

Steps needed to improve micro-data resources

- Initiate programs to archive and maintain key micro-data resources
- Consistent use of statistical units (most typically, the enterprise).
- A system to identify and link enterprises across the different datasets.
  - unique identification numbering system
- Coordinate sampling across surveys to ensure that a representative sample of enterprises is included in all samples.
  - specific enterprises are sometimes excluded from multiple or successive surveys
- Upgrade systems of administration for statistical purposes
  - Unified tax and statistics legislation
  - Software provided by member states with design input from Eurostat
- Do not ignore the need to include information on fully domestic enterprises in micro-datasets.

Institutional Structure for Filling Data Gaps and Improving Micro-data Resources in Europe

- ESSnet on Globalization Statistics
  - International sourcing surveys
  - Trade by enterprise characteristics
- ESSnet on Consistency Project
  - Consistency in target populations, sample frames, reference periods, classifications and their applications, as well as characteristics and their definitions
- European System of Business Registers (ESBRs)
  - within framework of the European Statistical System Vision Implementing Programme (ESS.VIP)
- SIMSTAT (rationalization of trade statistics)
  - Also within framework of the European Statistical System Vision Implementing Programme (ESS.VIP)
- ESSnet on Micro Data Linking and Data Warehousing in Statistical Production
- Framework Regulation Integrating Business Statistics (FRIBS)
- Modernization of European Enterprise and Trade Statistics (MEETS)

1. Solutions are incremental and only partial
2. Respondent burden could be ratcheted upwards
3. European harmonization is not the same as global harmonization

Needed?
An International Integrated Data Platform (IIDP)

- A vision for an integrated solution is needed that:
- fully leverages existing resources,
- uses an internationally harmonized data structure,
- brings in new data sources and analytic tools, and
- flexibly produces up-to-date, disclosable statistics and indicators that can be tailored to the needs of policy makers and researchers on an as-needed basis

International Integrated Data Platform (IIDP); Key Elements

- A full and accurate sample frame
- Links to full and consistently defined administrative data
- Links to improved statistics on international trade and FDI
- Links to improved business surveys that collect data on domestic and international sourcing by business function
- Links to business demographics covering enterprise dynamics (births and deaths)
- Unique enterprise identifiers or crosswalks to tie all of the data sources together
- Data normalization: e.g., cleaning, consistency, etc.
- A “virtual” International Statistical Data Warehouse (IS-DWH) to link data: this will be a “virtual” IIDP
- Structural meta-data to enable the application of analytic tools that can output descriptive metadata (i.e., meta-content) to ensure that only disclosable statistics are provided to users

International Integrated Data Platform (IIDP): Inputs and Outputs

- Inputs
  - Existing business statistics (improved)
  - Existing trade statistics (improved)
  - Administrative data (improved)
  - Private data (logistics, ERP, etc.)
- Outputs
  - Published indicators of economic globalization
    - Global engagement by enterprise characteristics, industry, and geography
    - Ownership; role of affiliates
    - Effects on jobs and wages
    - Effects on innovation and innovation's impact
  - Predetermined tables
  - User-defined tables of disclosable statistics
  - Resources for researchers

Detail in private enterprise systems, an example

Actual tracking records for a notebook computer making its way from a factory in China to the home of its ultimate customer in Medford, Massachusetts; Shipped by FedEx, January 18-21, 2011

- Delivered to customer home address, Jan 21, 2011 7:49 AM
- On FedEx vehicle for delivery, MEDFORD, MA, Jan 21, 2011 7:43 AM
- At local FedEx facility, MEDFORD, MA, Jan 20, 2011 5:01 PM
- At destination sort facility, FRANKLIN, MA, Jan 20, 2011 12:05 PM
- Departed FedEx location, NEWARK, NJ, Jan 20, 2011 1:59 AM
- Arrived at FedEx location, NEWARK, NJ, Jan 19, 2011 4:07 PM
- Departed FedEx location, ANCHORAGE, AK, Jan 19, 2011 1:30 PM
- International shipment release, ANCHORAGE, AK, Jan 19, 2011 12:43 PM
- Arrived at FedEx location, ANCHORAGE, AK, Jan 18, 2011 11:06 PM
- At local FedEx facility, LANTAU ISLAND HK, Jan 18, 2011 5:14 PM
- In transit, LANTAU ISLAND HK, Jan 17, 2011 11:12 PM
- Left FedEx origin facility, SHENZHEN CN, Jan 18, 2011 11:50 AM
- Picked up from factory: SHENZHEN CN, Jan 18, 2011 8:41 AM

Europe's "Natural" Leadership in International Statistics

- Eurostat, as a regional umbrella organization linking independent National Statistical Institutes, leads the **practice** of integrating economic statistics across borders
- Europe can innovate best practice, and is closer to an IIDP than any other entity – a natural test bed and innovative engine
- A European IIDP can demonstrate the feasibility of a Global IIDP
  - Successful sharing of confidential data among fully independent National Statistical Institutes
  - Usefulness of statistics
  - Successful incorporation of private data
- As globalization accelerates, there is a growing information gap between the private and public sectors
  - Some MNEs have good global data about their own operations, and sometimes the operations of their suppliers, but could benefit from seeing the larger picture
  - Some MNEs have a LOT of external data, and could be brought into to the system of economic statistics without compromising their competitive position of privacy of clients and members

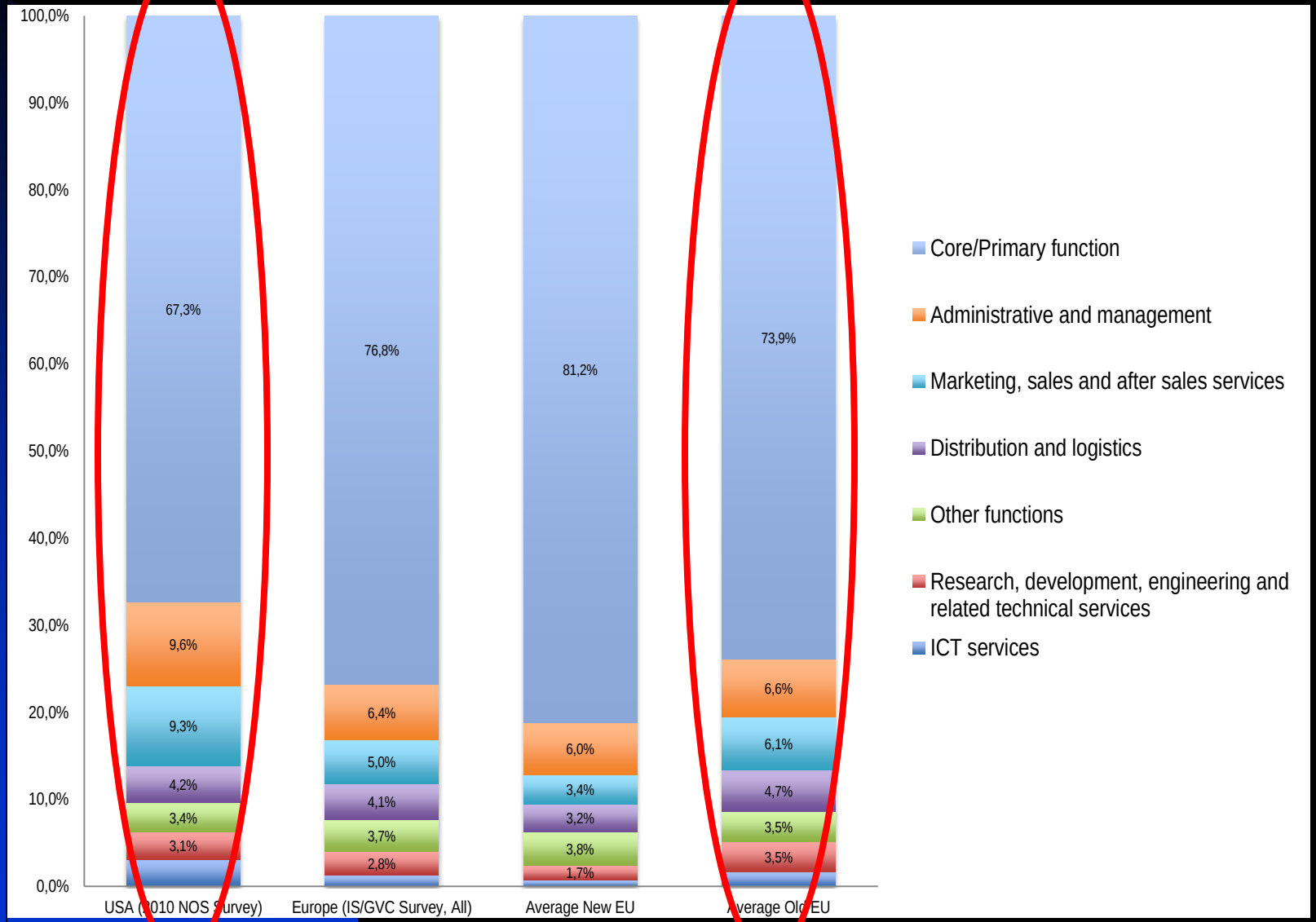
The Priorities for Eurostat

1. Develop the (virtual) IIDP
2. Establish R&D capacity at Eurostat in the areas of software development and "big data analytics"
3. Ensure that and new statistical resources related to economic globalization are designed with micro-data linking in mind, including future iterations of existing surveys
4. Improve the unique enterprise identifier system for Europe for use in a matrix for linking country enterprise IDs
5. Accelerate efforts to fill in the EuroGroup Register and link it to a fully interoperable European System of Business Registers (ESBRs)
6. Develop new information about intra-group trade by including a related party flag on all customs forms and international transactions records
7. Improve and institutionalize international sourcing surveys
8. Continue to improve information on trade in services; include related-party trade
9. Explore the feasibility of leveraging data from private companies in the official statistical system
10. Work with international agencies and NSIs outside of Europe to disseminate the best practice and related surveys to Europe's trading partners

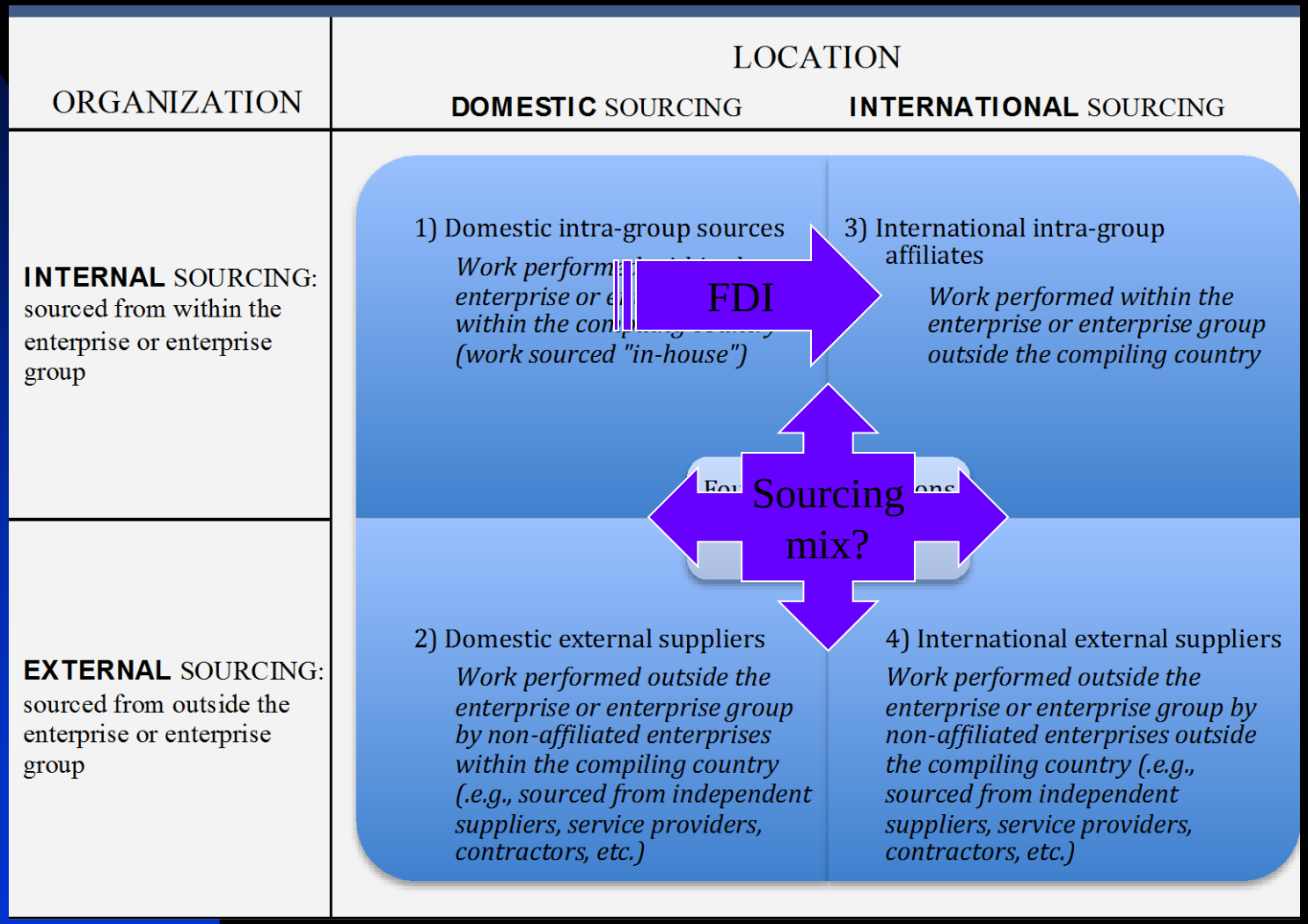
Business functions

- Primary Business Function: The main thing the organization makes or does;
- Research and Development of Products, Services, or Technology: Including designing, redesigning, or improving products or services, equipment, or procedures; and basic research and experimentation with new technology, systems, and processes;
- Sales and Marketing: Including pre-sale interactions with existing or potential buyers, advertising, market research, account management, managing brands or products;
- Transportation, Logistics, and Distribution: Including packing, storing, shipping or transporting in-process and finished products, and warehousing inventory;
- Customer and After-Sales Service: Including call center services (excepting sales), maintaining and repairing products, technical support, customer service, and warranty support;
- Management, Administration, and Back Office Functions: Including top management and centralized administrative support and procurement, human resources, accounting, legal, and finance;
- Information Technology Systems: Including developing, maintaining, and repairing computer systems for internal use, writing software for internal use, and processing or managing data for internal use; and
- Facilities Maintenance: Including maintenance and repair of owned or leased space or buildings, and janitorial and cleaning services.

Employment by Business Function, Comparison of Eurostat 2011 International Sourcing/Global Value Chain (IS/GVC) Survey with 2010 NOS



International flows in four sourcing options



Innovations in the US Study

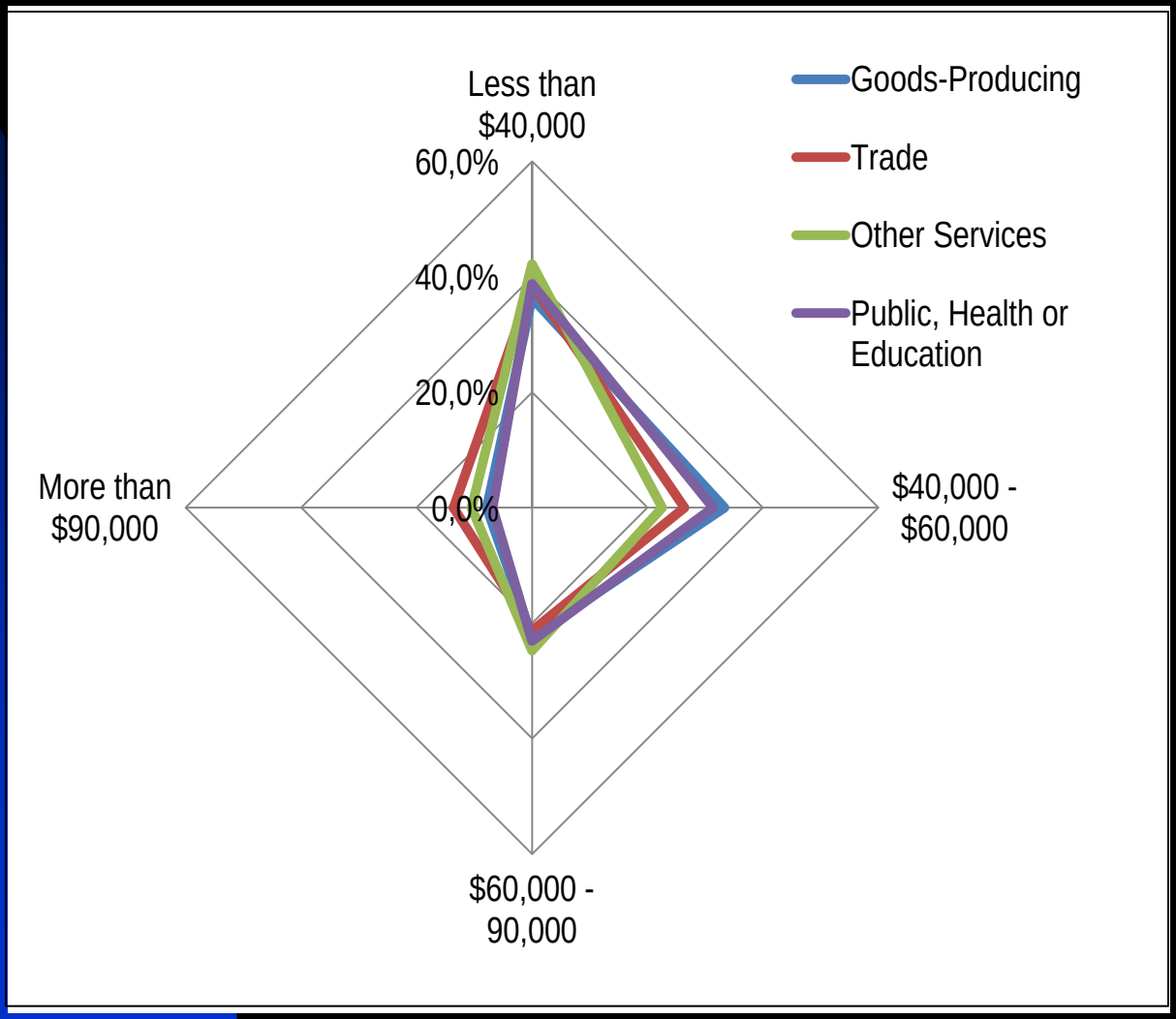
1. Inclusion of Public organizations
2. Measurement of sourcing as a percent of cost of goods and services sold for each business function
   - Manufacturing: Costs represent the costs of goods sold (COGS), or the costs of materials, labor, and factory overhead;
   - Retail: Costs represent the COGS, described as what the organization pays to buy the goods that it sells to its customers;
   - Other Services: Costs represent the costs associated with persons or machines directly applying the service, a measure of costs typically referred to as the cost of sales by accountants; and,
   - Public Administration: Costs represent spending in the organization's operating budget
3. Collection of wage ranges by business function
   - % of employees making less than $40,000 annually,
   - % of employees making $40,000 to $60,000 annually,
   - % making $60,000 to $90,000 annually, and
   - % making more than $90,000 annually

Share of Full-time Domestic U.S. Employees Working at Organizations that Engage in Some External Sourcing, and Distribution of Sourcing costs by Business Function (full sample)

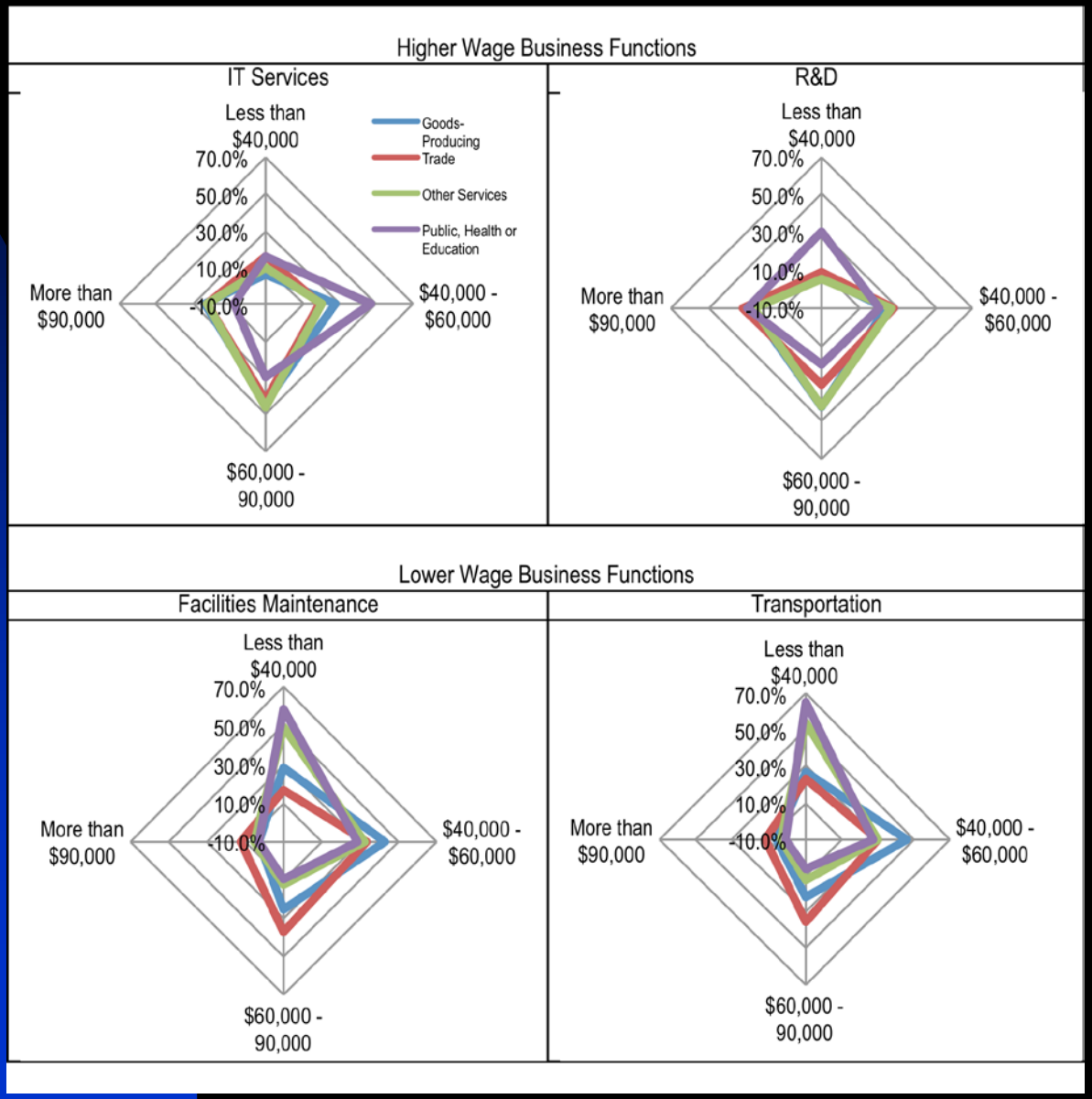
Business Function	Domestic In House	Domestic External	International Affiliate	International External	International Sourcing	N
Primary Business Function	100.0%	18.4%	13.8%	8.0%	16.4%	317
Research and Development	99.2%	19.7%	16.9%	5.1%	19.2%	190
Sales and Marketing	99.5%	22.0%	17.3%	6.0%	19.2%	222
Transportation Services	98.1%	30.2%	15.0%	8.8%	18.6%	210
Customer & After-sales Service	100.0%	12.4%	15.2%	5.4%	17.5%	220
Management, Admin, and Back-office	99.7%	13.8%	13.3%	3.9%	14.5%	292
Information Technology Systems	96.2%	33.9%	12.2%	9.3%	17.6%	253
Facilities Maintenance	93.5%	34.1%	12.5%	4.5%	13.3%	243

Business Function	Domestic In House	Domestic External	International Affiliate	International External	International Sourcing	N
Primary Business Function	93.3%	3.0%	2.9%	0.8%	3.7%	317
Research and Development	91.8%	3.4%	3.9%	0.9%	4.8%	190
Sales and Marketing	91.5%	4.2%	4.0%	0.3%	4.3%	222
Transportation Services	82.6%	12.6%	3.2%	1.7%	4.8%	210
Customer & After-sales Service	92.9%	2.3%	4.2%	0.6%	4.8%	220
Management, Admin, and Back-office	94.9%	1.8%	3.0%	0.4%	3.4%	292
Information Technology Systems	83.2%	12.4%	3.1%	1.4%	4.5%	253
Facilities Maintenance	81.6%	14.5%	3.4%	0.5%	3.9%	243

Wage Range Distribution in Primary Business Functions, by Industry (full sample)



Wage Range Distribution in High and Low Wage Business Functions, by Industry (full sample)



What's in it for Member States? Better policy!

1. Visibility of the country's evolving role in Global Value Chains at the European and global levels – in other words,
   What is the nation's competitive profile in an open regional and global economy?
   - Specialization in GVC roles:
     - Lead firms (controlling units on MNCs and global buyers)?
     - Suppliers, contractors, and service providers?
   - Specialization in GVC niches
     - R&D?
     - ITC?
     - Manufacturing services?
     - Support services (call centers, BPO)?
2. Better understanding of what's driving economic growth (or decline)
3. Better understanding of employment dynamics
4. Better understanding of skill requirements
5. Better understanding of country's role in global innovation networks

Big Challenges Create Opportunities for Leadership

1. Lead elements of the (virtual) IIDP (e.g., multinational surveys, international sourcing surveys, software, data mining, etc.)
2. Practice fast followership on new initiatives (e.g., new and better services trade statistics)
3. Compete with other NSIs in Europe to deliver the best underlying data to Europe-wide initiatives (e.g., SIMSTAT, EuroGroup Register and other elements of the ESBR)
4. Focus on national best practice – be a model for other NSIs
5. Reach out to peer NSIs in developing countries (sister statistics concept)

Thank you!