

**UN ECLAC in collaboration with the Statistics Department of IMF and
UNCTAD**

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**Webinar on “Measuring the Digital Economy and Trade in Latin
America and the Caribbean”**

“Using Big Data to Measure Trade in Services”

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Index

1. New methods of data collection and exploitation: techniques and some applications of interest

1.1. Mobile Positioning Data (MPD)

1.2. AIS - Automatic Identification System for Ships

1.3. 5G and the Internet-of-Things (IoT)

1.4. Means of payment and measurement of e-commerce

2. Problems in collection, treatment and public-private partnership agreements

3. Small questionnaire to National Statistical Offices and other public agents

Data collection through digital tools in large volumes, Big Data,

Advantages:

- Faster and less expensive pickups and processing
- Repeating "sampling" is, more often, less expensive
- Allows micro-data collection, with much greater breakdowns/disaggregation
- Often, they are not "samples", they are records (although there may be problems)
- Allows application of Artificial Intelligence, Big Data... New ways of handling and exploiting data (for prediction, simulation,)

And problems too:

- New methods for data processing and exploitation
- Protect the anonymity of citizens/users
- Access to data
- Comparability of data from official sources

1. New methods of data collection and exploitation: techniques and some applications of interest

1.1. Mobile Positioning Data (MPD)

1.2. AIS - Automatic Ship Identification System

1.3. 5G and the Internet-of-Things (IoT)

1.4. Payment methods and e-commerce measurement

**"Data" needs a
telecommunications
network**

1.1. Mobile Positioning Data (MPD)

For the measurement of tourist flows, three types of Big Data are mainly used, each with its diverse sources:

1. **User-generated data (UGD)**, for example uploading a photograph on a social network, participating in a chat or using the maps application
2. **Terminal data** (smartphones), collection of data directly from the terminal from a use or network that is used, such as GPS data (satellite location), international roaming data on mobile networks, or data collected through a local area network (bluetooth, Wi-Fi).
3. **Transaction data**, as the number of visits to a website, the number of electronic payment transactions, or e-commerce contracts.

Tabla 7: ventajas e inconvenientes del uso de MPD para la elaboración de estadísticas de turismo. *Fuente:* Eurostat 2014.

Ventajas	Inconvenientes
Consistencia del número de viajes y noches de estancia comparado con la evidencia derivada de estadísticas “tradicionales”	Complejos procesos para el acceso a los datos de los operadores de redes móviles e incertidumbre en colaboración a futuro
Mejor cobertura de estancias en sitios de no- pago gracias al MPD	Falta de información adicional al viaje y lugar que es de interés (gastos efectuados, precios, medios de transporte utilizados...)
La posibilidad de hacer desgloses mucho más detallados, ya sea en el tiempo(día/ hora), por ciudad, área, comarca	Sesgos en algunas clasificaciones como resultado del uso de definiciones distintas (visitas de muy corta estancia)
Posibilidad con Big Data de identificar eventos turísticos de interés, visitas repetidas, frecuencia en las visitas	Sobre ponderación de visitas que no son estrictamente de turismo
Proporciona estadísticas en tiempo real (casi instantáneamente)	Sobre o infra representación de flujos reales de turistas (los que no utilizan terminal móvil nunca; los que hacen mucho uso de itinerancia internacional de varios operadores a la vez o varios terminales)
Producción de estadísticas de un modo más automatizado	
Posibilidad de utilizar “estadísticas espejo” transfronteriza que identifique redes de turismo a través de varias fronteras, si existe coordinación en la colecta de datos entre países	

1.2. AIS- Automatic Identification System for Ships

- AIS provides data, either via radio frequency (VHF) or via satellite, of the location, identity, draft, type and movement of a ship at sea.

Case of interest: approximation of the global flow of maritime trade in iron, fertilizers, grain and coal in the different ports of Japan for 2016 (Kanamoto et. al. 2021).

Combination of information sources

AIS- Data location, movement, draft

AXS: berthing, unloading of goods (type), date, port

Official data (1): Port entering/leaving

Official data (2): Statistics Institute, UNComTrade

Problems encountered:

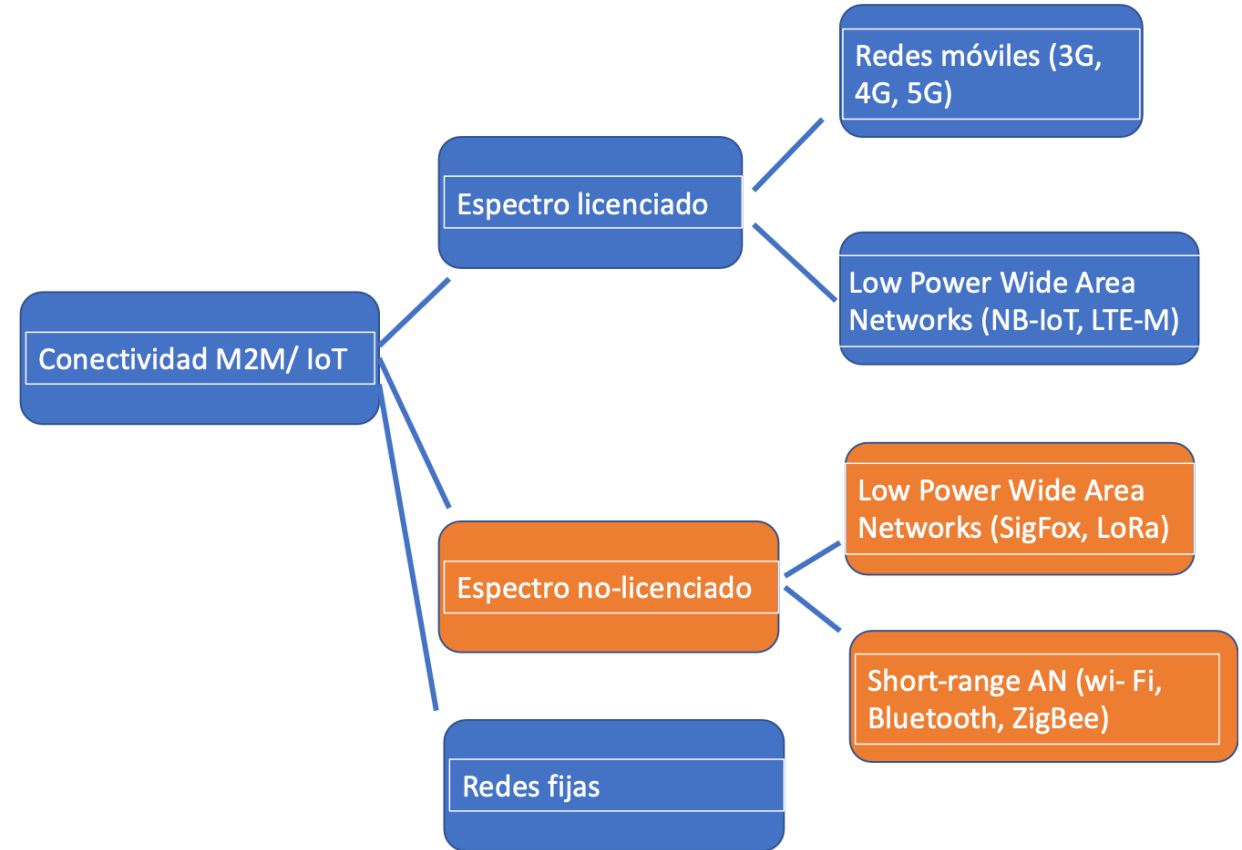
- Each data source uses a different classification of merchandise/goods:
 - (1) national authorities (Ministry, Ports),
 - (2) private sources (AXS, Clarkson) and
 - (3) public sources (UN ComTrade)
- Need to match different information through different sources:
 - * Different format issues,
 - * Identification of subjects to be measured with different scales or metrics.

Experiences: approximation to the volume of maritime trade: volume of trade in petroleum (Adland, 2017), liquid gas (Shibashaki, 2020), an analysis of real time traffic flows of ships (Arslanalp, 2019), load of big ships (Jia, 2019) or the planning of traffic in harbours (Arifin, 2018).....

1.3. 5G and the Internet-of-Things (IoT)

5G (3GPP) or IMT-2020 (ITU) standard can provide speeds up to 100 times faster than the 4G/LTE standard, and with much lower latency level.

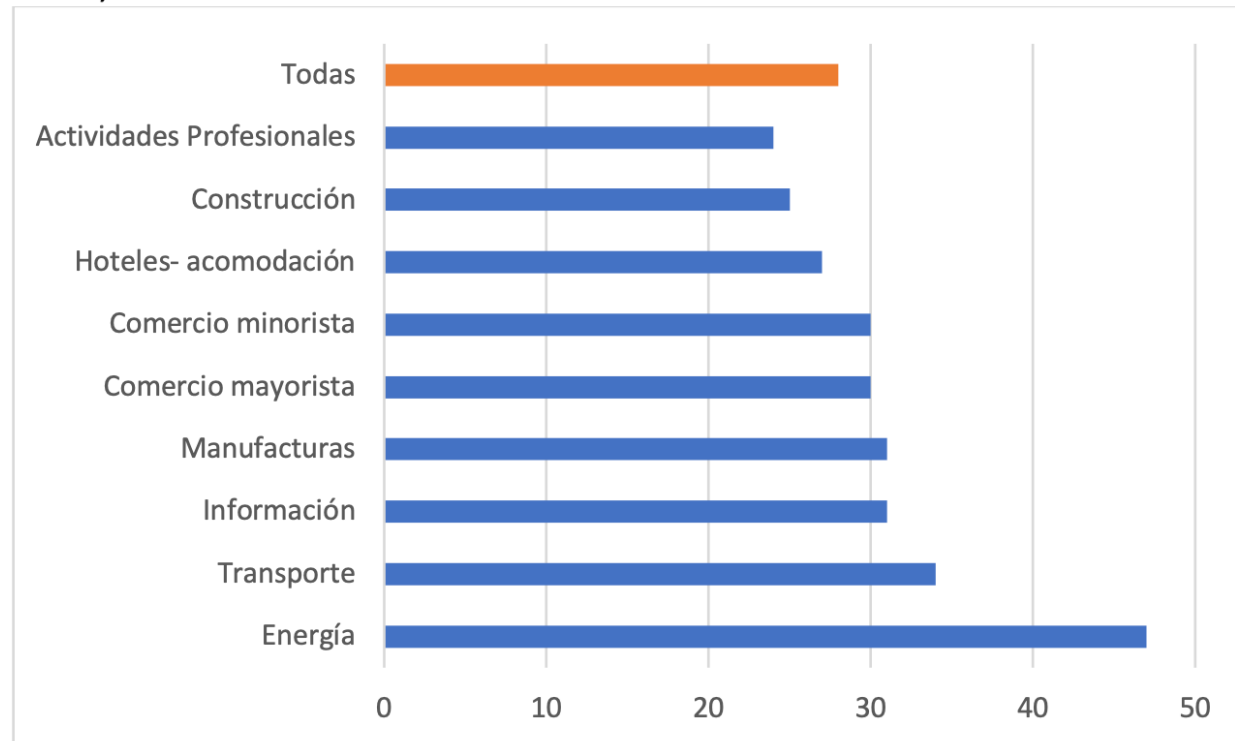
Figura 2: redes utilizadas para Internet de las Cosas. *Fuente:* BEREC, 2019



The main uses of 5G/IMT-2020 connections can be grouped into three major classes:

- (1) Enhanced mobile broadband (eMBB),
- (2) Massive Machine-Type communications (mMTC)
- (3) Ultra-reliable, low-latency communications (ULLC)

Figura 1: Proporción de empresas en países seleccionados de OECD que utilizan IoT, 2021. *Fuente:* OECD, 2022



Cases of interest:

1. Connected logistics

- Monitoring and measuring all elements of a supply chain implies investments as well as great improvements in efficiency and cost savings. This will be possible if three conditions are met:

(1) global or **universal connectivity** to very local levels – of "final delivery or distribution point",

(2) computing power and **sensors integrated** with each other, and

(3) **use of AI** (artificial intelligence) to know what happens between sensors, terminals and machines connected to each other.

- It is this integration of networks, data and analytical capacity that leads to profound changes in the integration of services so far segmented, provided by different agents.

Cases of interest:

2. Port management with 5G

- port of Livorno (Italy) installation of cameras, sensors and objects all connected to a highly reliable 5G network
- To this system are added technologies such as AI, Augmented Reality and, this way, it is possible to load/unload goods with robots, manage multi-modal transport, control quality or condition of goods...
- Ericsson estimates that a cost reduction of 2.5 million Euros has been achieved only in the berthing time of ships and 25% more productivity in the use of cranes in docks thanks to remote control and management of the same and less energy use
- Experience in other ports, such as Singapore and Shanghai, Malaga, Barcelona...

Cases of interest:

3. "Truck platooning" tests in Japan

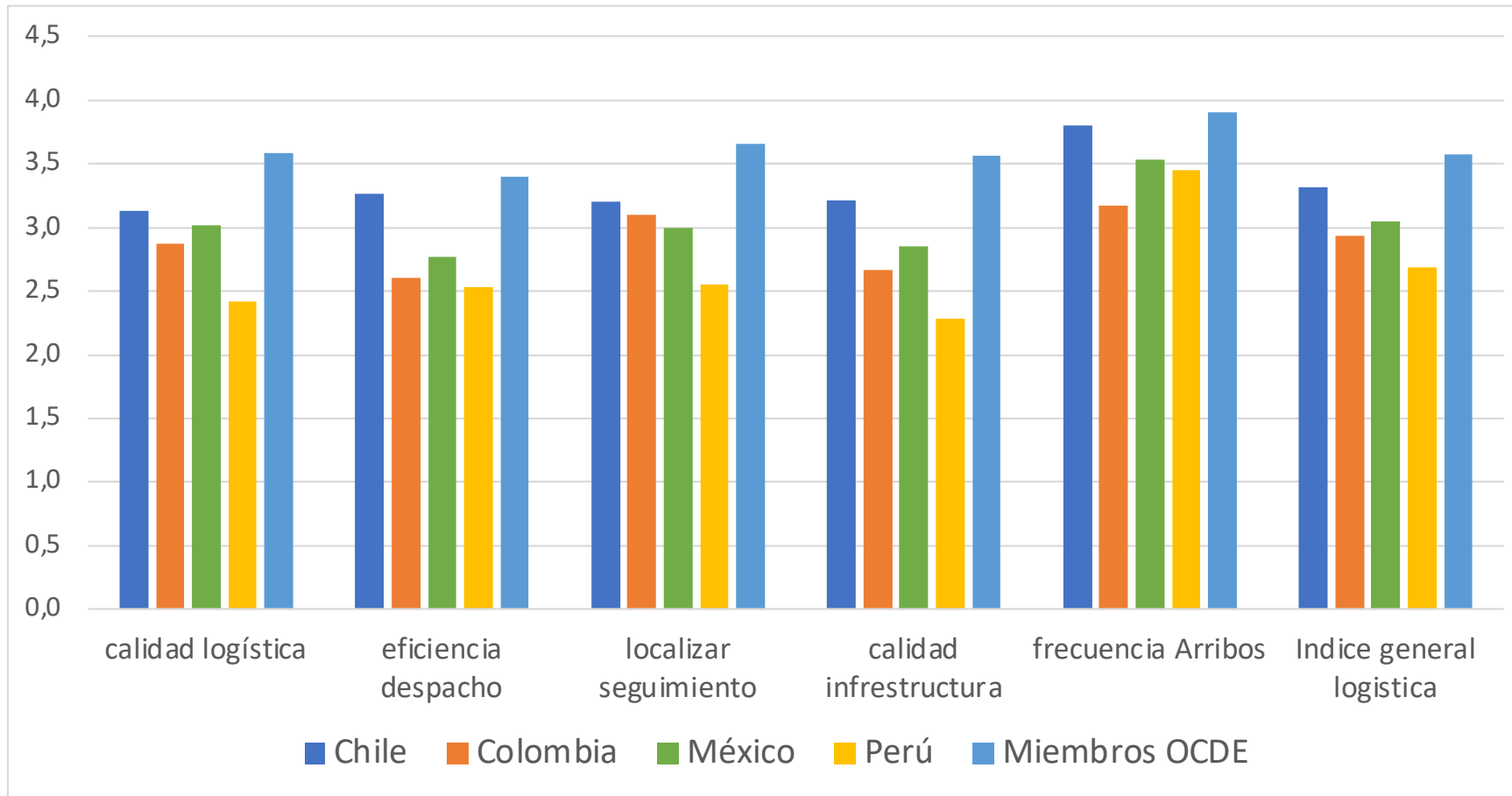
- Japan's Ministry of Communications has promoted 5G testing, such as the *truck platooning* experience.
- Similar tests in the EU.

4. Cross-border corridors in the EU

- To facilitate, manage and optimize road traffic of persons and goods and to promote autonomous driving.
- Public-private collaboration.

Interest for member countries in the Pacific Alliance

Logistics Performance Index and its components, data for 2018. *Source:* World Bank



Degrees:

1 – low

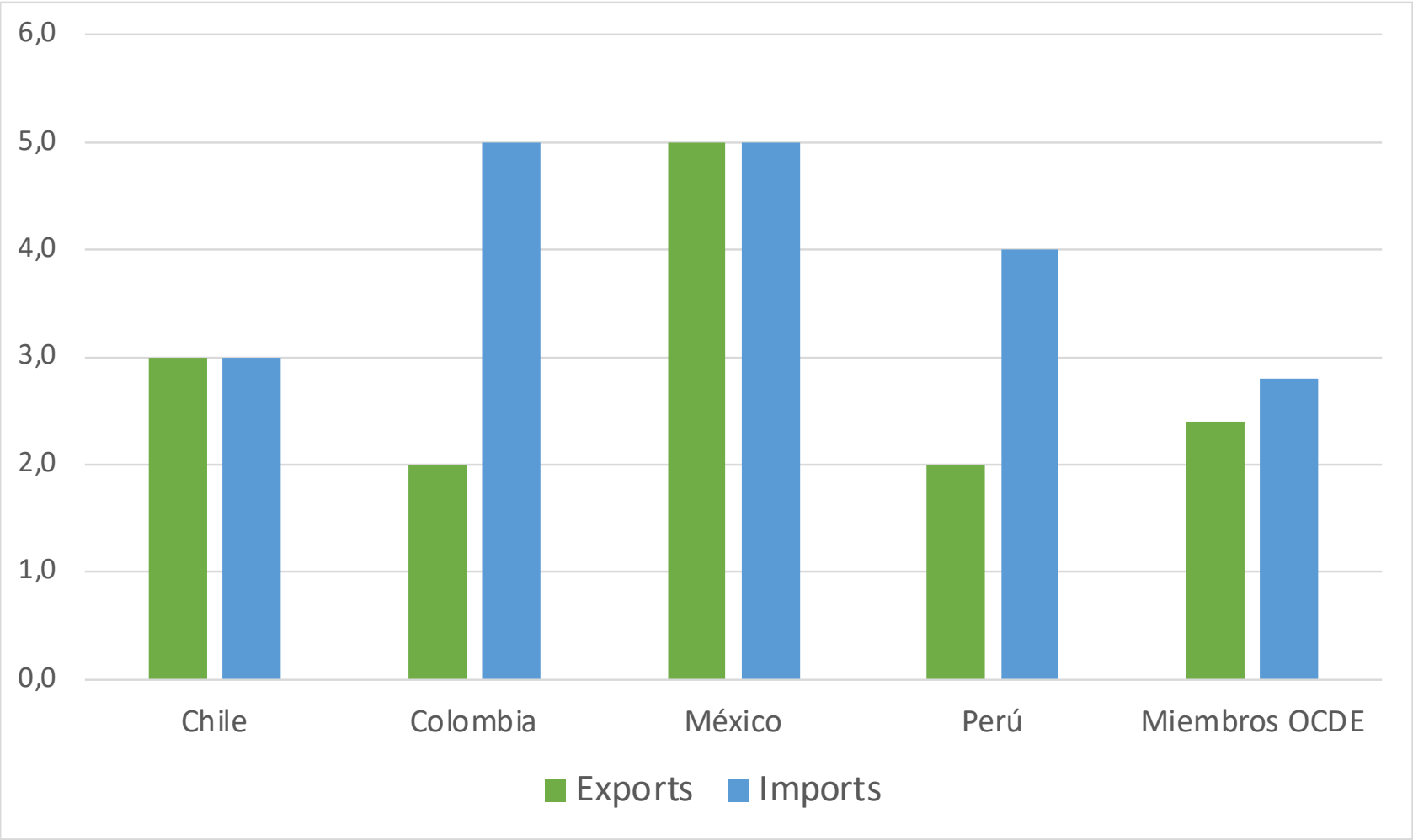
5 – high performance

Universe:

> 5000 evaluations

> 1000 cargo services

Delivery times for **imports and exports** from the countries of the Pacific Settlement (Mexican days). *Source: World Bank*



1.4. Payment methods and e-commerce measurement

Phases in the purchase:

- (1) The purchase/sale order, **“All contracts made online....”**
- (2) Payment,
- (3) the final distribution or delivery

- It matters more and more (retail and wholesale)
- different accounting with respect to "value added" (GDP)
- B2C, B2B, B2G
- different sources (electronic payments without the presence of a physical card, EDI, e-commerce platforms...)
- difficulties in measuring cross-border trade (mere transit, heterogeneous classifications of "services" ...)

- NACE Class 479x (rev.4)/ ISIC, "retail sales in non-physical stores..."

- Sources:

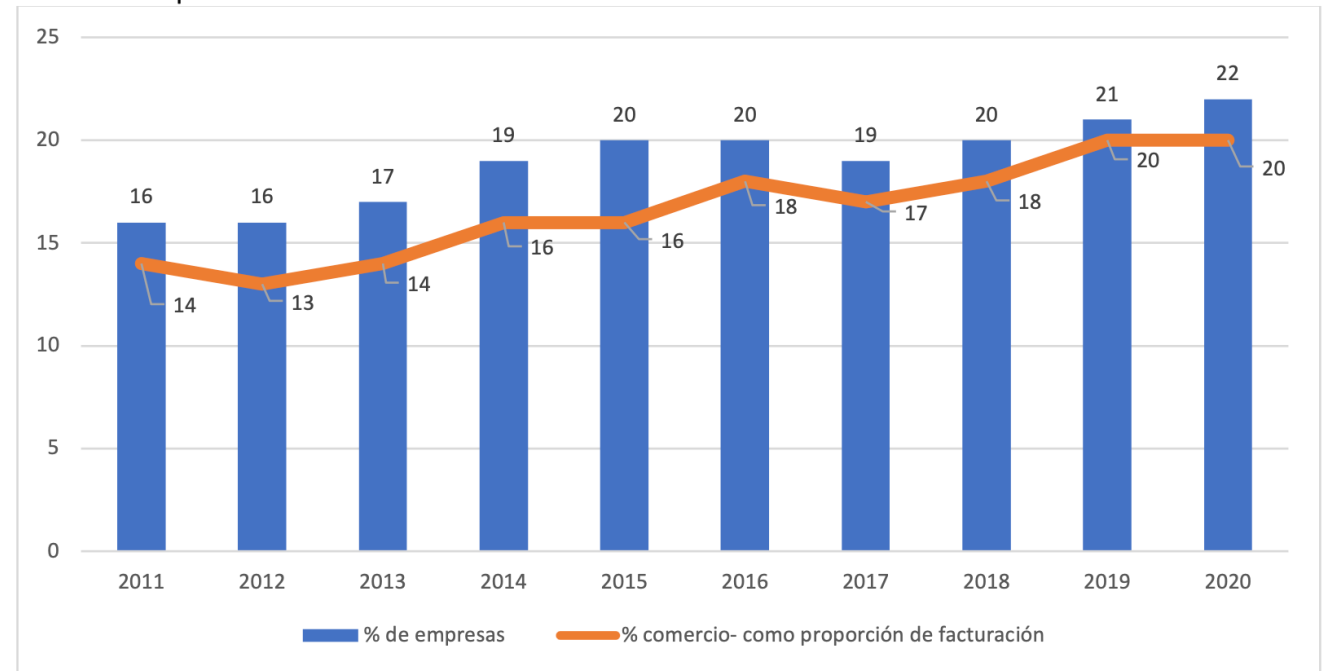
(1) Surveys (enterprises, households)

(2) Online payment registration

(3) Delivery records (goods)

(4) E-commerce platform registrations

Figura 3: Proporción de empresas que utilizan comercio-e y proporción de ventas online sobre ventas totales en la Unión Europea. Fuente: Eurostat



2. Problems in collection, treatment and public-private partnership agreements

2.1. Administrative issues accessing mobility data

2.2. Technical problems of data processing and methodological problems

2.3. Baseline, evaluation and estimation data: new methods for the treatment of Big Data

2.2. Technical problems of data processing and methodological problems

Some methodological aspects that must be taken into account:

(1) **Anonymization**

(2) **Data processing**

(3) Need to **apply new software** that manages the large volume of data

3. Small questionnaire to National Statistical Offices and other public agents

Objective: know the use of Big Data, Geographic Information System (GIS), Artificial Intelligence, Web Scraping and other digital techniques for data collection and processing.

1. Does your organization have experience with Big Data?

(satellite imagery, web scraping, mobility data, scanner, sensors...)

2. Does your organization use any open data sources obtained from third parties as complement to official sources?

3. Do you find it easy or expensive to reach collaboration agreements with agents or companies that have access to Big Data?
(accessing and managing big data, legislation, costs....)

4. Does your organization use any of the following AI technologies?

(text mining, image recognition, image processing, Machine learning, autonomous robots)

5. Has your organization replaced part of its regular production of statistics with data obtained through Big Data (for example, moving from surveys or census collections to data collections from other sources)?

6. Does your organization have personnel specialized in collecting, processing and exploiting Big Data?

7. Do you consider that the applicable data protection legislation is well designed to protect individuals, on the one hand, and to incentivize the use of Big Data?

Thank you!