Linking Trade Statistics to the Statistical Business Register – Results of Global Survey
November 2015

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I.   Introduction

A major development in official statistics in recent years has been the establishment and use of national statistical business registers (SBRs) that not only allow for integration of business surveys, but also for linking of administrative and other data sources, potentially leading to significant gains in efficiency and quality of data collection and processing. The SBR is an essential part of the statistical infrastructure for a country's economic statistics programme. On the one hand, it can serve as a cost-effective sample frame and be an important tool for stratification, imputation and editing of basic source data. On the other hand, it can serve as a single frame for integrated survey design and thereby reduce response burden. The SBR is therefore essential for integrated economic statistics (see *Guidelines for Integrated Economic Statistics[1]*). In Africa and Europe, renewed attention to the importance of the SBR for economic statistics has led to the developments of guidelines on SBRs, namely the *Guidelines for Building Statistical Business Registers in Africa[2]* and the *Guidelines on Statistical Business Registers* as published by the UN Economic Commission for Europe (UNECE).[3]

The *Guidelines on Statistical Business Registers* acknowledge that, while traditionally the function of the SBR has been to provide sample frames from which economic surveys are drawn, it can also be crucial in the integration and use of data from administrative and other sources and the business demographics contained therein can be used as a source of economic statistics in their own right. In fact, the integration of the SBR with economic statistics from different statistical domains can provide new information that would not otherwise exist. For example, the SBR can be linked with trade statistics at the micro-level and in fact an increasing number of countries have undertaken projects to do so. Such integrated datasets can, for instance, indicate which firms (characterized by industry, size class, foreign ownership, and geographic location) are engaged in international trade as part of global value chains and help measure the importance of those firms in the overall economy.

In order to assess the status globally of linking trade statistics to the SBR, and at the same time to take stock of the availability and use of SBRs worldwide, UNSD administered a global assessment to all NSOs, entitled the *Survey on national practices in linking trade statistics and business registers* ("the survey"), in the summer of 2015 to all NSOs, requesting information on their national practices in this area. This document presents the final results of this survey.

II.   Overview of survey responses

The UNSD survey conducted in 2015 requested information from respondents on national practices in linking trade statistics to the SBR. Responses were received from 98 NSOs, including 54 developing economies, 10 economies in transition, and 34 developed economies, representing 30 OECD countries and 68 non-OECD countries. The regional distribution of responses is shown in figures 1.1 and 1.2.

Among the 98 national statistical offices that responded, 92 report that they currently have a functioning SBR.[4] In addition, 46 percent report that they have linked international merchandise trade statistics

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[1] UNSD, *Guidelines for Integrated Economic Statistics*, New York, 2013, ST/ESA/STAT/SER.F/108. http://unstats.un.org/unsd/publication/seriesf/Seriesf_108e.pdf.

[2] African Development Bank Group, *Guidelines for Building Business Registers in Africa*, 2014. http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Guidelines_for_Building_Statistical_Business_Registers_in_Africa.pdf.

[3] UNECE, *Guidelines on Statistical Business Registers*, Geneva, 2015. http://www.unece.org/fileadmin/DAM/stats/publications/2015/ECE_CES_39_WEB.pdf

[4] Four respondents in the Asia-Pacific region and 2 respondents in Africa reported that they do not have an SBR or that the SBR is not fully operational.

(IMTS) to the SBR; 29 percent report linking statistics on international trade in services (SITS) to the SBR; and 28 percent report linking foreign direct investment statistics (FDI) to the SBR. More detailed information on the national linking practices is presented in sections IV-VI.

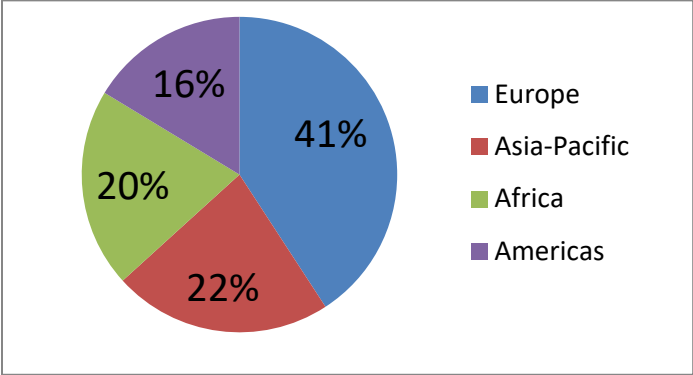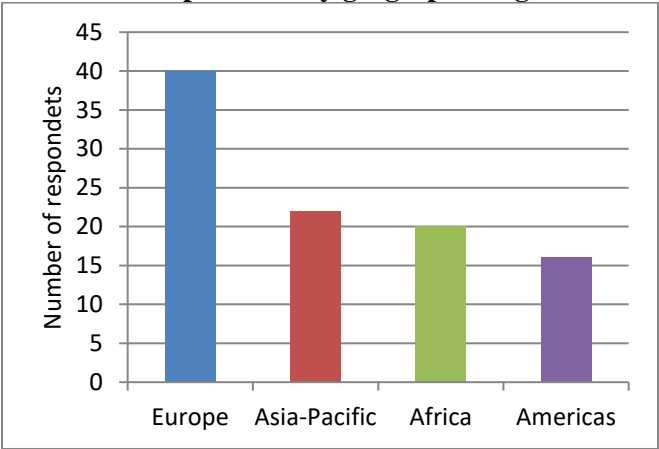**Figure 1.1**
Geographical distribution of survey respondents

Figure 1.2
Number of respondents by geographic region

III.   Statistical Business Register (SBR)

The UN Statistical Commission ("the Commission") recommends national statistical offices (NSOs) to adopt an integrated approach to economic statistics in order to ensure the efficiency of the statistical process and increase the consistency and coherence of economic statistics.[5] The Commission has identified several benefits of integrated economic statistics programmes, including consistency between short-term, annual and benchmark statistics; consistency in measuring economic activity across different sectors, industries and regions; consistency across countries for key economic indicators (such as real GDP, inflation, and international trade); greater accuracy in the economic data through the reconciliation of discrepancies across data from different sources; and reduction in the reporting burden for business

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[5] Based on the report of the Secretary-General on integrated economic statistics (E/CN.3/2006/5).

respondents and increased efficiency in the production of data.[6] In order to create an integrated economic statistics programme, the Commission outlines the importance of the following key features:[7]

    i. The use of harmonized terminology, definitions, concepts, standards and classifications;
    ii. The central role of SBRs in providing a central sampling frame for all business surveys;
    iii. The standardization of surveys, including survey design, sample frame, and questionnaire design;
    iv. Matching of the concepts of administrative source data with statistical records, allowing for the utilization of using administrative records to promote more efficient data collection and reduction of the burden on respondents;
    v. Editing, linkage and integration of data across various statistical domains;
    vi. Integration of dissemination and communication in order to provide user-friendly presentations of data and explanations of concepts and to ensure consistent formats across dissemination platforms.

Thus, SBRs have a central role in integrated economic statistics. They provide a common universe for sampling and a uniform classification of firms, which promote consistency in collected data across surveys. Moreover, they allow for the integration of data from administrative sources and surveys and serve as an important tool for stratification, imputation and editing of basic source data. As a result, the timeliness in producing statistics can be improved and respondent burden reduced.
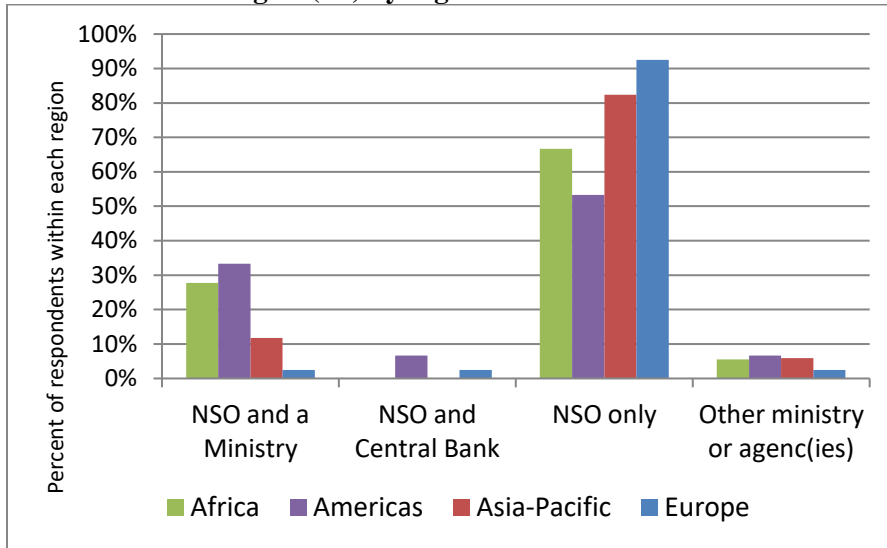
A. Maintenance of the SBR

Effective maintenance and updating of the SBR is a crucial component in facilitating the linking of trade statistics to the SBR. UNSD encourages statistical compilers to ensure shared access to the SBR for all agencies involved in the compilation of economic statistics; to establish a shared vision and commitment to integrating trade and business statistics among the agencies involved; and formation of clear policies on access to and use of confidential information. In the vast majority (87 percent) of responding NSOs, the maintenance and use of the SBR is centralized to one agency – typically the NSO itself. Having a centralized system for the maintenance of the SBR facilitates consistent updating and recording of information. Half of the respondents report updating the SBR continuously, while most others report updating it annually. Sixty-nine percent of respondents report using tax records and enterprise surveys to update the SBR. Half of the respondents report also using the economic census.

Among the 92 respondents with an SBR, 76 percent reported that its maintenance is centralized to one agency, with 74 percent citing the NSO. Moreover, on a regional basis, the majority of respondents from all regions reported similar information, with 67 percent of respondents in Africa reporting that the NSO is the sole maintenance agency; 53 percent of respondents from the Americas, 82 percent of respondents from the Asia-Pacific region, and 93 percent of respondents from Europe, as shown in figure 1.3. A majority (83 percent) of those reporting that maintenance of the SBR is *not* centralized are from developing countries.

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[6] *Guidelines on Integrated Economic Statistics,* Series F No. 108, New York, NY, 2013, p. 2. http://unstats.un.org/unsd/publication/seriesf/Seriesf_108e.pdf.
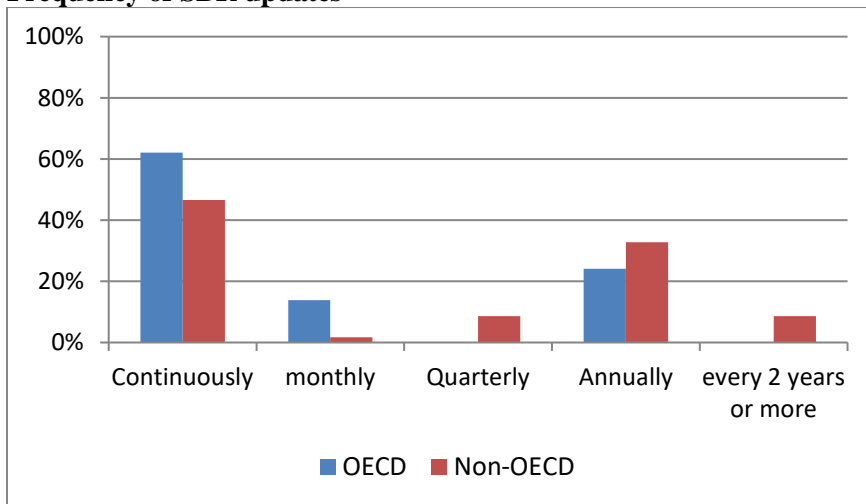[7] *Ibid., p. 9.*

Figure 1.3
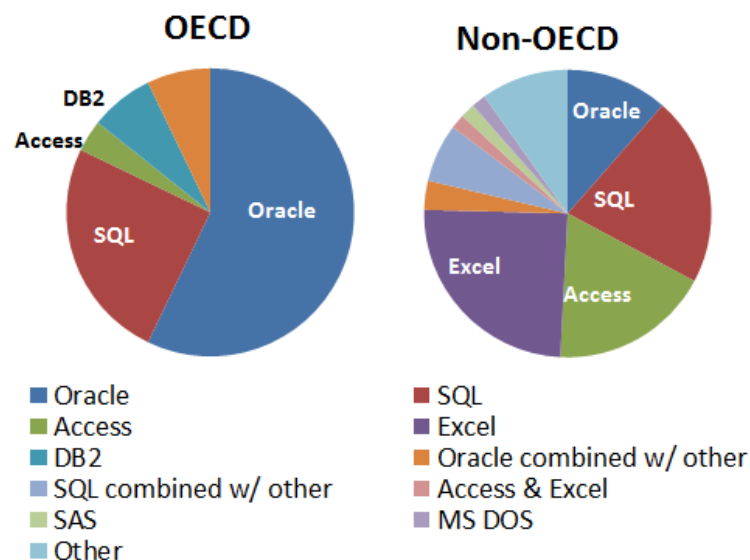**SBR maintenance agenc(ies) by region**

Fifty-two percent of respondents that have an SBR reported that they update it on a continuous basis, while 30 percent reported they do so annually, 12 percent reported monthly or quarterly and 6 percent reported every two years or more. As shown in figure 1.4, both OECD and non-OECD countries mostly report updating the SBR on a continuous basis. Very few non-OECD countries update the SBR on a monthly or quarterly basis.

Figure 1.4
Frequency of SBR updates

When asked in what database format the SBR is maintained, the most commonly cited database was Oracle, reported by 26 percent of respondents, followed by SQL cited by 22 percent, Excel cited by 17 percent, and Access reported by 13 percent. There was a dramatic difference between OECD and Non-OECD countries, with a majority of OECD countries reporting the use of Oracle and with Non-OECD countries citing a much wider range of databases, as shown in figure 1.5. Among Non-OECD countries, Excel was the most commonly reported database format, cited by 25 percent of non-OECD countries, followed closely by SQL and Access, cited by 21 percent and 18 percent, respectively.

Figure 1.5
Database format used to maintain SBR

B. Variables maintained in the SBR

It is also desirable to include other variables in the SBR, including legal name; address; economic activity; number of employees; turnover; date of entry; and active/non-active status. Identification of a principal economic activity (that which contributes most to the value added of the unit, or to the activity the value added of which exceeds that of any other activity undertaken by the unit); turnover and number of employees are relevant for compiling detailed statistics of trade by enterprise characteristics, which are highly policy-relevant (and are discussed further in section IV). These variables are also important pieces of information when using the SBR for establishing the sample for a given survey. Other potential variables in the SBR include identification of trader/non-trader and percentage of foreign ownership. Such information is relevant to analyzing the behavior of multinational corporations and the relationship between foreign direct investment and a country's international trade.[8]

Respondents were asked if they maintain the following variables in their SBR:
- Statistical unit
- Legal name
- Address
- Business ID number
- Link to other business ID number
- Economic activity
- Number of employees
- Turnover
- Percentage of foreign ownership
- Date of entry
- Trader or non-trader
- Active or non-active
- Other

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[8] An alternative to maintaining such variables on the SBR is to conduct an enterprise FDI survey, which could be linked to the SBR in order to validate responses or to update information in the SBR.

Virtually all of the respondents with an SBR report that they maintain address, legal name, and economic activity, as shown in figure 1.6. Nearly all OECD countries also reported maintaining business identification number, number of employees, date of entry, statistical unit, active/non-active status, and turnover. For non-OECD countries, 86 percent reported maintaining a business identification number of the SBR, which would facilitate linking the SBR to other data sources.

Non-OECD countries are less likely than OECD countries to maintain active/non-active status and turnover, with only 74 percent and 55 percent, respectively, maintaining such variables. Foreign ownership and trader/non-trader status are much less commonly maintained across all regions, with 41 and 32 percent of all respondents citing these variables. Other SBR variables cited were wage or payroll information, employees by gender, and legal form of business.

Figure 1.6
Variables maintained in the SBR
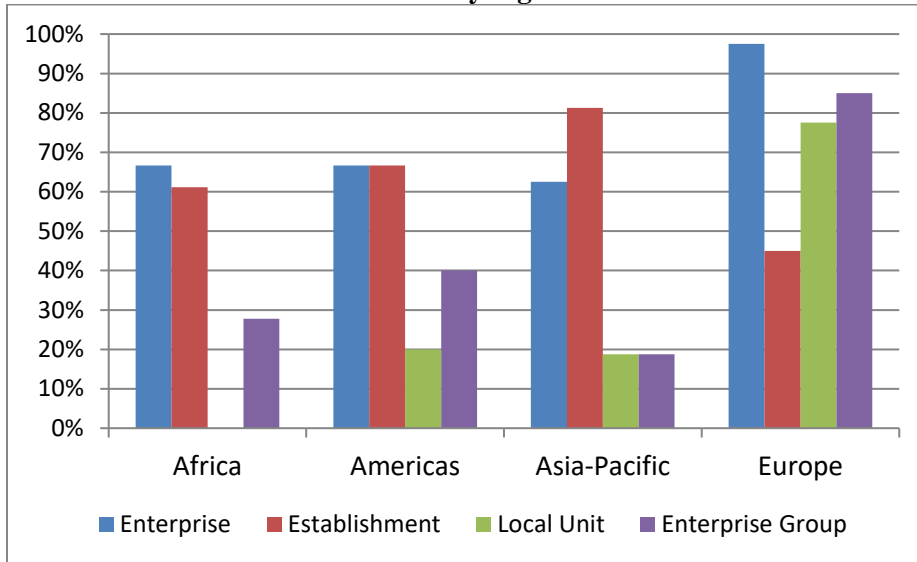

C. Statistical units

The *Guidelines on Statistical Business Registers* recommends that the SBR should include the legal unit, the enterprise, the local unit,[9] and the enterprise group.[10] Among survey respondents that maintain an SBR, 80 percent report using the enterprise as a statistical unit in the SBR, followed by 60 percent citing establishment, 55 percent local unit, and 43 percent citing enterprise group. Regionally, the use of the establishment as a statistical unit was more commonly cited in Asia-Pacific, Africa, and the Americas. Roughly two-thirds of countries in Africa and the Americas each report using enterprise and establishment as statistical units in the SBR. Meanwhile, 81 percent of Asia-Pacific countries report using the establishment, compared to 63 percent citing the enterprise. In Europe, nearly all countries report using the enterprise, followed by about 80 percent citing use of the enterprise group and local unit.

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[9] A "local unit" is defined as an enterprise or a part of an enterprise (for example, a workshop, factory, warehouse, office, mine or depot) which engages in productive activity at or from one location.
[10] UNECE, *Guidelines for Statistical Business Registers*, Geneva, June 2015, p. 60.
file:///C:/Users/Nancy.Snyder/Downloads/Guidelines%20on%20Business%20Registers,%202015.06.04.pdf.

Figure 1.7
Statistical units maintained in SBR by region

Among respondents that reported that their country has linked IMTS to the SBR, 91 percent cited maintaining the enterprise as a statistical unit, followed by 70 percent citing local unit, 61 percent citing enterprise group, and only 41 percent citing establishment.
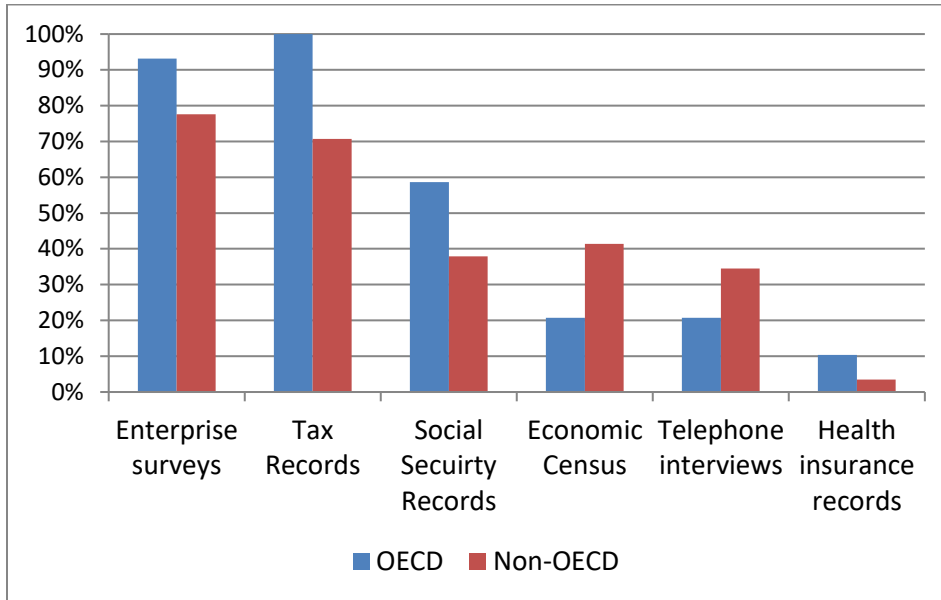
Eighty-six percent of all respondents report that they allocate and maintain unique identifiers for each business. On a regional basis, this figure is slightly less for Africa (65 percent) and Asia-Pacific (80 percent), and slightly higher in the Americas and Europe (93 and 95 percent, respectively). Among those countries that currently link IMTS to the SBR, 95 percent report allocating and maintaining a unique identifier for each business.

D. Data Sources for the SBR

When asked which data sources are used to update the SBR, the most commonly cited source was enterprise surveys, reported by 83 percent of respondents with SBRs, followed closely by tax records, reported by 80 percent. Forty-five percent reported the use of social security records; 34 percent cited the economic census; 30 percent cited telephone interviews; and 6 percent cited health insurance records. About half of the respondents also reported the use of other data sources; the most commonly cited being industry-specific registers; trade registers; other administrative data sources (such as business registration databases, patent agencies, ministry of justice, and ministry of energy); private sources; and research of publicly available sources.

There was some regional variation, with all OECD countries citing the use of tax records compared to 71 percent of non-OECD countries, as shown in figure 1.8. And the use of the economic census and telephone interviews was slightly more common in non-OECD countries than in OECD countries.
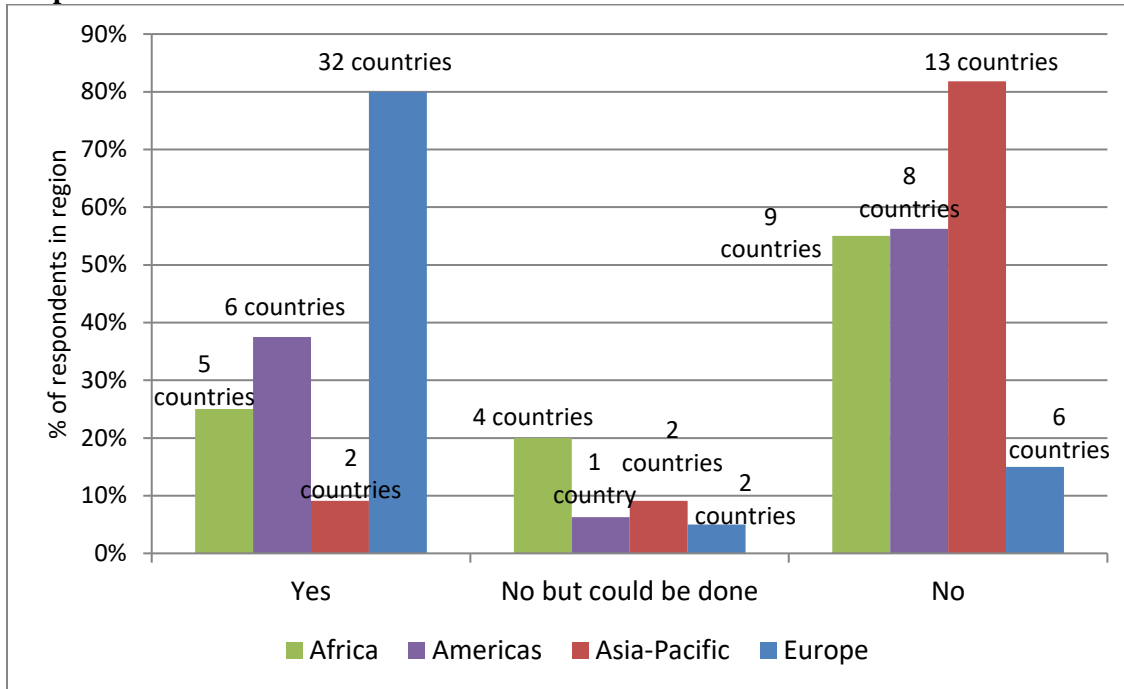
Figure 1.8
Data sources for the SBR

IV. Linking international merchandise trade statistics to the SBR

Half of all survey respondents with an SBR report that they have linked IMTS to the SBR, while another 10 percent report that the link could be done in the future. There was a strong divergence between OECD and non-OECD countries, with 80 percent of OECD countries and only 35 percent of non-OECD countries reporting that they have linked IMTS to the SBR. Regionally, Europe reports the highest rate of linking IMTS to the SBR, at 80 percent of respondents in this region, reflecting 32 out of 40 countries. Alternatively, less than 40 percent of the Americas have conducted this linking and less than 30 percent in Africa and 10 percent in Asia-Pacific, as shown in figure 1.9.

Eight-two percent of the respondents that link IMTS to the SBR report that the NSO conducted the linking, with the remainder (mostly European countries) citing the customs authority, followed by a combination of the NSO and customs and/or the central bank. Among respondents that have not linked IMTS to the SBR but reported that it is possible to do so, virtually all stated that the NSO would be in the best position to conduct the linking.[11]

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[11] One respondent cited the customs authority.

Figure 1.9
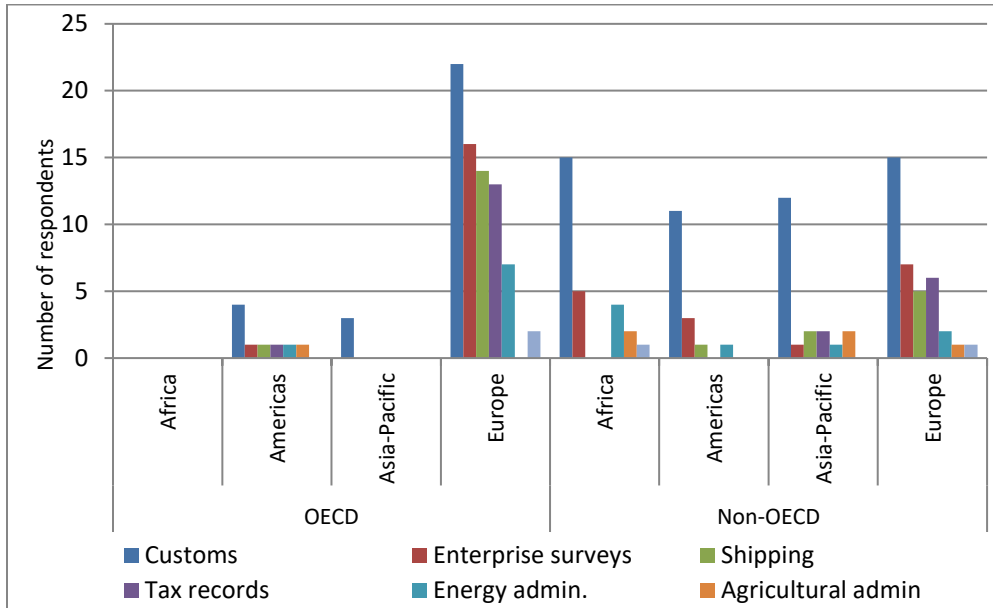**Respondents that have linked IMTS to the SBR**

A. *IMTS compilation*

When asked which agency or agencies compile IMTS in their country, 65 percent of all respondents cited the NSO, while 22 percent cited the customs administration. Eight percent reported that a combination of agencies (including customs, NSO, central bank and other agencies) compile IMTS and five percent cited the central bank. The NSO, however, is by far the most common agency that disseminates IMTS, with 74 percent of respondents citing it, with only 9 percent citing customs. These patterns are generally true across all regions and level of development.

By far the most commonly reported source for IMTS across regions is customs, cited by 94 percent of all respondents, as shown in figure 1.10. Countries in Europe also reported relying heavily on enterprise surveys, shipping manifests, and tax records. Other data sources (including energy administrative records, agricultural and fisheries administrative data, records of couriers, and records of mining companies) were cited by four percent or less of respondents.

When asked if these data sources identify the importing or exporting firm, 96 percent of all respondents reported that they do provide this information. Specifically, 49 percent reported that such firms are identified with a unique ID number, and another 33 percent reported they are identified not only with a unique ID number, but also with name and address. Ten percent the firms are identified with name and address only. These responses were similar across all regions of the world.
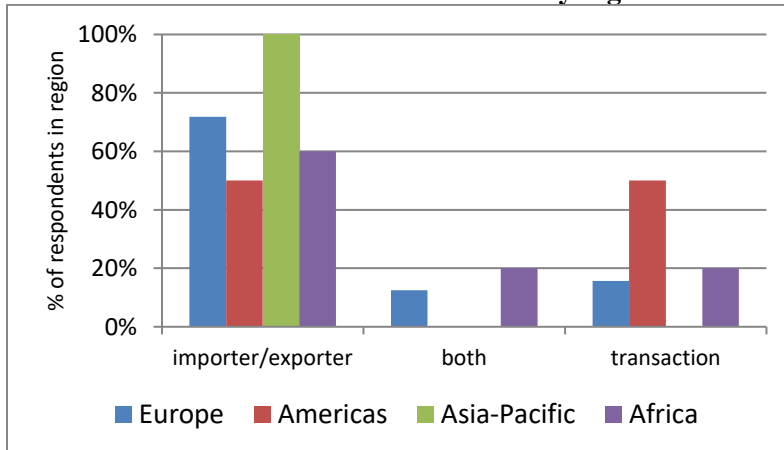
Figure 1.10
Data sources for IMTS

B. Detail of linking IMTS to SBR

Survey respondents were asked if the trade data were linked to the SBR at the level of the transaction or at the level of the importer/exporter. Among those that have linked IMTS to the SBR, a majority reported doing so at the level of the importer/exporter; specifically, 79 percent of OECD countries and 57 percent of non-OECD countries reported linking at that level of detail. By comparison, 33 percent of non-OECD countries and only 8 percent of OECD countries reported linking at the transaction level. The remaining respondents reported linking at both levels of detail, one of which reported that it links the basic indicators (such as number of exported products) at the transaction level and then aggregates the records to the level of the importer/exporter, which it reports is more meaningful than linked data at the level of the transaction. Regionally, a majority of respondents cited linking at the level of importer/exporter in all of the regions except Asia-Pacific, where half of the respondents also cited linking at the level of the transaction, as shown in figure 1.11.

Figure 1.11
Level of detail of trade data linked to SBR by region

Survey respondents were asked how the trade data were linked to the SBR, either by:
- Enterprise (trade data) to enterprise (SBR)
- Establishment (trade data) to establishment (SBR)
- Establishment (trade data) to enterprise (SBR)

Sixty-six percent of respondents linking IMTS to the SBR reported linking the enterprise (in the trade data) to the enterprise (in the SBR). Ten percent report that they link on a combination of both enterprise to enterprise, establishment and to establishment, and/or establishment to enterprise. Seven percent reported they link based on legal units in both the trade data and the SBR. This pattern holds true across all responding regions.

When asked how they deal with trade records that cannot be matched to the SBR, most respondents reported that they either exclude those records from the output (cited by 32 percent) or classify them as "unknown" in the output (also cited by 32 percent). Another 19 percent reported that they conduct further research on the unmatched records and/or complement them with other data sources in order to match them to the SBR. Eleven percent reported that all (or virtually all) of their records match. One respondent reported using a probabilistic linking exercise for unmatched records.

C. Dissemination of IMTS Trade by Enterprise Characteristics (TEC) data

Linking trade statistics to the SBR enables the compilation of a new statistical domain, called "trade by enterprise characteristics" (TEC). Several countries[12] are already compiling TEC indicators, with international organizations Eurostat[13] and the Organization for Economic Cooperation and Development (OECD) involved in the collection and dissemination.[14] TEC data indicate which types of firms – for example, by industry, size class, foreign ownership, or geographical region – are engaged in international trade. This information is becoming increasingly relevant for policymakers, as countries' economic activity is becoming more interconnected and globalized. TEC data can address policy questions about what types of firms are involved in international trade; the principal economic activities or industrial sectors of traders; trading firms' contribution to employment; and generally these firms' role in global value chains and the associated structure of imported and exported products. TEC data can be compiled based on trade value, trade quantity, and by number of enterprises for the following variables (and combinations thereof):
- Trade by economic activity (i.e., *International Standard Industrial Classification (*ISIC))
- Trade by enterprise size as measured by number of employees
- Trade by enterprise size as measured by sales/turnover
- Trade by (sub-national) geographic location
- Trade by foreign ownership (e.g., domestically-controlled; foreign enterprise; presence of affiliates abroad)
- Trade by partner countries (by zone of partner countries and/or by number of partner countries)
- Trade by sectors' traded commodities
- Trade by export intensity (i.e., exports as percent of total sales)

Similar variables (with the exception of quantity) can be compiled for trade in services statistics (i.e., Services Trade by Enterprise Characteristics (STEC)) and FDI statistics (FDIEC).

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[12] A non-exhaustive list of these countries includes the EU member states (except Ireland), Albania, Canada, Norway, Israel, Turkey and the United States; Australia compiles TEC for exporters only.

[13] See http://ec.europa.eu/eurostat/statistics-explained/index.php/International_trade_by_enterprise_characteristics

[14] See http://www.oecd.org/std/its/trade-by-enterprise-characteristics.htm.

Twenty-nine percent of all survey respondents report that they maintain a micro-level database of trade by enterprise characteristics (TEC). Alternatively, among those respondents that have linked IMTS to the SBR, 63 percent report maintaining such a database, which holds true across all regions. When asked if this micro-level database of TEC data was made available for use by the public or researchers, about 60 percent of respondents with such a micro-database reported that it was *not* available outside the agency, while 22 percent reported that it is available to researchers only. Only two respondents reported that such a micro-level database is made available to the public.

Forty-four respondents, representing 45 percent of all respondents, report disseminating TEC indicators. More specifically, 73 percent of OECD countries and only 32 percent of non-OECD report disseminating TEC data. The number of countries in each region that disseminate TEC variables are shown in table 1.1.

Table 1.1
Respondents that disseminate TEC variables

	# of respondents disseminating TEC	% of all respondents in region
OECD	22	73%
Non-OECD	22	32%
Africa	5	25%
Americas	6	38%
Asia-Pacific	2	9%
Europe	31	78%
Total	**44**	**45%**

More specifically, among respondents that have linked IMTS to the SBR, an overwhelming 89 percent report disseminating TEC indicators, which holds true across all regions. Interestingly, one respondent that disseminates TEC variables reported that such data are based on survey information, and are *not* compiled by linking IMTS to the SBR. Two respondents noted that TEC indicators are compiled but not disseminated.

TEC data can be disseminated across a wide array of possible variables, including, most commonly, trade by economic activity of the trading firms, trade by enterprise size (measured by number of employees or revenues/turnover), and trade by foreign ownership status, among others. Such variables can further be disseminated across the following dimensions of trade data: trade by value, trade by quantity, and trade by number of enterprises, all of which can be further disaggregated by commodity or commodity grouping and by partner countries. For example, sample TEC data sets prepared for different parameters are shown in figure 1.12.

Figure 1.12
Sample TEC datasets

Sample 1: Dataset: TEC number of trading enterprises by sector and size class

Flow:	Imports				
Reporter:	x				
Partner:	World				
Indicator:	Number of trading enterprises				
Size class (# of employees):	Total	0-9	10-49	50-249	250+
ISIC category					
Total economy	x	x	x	x	x
Industry (excluding construction)	x	x	x	x	x
Wholesale, retail trade, repair	x	x	x	x	x
Other sectors	x	x	x	x	x
Etc.	x	x	x	x	x

Sample 2: Dataset: TEC trade value by sector and size class

Flow:	Imports				
Reporter:	x				
Partner:	World				
Indicator:	Trade value (in millions of				
Size class (# of employees):	Total	0-9	10-49	50-249	250+
ISIC category					
Total economy	x	x	x	x	x
Industry (excluding construction)	x	x	x	x	x
Wholesale, retail trade, repair	x	x	x	x	x
Other sectors	x	x	x	x	x
Etc.	x	x	x	x	x

Survey respondents were asked how their TEC variables are disseminated, according to the dimensions shown in table 1.2.

Table 1.2
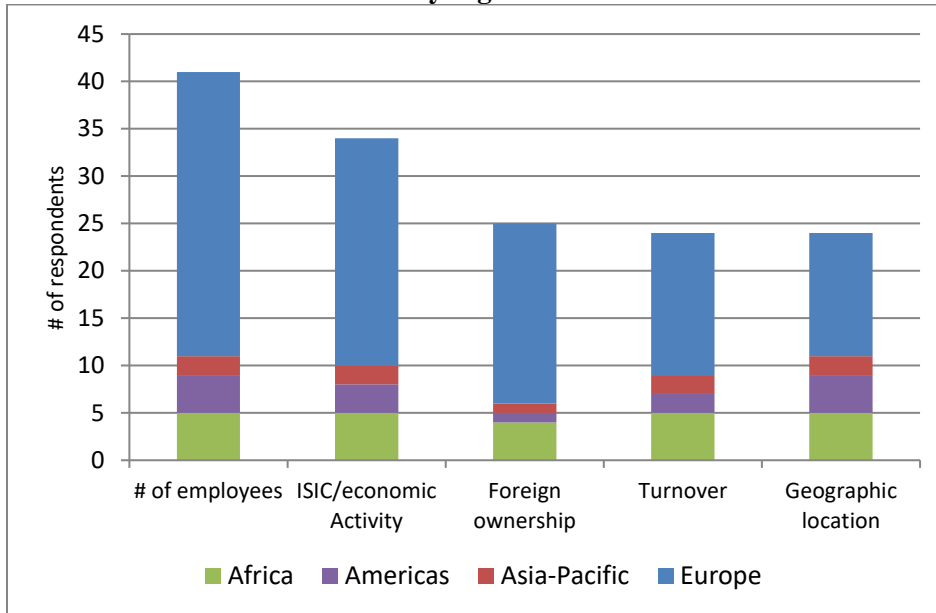**Survey question: how are TEC disseminated?**

	Dimensions		
Variables	Value	Quantity	# of enterprises
Trade by economic activity (ISIC)	❑	❑	❑
Trade by enterprise size (employees)	❑	❑	❑
Trade by enterprise size (turnover)	❑	❑	❑
Trade by sub-national geographic location	❑	❑	❑
Trade by foreign ownership	❑	❑	❑
Other	❑	❑	❑

The greatest number of respondents reported disseminating TEC variables by number of employees, followed by economic activity, (either based on the International Standard Industrial Classification (ISIC), or the industry standard classification code used in Europe (NACE), or the industry standard classification code used in North America (NAICS)), as shown in figure 1.13.
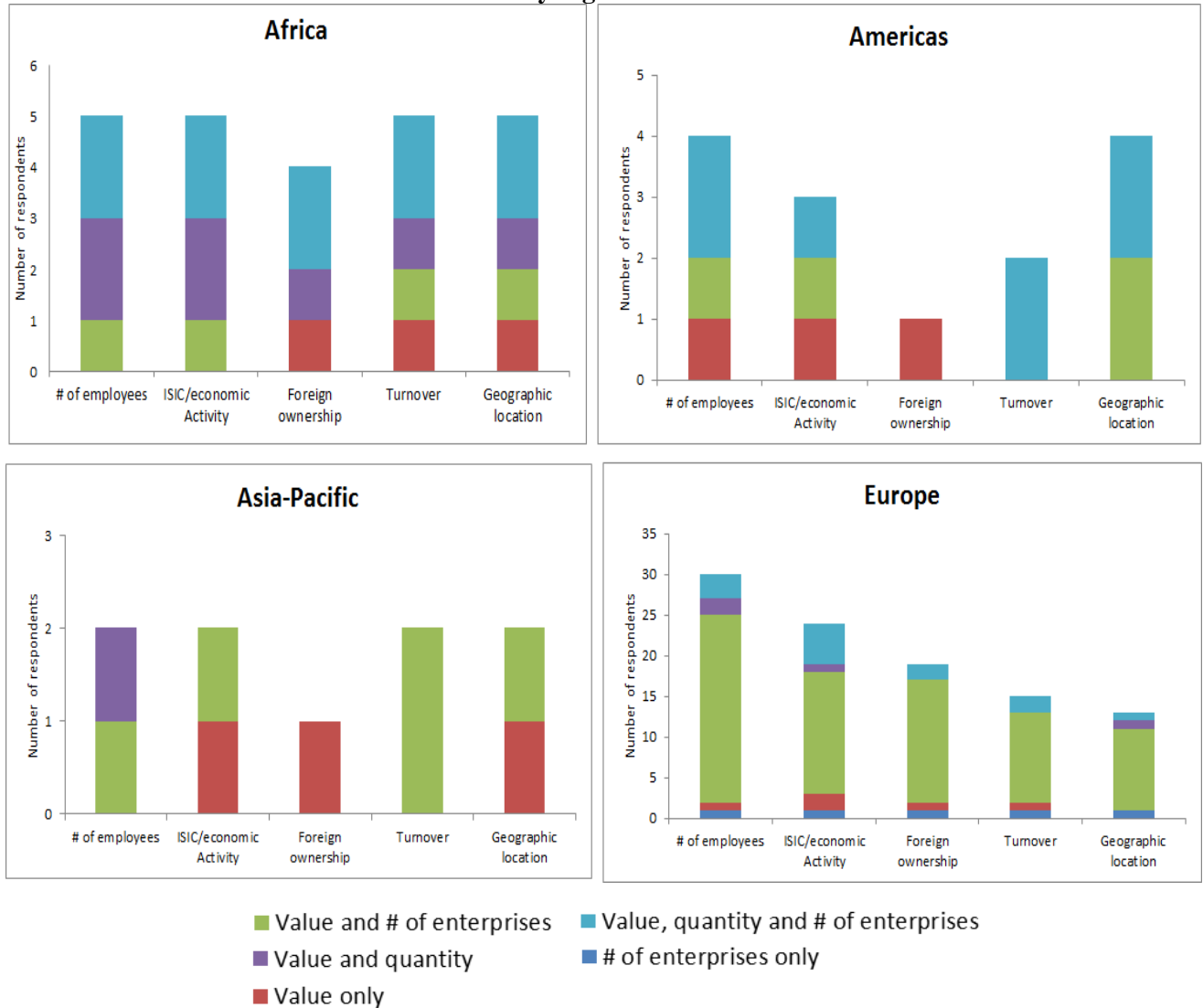
Moreover, 8 respondents (all in Europe) report disseminating TEC data by commodity and 7 (all in Europe) report disseminating TEC for partner countries and by number of partner countries. Three respondents also report disseminating data by export intensity of the enterprise, or the export value as a share of turnover, and two respondents disseminate TEC by type of trader (either exporter or importer).

Figure 1.13
Dissemination of TEC variables by region

On a regional basis, nearly all of the respondents in Africa disseminating TEC data reported that they disseminate all of the variables (i.e., # of employees, economic activity, foreign ownership, turnover and geographic location), and mostly report disseminating all dimensions (i.e., value, quantity and number of enterprises) for those variables, as shown in figure 1.14. Respondents in the Americas mostly report disseminating variables on number of employees, geographic location and economic activity, with a varying range of disseminated dimensions. Respondents in Asia-Pacific mostly report disseminating dimensions on value and number of enterprises. Respondents in Europe mostly report disseminating value and number of enterprises, with number of employees being their most frequently cited variable, followed by economic activity and foreign ownership.

Figure 1.14
Disseminated TEC variables and dimensions by region

Seventy-five percent of all respondents that disseminate TEC data report that they publish them annually, which holds true across all regions. Half of the respondents report that the confidentiality rule applied to their disseminated TEC data is at least three enterprises per cell, with half of these respondents stating that a domination rule (or p% rule) is also applied. Another 21 percent of respondents reported that there must be *more* than three enterprises in each cell.
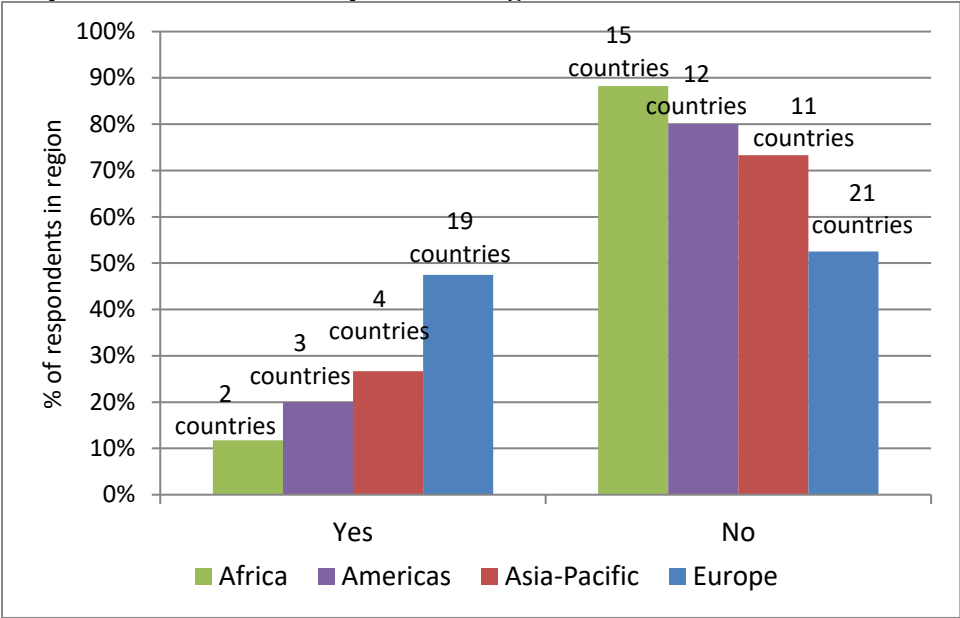
V. Linking Statistics of Trade in Services (SITS) to the SBR

Thirty-two percent of all respondents with an SBR report that enterprises that export or import services are linked to the SBR (compared to 50 percent that are linking IMTS to the SBR, as described in section IV). About half of the respondents that have linked ITMS to the SBR have also conducted this link for SITS.

More specifically, 43 percent of OECD countries and 22 percent of non-OECD countries are linking SITS to the SBR. On a regional basis, countries in Europe are by far most commonly conducting this link, with 48 percent of them reporting doing so, compared to 27 percent of countries in the Asia-Pacific region, 20 percent of countries in the Americas, and 12 percent in Africa, as shown in figure 1.15. Two of the respondents report that this linking is conducted by linking the results of enterprise surveys on international trade in services to the centrally-maintained SBR.

Eight respondents report that they are planning to link SITS to the SBR in the near future and one reports that its data sources for SITS have the necessary information to link them to the SBR. In addition, 3 respondents report that while they do not directly link SITS to the SBR, they link results from different enterprise surveys in order to compile more detailed information on enterprises that are involved in international trade in services.

Figure 1.15
Respondents that link enterprises trading in services to the SBR

A. Compilation of SITS

When asked which agency maintains a list of enterprises that export or import services, 38 percent of respondents cited the central bank and one-third cited the NSO. Meanwhile, 17 percent reported that no agency maintains such a list.

B. Dissemination of Services Trade Enterprise Characteristics (STEC) data

Twenty respondents, representing 20 percent of all respondents, report disseminating STEC indicators. More specifically, 33 percent of OECD countries and only 15 percent of non-OECD report disseminating STEC data. The number of countries in each region that disseminate STEC variables are shown in table 1.2.

Table 1.2
Respondents that disseminate STEC variables

	# of respondents disseminating TEC	% of all respondents in region
OECD	10	33%
Non-OECD	10	15%
Africa	3	15%
Americas	3	19%
Asia-Pacific	3	14%
Europe	11	28%
Total	**20**	**20%**

Survey respondents were asked how their services trade by enterprise characteristics (STEC) data are disseminated, according to the variables and dimensions shown in table 1.3. Notably, these variables and dimensions are the same as those requested regarding IMTS TEC data, with the exception that there is no quantity dimension for services.

Table 1.3
Survey question: If statistics of international trade in services are indeed linked to the SBR, how are the data disseminated?

Variables	Dimensions	
	Value	# of enterprises
Trade by economic activity (ISIC)	❏	❏
Trade by enterprise size (employees)	❏	❏
Trade by enterprise size (turnover)	❏	❏
Trade by sub-national geographic location	❏	❏
Trade by foreign ownership	❏	❏
Other	❏	❏

The greatest number of respondents report disseminating STEC variables by economic activity, followed by number of employees and foreign ownership, geographic location, as shown in figure 1.16. One respondent (in Asia-Pacific) reports disseminating STEC data on the number of enterprise by extended balance of payments services classification (EBOPS 2010).

Three respondents report that they compile STEC data via enterprise surveys and one cited using administrative data, rather than linking SITS to the SBR. Another 11 respondents report that compilation of STEC indicators is under development.

On a regional basis, nearly all of the respondents in Africa compiling STEC data report that they disseminate value and number of enterprises for the variables, as shown in figure 1.17. Respondents in the Americas mostly report disseminating value only among the variables. Respondents in Asia-Pacific mostly report disseminating value and number of enterprises. Respondents in Europe mostly report disseminating value only for most of the variables, but only two countries in Europe disseminate data on turnover.

Figure 1.16
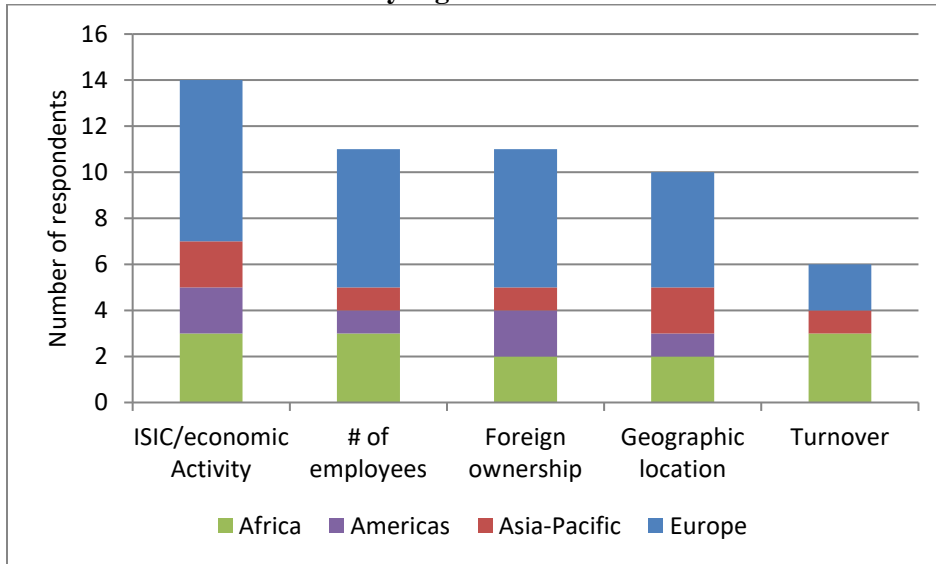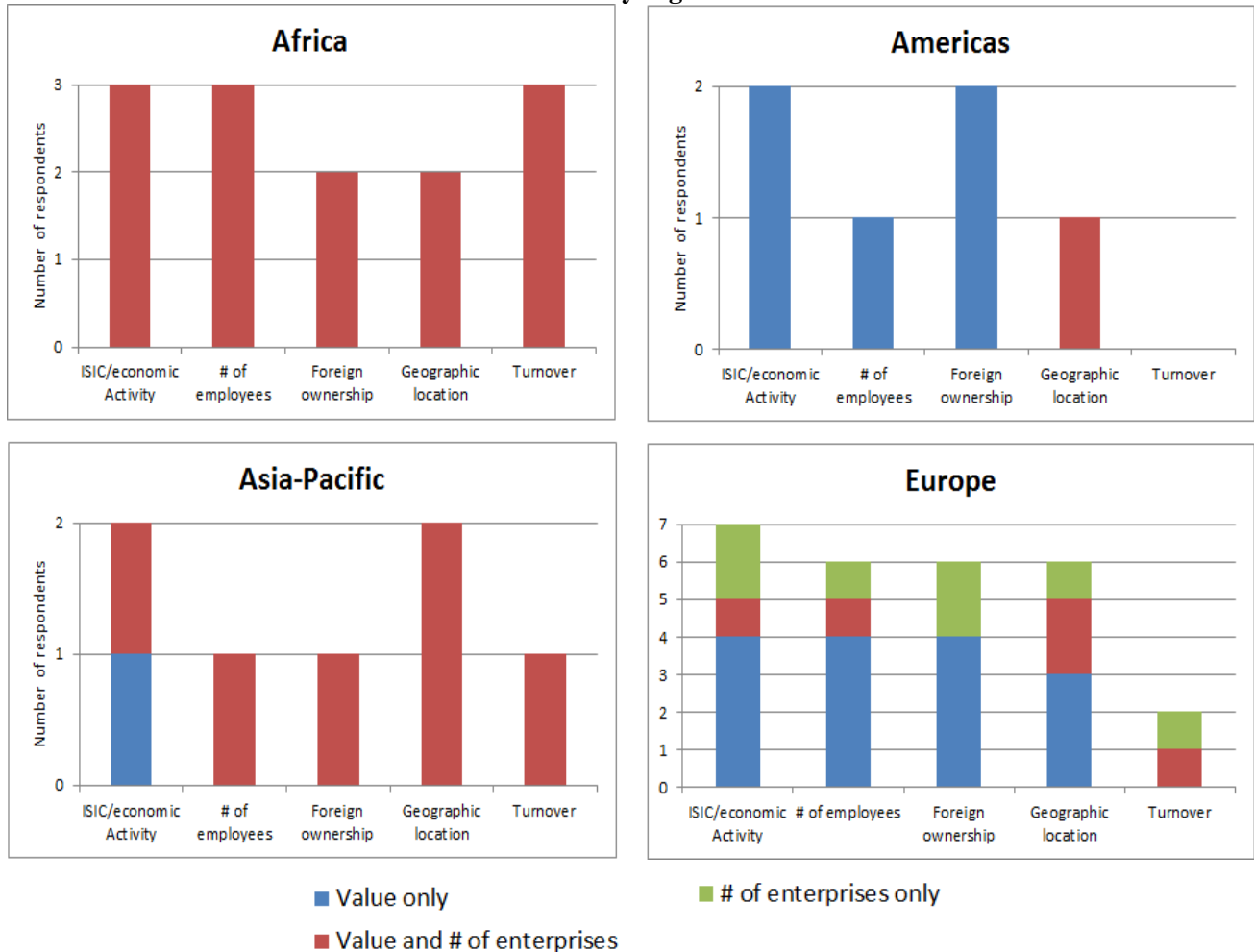**Dissemination of STEC data by region**

Figure 1.17
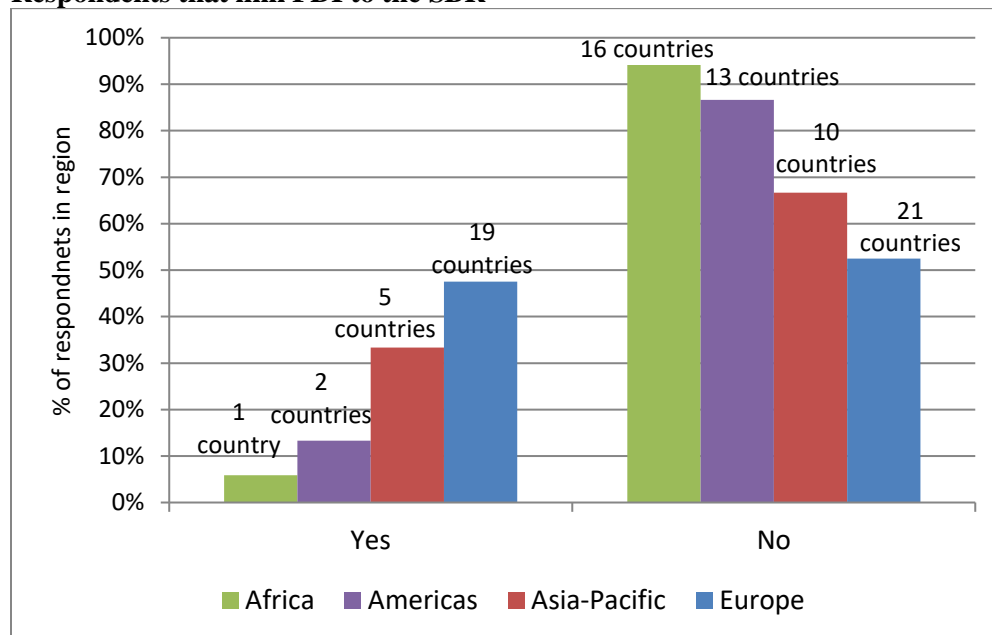**Dissemination of STEC variables and dimensions by region**

VI. Linking Foreign Direct Investment statistics (FDI) to the SBR

Thirty-one percent of respondents with an SBR report that they link FDI statistics to the SBR (compared to 50 percent that are linking IMTS to the SBR and 32 percent that link SITS to the SBR, as described in sections IV and V).[15] More specifically, 33 percent of OECD countries and 22 percent of non-OECD countries are linking FDI to the SBR. On a regional basis, countries in Europe are by far most commonly conducting this link, with 48 percent of European countries reporting doing so, compared to 33 percent of countries in the Asia-Pacific region, 13 percent of countries in the Americas, and 6 percent in Africa, as shown in figure 1.18. This regional pattern is similar to that which reports linking SITS to the SBR.

One respondent reports that domestic enterprises that receive FDI are currently linked to the SBR based on results from the quinquennial economic census, but that enterprises making outbound FDI will also be linked to the SBR in the near future. One other respondent reports that a separately-maintained FDI survey database is fed into the centrally-maintained SBR. Another 2 respondents report that compilation of FDIEC indicators is under development.

Figure 1.18
Respondents that link FDI to the SBR

A. *Dissemination of FDI by Enterprise Characteristics (FDIEC) data*

Twenty-eight respondents, representing 29 percent of all respondents, report disseminating FDIEC indicators. More specifically, 40 percent of OECD countries and 24 percent of non-OECD report disseminating STEC data. The number of countries in each region that disseminate STEC variables are shown in table 1.4.

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[15] One of these respondents reports that FDI statistics are linked to the central bank's SBR, which is aligned with, but not identical to, the central SBR.

Table 1.4
Respondents that disseminate STEC variables

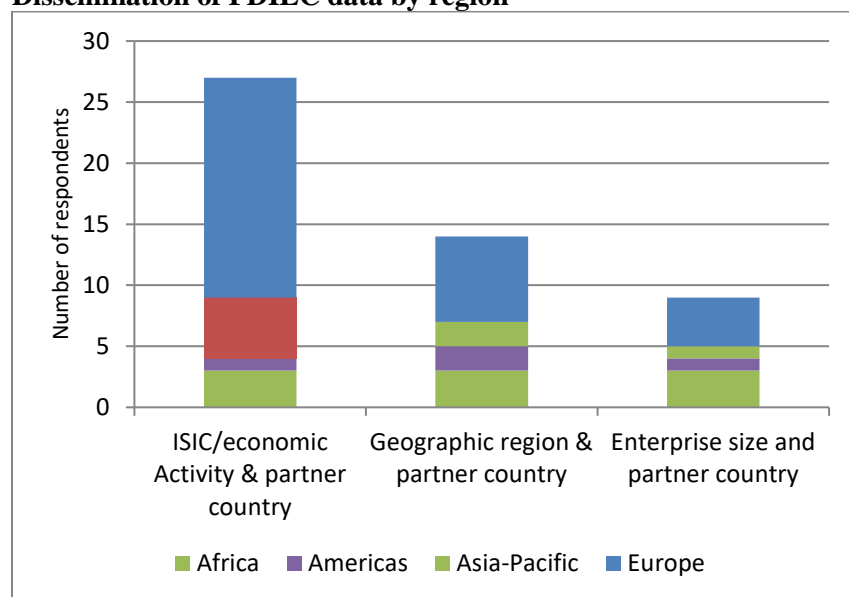|	# of respondents disseminating TEC	% of all respondents in region
OECD	12	40%
Non-OECD	16	24%
Africa	3	15%
Americas	2	13%
Asia-Pacific	5	23%
Europe	18	45%
Total	**28**	**29%**

Survey respondents were asked how their FDI by enterprise characteristics (FDEC) data are disseminated, according to the variables and dimensions shown in table 1.5. Notably, these variables and dimensions are similar to those requested in the survey regarding STEC data, but include partner country.

Table 1.5
Survey question: If FDI statistics are indeed linked to enterprise characteristics, how are they disseminated?

Variables	Dimensions	
	Value	# of enterprises
Trade by economic activity (ISIC) and partner country	❑	❑
Trade by enterprise size and partner country	❑	❑
Trade by sub-national geographic location and partner country	❑	❑
Other	❑	❑

Virtually all respondents that disseminate FDIEC indicators report doing so for economic activity and partner country (cited by 96 percent of these respondents), followed distantly by geographic location and partner country (cited by 55 percent), and enterprise size and partner country (cited by 33 percent), as shown in figure 1.19. One respondent also reports disseminating FDIEC by age of enterprise, legal form, and extent of FDI participation.

Figure 1.19
Dissemination of FDIEC data by region

On a regional basis, the respondents in Africa and the Americas compiling FDIC data reported that they mostly disseminate value and number of enterprises for the variables, as shown in figure 1.20. And respondents in Asia-Pacific and Europe mostly report disseminating value for economic activity and partner country. Only one respondent (in Europe) reports that it disseminates FDIEC data on number of enterprises.
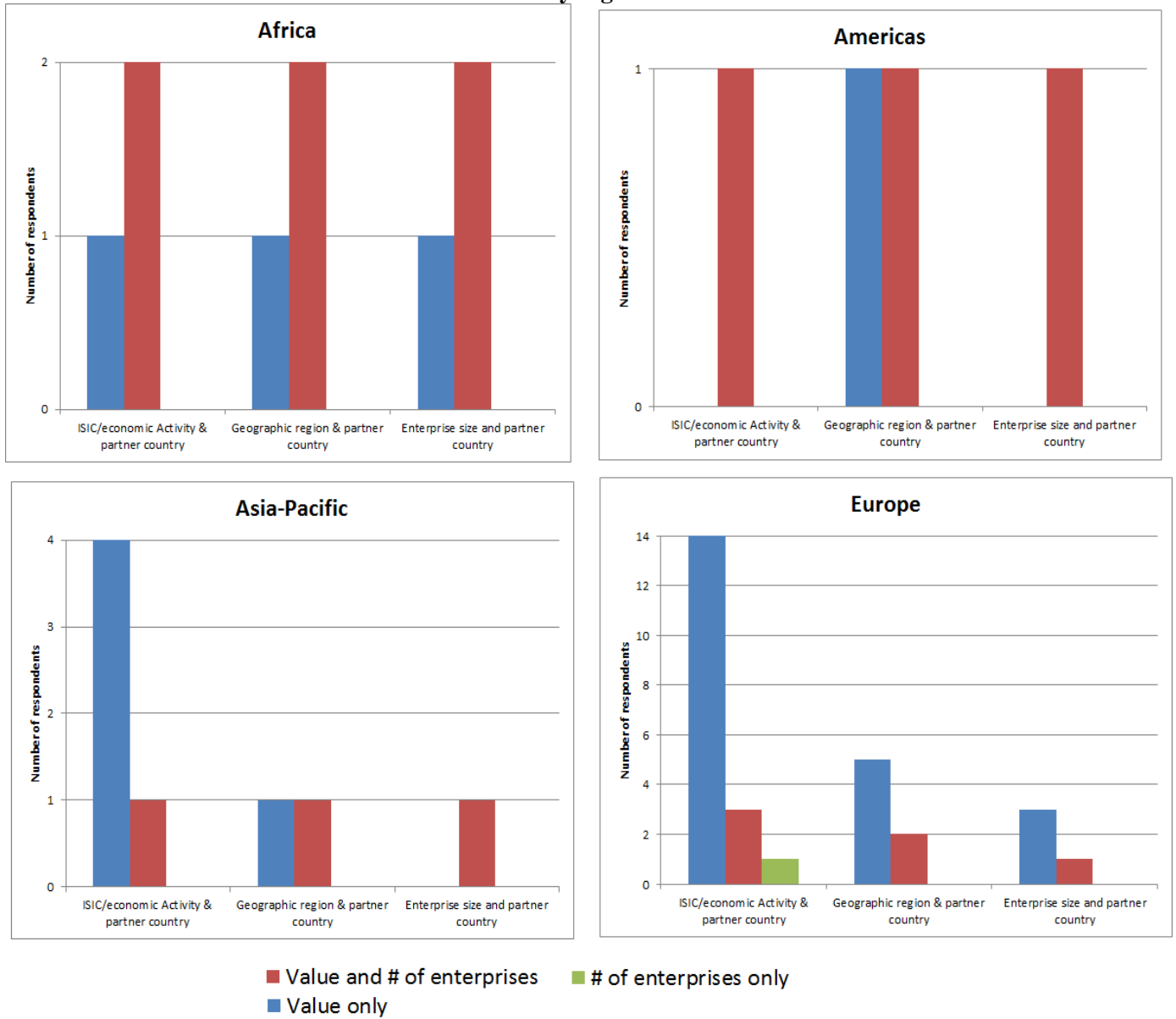
VII. Challenges in linking trade statistics to the SBR

Respondents were asked which of the following challenges the linking agency faces when attempting to link trade statistics to the SBR:
- Matching enterprises or establishments
- Many "wholesalers" or "distributors"
- Many forwarding agents and other intermediaries
- Technological challenges
- Methodological challenges
- Institutional challenges
- Financial challenges
- Human resource challenges
- Other challenges

"Matching enterprises or establishments" is the most commonly reported challenge, cited by one third of respondents. More specifically, two respondents report that enterprise groups or VAT groups are assigned one identification number, which makes it difficult to allocate them to an enterprise-level statistical unit. One respondent reports that identification numbers are sometimes missing, which necessitates the use of business name to conduct the link, which may be an imperfect procedure. Another respondent reports that the Customs authority internally assigns its own identification numbers to enterprises which cannot be linked to the SBR.

Figure 1.20
Dissemination of FDIEC variables and dimensions by region

"Methodological" and "Human resource" challenges were the second most commonly reported, cited by 20 respondents each. Respondents note that the linking process, particularly researching unmatched records or anomalous data, is resource-intensive.

Seventeen respondents cite the challenges of "Many wholesalers or distributors" and 12 cite "Many forwarding agents and other intermediaries." One respondent notes that it is important to be able to tie wholesale activity to a producer and to identify larger enterprises that are acting as intermediaries for smaller enterprises, perhaps by linking to other datasets or surveys. Relatedly, another respondent notes that enterprises classified as holding companies need to be further analyzed in order to link them to an economic activity.

Eleven respondents cite "Technological challenges". One respondent notes that it employs the use of software packages specifically purchased for this activity. "Institutional" and "Financial" challenges were each cited by 9 percent of respondents. And 6 percent report that an incomplete SBR was a challenge, with respondents citing the exclusion of SPEs, non-established traders, foreign enterprises, and records with missing or confidential information.

VIII. Steps in the linking process and best practices

The first step in the linking exercise is to establish a common unit of analysis as the basis to conduct the linking (i.e., "the enterprise"). As shown previously, the results from the survey indicate that, among those NSOs that have linked IMTS to the SBR, a majority (67 percent) report linking at the level of the enterprise (in the trade data) to the enterprise (in the SBR).

The enterprises in the SBR are linked to the businesses recorded in the trade data source (i.e., most likely customs declarations for IMTS, enterprise surveys and/or international transactions reporting systems for SITS and FDI). While surveys are most typically administered at the enterprise level, in many instances, there is not a defined statistical unit in customs declarations. If the trade data are recorded by establishment, the data must be aggregated to the enterprise level (or enterprise group, which is a set of enterprises controlled by a group head), based on some other identifying feature, such as legal name or identification numbers used in administrative sources, such as tax ID numbers.[16]

Implementing a unique identifying number for enterprises that is common throughout the statistical system is another key step needed to conduct the linking exercise. In relatively simple cases in which common identification numbers are used in the SBR and trade data sources, enterprises can be matched using basic software programs. However, in some cases (e.g., enterprise groups), linking units to an enterprise-level statistical unit likely requires manual intervention. For example, enterprises registered on customs documentation are not necessarily relevant for statistical purposes, as they may include large and complex enterprise groups or firms acting as forwarding agents or distributors. Such complex businesses will require human resource-intensive research and analysis, and possibly profiling (based on analysis of company accounts and interviews) to better understand their structure.[17]

While the majority of survey respondents indicated that they use a unique identifying number for each enterprise, if such a number is not available, other approaches to linking can be adopted, based on unique legal names and addresses that can be later linked to identifying numbers used in other parts of the statistical system or in administrative data, such as tax identification numbers. In these cases, more sophisticated software packages can be utilized to facilitate the matching; and more generally, compilers must pay closer attention to the quality of the data in the SBR and the trade data sources. Unmatched records will likely require human intervention.

Additionally, a snapshot of the SBR from a moment in time will likely be used, so compilers will need to select an appropriate reference period that will align with the trade data sources. Moreover, SBRs do not always have complete coverage of all importers and exporters and may need to be updated with

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[16] UNSD notes that while unmatched enterprises (that are typically marked to an "unknown" category or excluded from analytical results, as reported on the survey) may be a concern, evidence from European countries shows that such unmatched enterprises are mostly small and medium sized enterprises (SMEs) (defined as having less than 250 employees) that represent a relatively small portion of the aggregate trade value. According to Eurostat, unmatched enterprises represent about 8 to 9 percent of trade values.   http://ec.europa.eu/eurostat/statistics-explained/index.php/International_trade_by_enterprise_characteristics#Data_sources_and_availability

[17] For more information on profiling, *see* UNECE *Guidelines on Statistical Business Registers*, Geneva, 2015, pp. 69-70. http://www.unece.org/fileadmin/DAM/stats/publications/2015/ECE_CES_39_WEB.pdf.

information from other sources, such as enterprise surveys or research based on publicly available information.

The next step is to define the level of detail for the linking; i.e., whether to link at the level of the trade transaction, or at the level of the enterprise or establishment. Customs declarations are recorded by business for each transaction (export or import), with detailed product description and classification, value, exporting and importing country, and date. The survey results indicate that, among those that have linked IMTS to the SBR, a majority (67 percent) reported doing so at the level of the importer/exporter, compared to only 20 percent at the level of the transaction.

Once records from trade data sources have been linked to the SBR, NSOs must choose the level of TEC (or STEC or FDIEC) data co compile and disseminate. As described in sections IV.C, V.B and VI.B, there are a wide range of potential variables and dimensions of TEC data. The choice of the level of TEC indicators to disseminate rests upon the needs of data users and policy makers, as well as the quality and availability of the underlying data used to compile such indicators.

For TEC data, survey respondents most commonly report disseminating trade data presented on the basis of value and number of enterprises, broken out primarily by enterprise size (as measured by number of employees), followed by economic activity of the enterprise.

For STEC data, survey respondents most commonly report disseminating trade data presented primarily on the basis of value, broken out primarily by economic activity, followed by (in decreasing order): enterprise size (as measured by number of employees), foreign ownership of the enterprise, and sub-national geographic location of the enterprise. For FDIEC data, survey respondents most commonly report disseminating trade data presented primarily on the basis of value, broken out primarily by economic activity and partner country, followed distantly by geographic location and partner country and enterprise size and partner country.

Maintaining confidentiality of the identities of the trading enterprises is of critical importance, in order to maintain the trust of the data providers. Half of the survey respondents report that the confidentiality rule applied to their disseminated TEC data is at least three enterprises per cell, with half of these respondents stating that a domination rule (or p% rule) is also applied. Another 21 percent of respondents reported that there must be *more* than three enterprises in each cell.