PRELIMINARY REFLECTIONS ON THE MEASUREMENT OF THE SUSTAINABLE DEVELOPMENT OF TOURISM UNDER THE FRAMEWORK OF THE 2030 AGENDA AND BIG DATA

Dr. AURKENE ALZUA-SORZABAL (Ph.D)

University of Deusto

DECEMBER 2017

UNWTOINSTO
World Tourism Organization International Network of Sustainable Tourism Observatories

Regal Princess Gets New Technology

Princess Cruises' **Regal Princess**, from parent company Carnival Corp., has been outfitted with new **Ocean Medallion and Ocean Compass technology** that will let the ship and the crew know who passengers are, what their interests are and where on the ship the travelers are located. The new tech debuts in mid-November.

- **75 miles** of cable
- **7,000** sensors
- **650** readers
- **4,030 interactive** portals

◄ **Medallion Pendant**

Medallion ▶ wristband

UNWTO INSTO
World Tourism Organization International Network of Sustainable Tourism Observatories

THE AIM IS TO ACHIEVE A **BETTER UNDERSTANDING** OF THE **TOURISM PHENOMENA THROUGH NEW METHODS OF MEASURING AND MODELLING TOURIST INFORMATION** ASSOCIATED WITH NEW TECHNOLOGY DEVELOPMENT.

IT INCLUDES A **SCIENTIFIC APPROACH TO THE STUDY AND REALITY REPRESENTATION** THROUGH THE **TECHNOLOGICAL CONVERGENCE** AND **INTERDISCIPLINARY WORK**
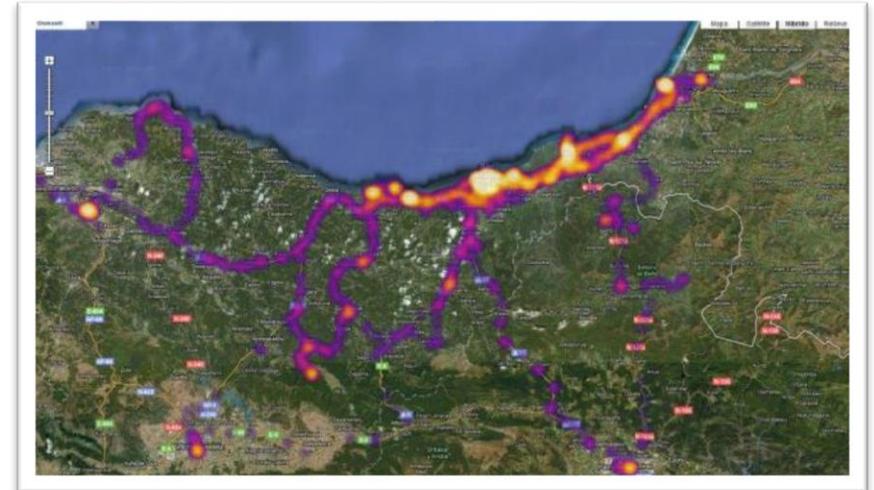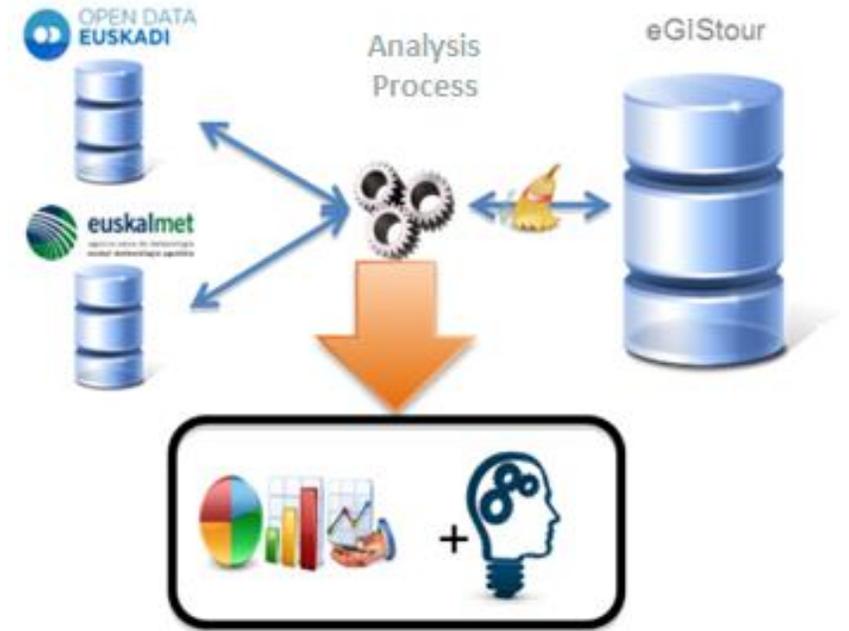
MEASURMENT FRAMEWORKS FOR SUSTAINABLE TOURISM

- Field has progressed and matured enormously since the 1990s.

- Acknowledges the main contribution in the area of sustainable tourism from the UNWTO which has been the ongoing work to develop relevant sets of indicators that respond to policy needs.

- One of the most outstanding results has been the foundation of UNWTO's International Network of Sustainable Tourism Observatories (INSTO) which brings together tourism observatories from around the world.

- The commitment of the UNWTO and the international observatories, INSTO, to advance towards a sound framework for the measurement of sustainable development of tourism, is evidenced by the establishment of the *First Meeting of the Working Group of Experts on Measuring Sustainable Tourism in 2016*.

UNWTOINSTO
World Tourism Organization International Network of Sustainable Tourism Observatories

MEASURMENT FRAMEWORKS FOR SUSTAINABLE TOURISM

The review on the ongoing initiatives, unveils that the broad rationale for developing a statistical framework for the measurement of sustainable tourism has been to inform on the multiple dimensions of sustainable tourism. However, it is worth mentioning other motivations, such as:

- the need to find integrated policy solutions across multiple domains and varying spatial scales;

- the need to enhance the co-ordination among institutions, sectors and countries;

- the need to increase efficiency, effectiveness and continuity in data collection and management.

Acknowledging the complexity in the delineation of more inclusive, plural, and useful measurement framework for tourism sustainability, the relevance and convenience of aiming for integration in support of global initiatives such as the *UN 2030 Development Agenda* and the related *10FYP on Sustainable Production and Consumption*, seem to be on the common ground of the diverse approaches.

MEASURMENT FRAMEWORKS FOR SUSTAINABLE TOURISM

- By far the largest number of existing measurement relates to SDG 12 "to ensure sustainable consumption and production patterns".

- The 10YFP has initiated the development of a flexible Monitoring and Evaluation (M&E) framework to provide directions and vision and measure its progress on capacity enhancement for the shift towards Sustainable Consumption and Production (SCP).

- The societal relations and socio-technical systems involve broad systems of production and consumption. Our systems of consumption are socially produced and production systems are based upon technologies, infrastructures and governance processes that may largely dictate people's behavioural and consumption patterns. It can be suggested here that in order to move toward more sustainable tourism, there is a need to alter the relationships within and between social practices, social relations and socio-technical systems.

MEASURMENT FRAMEWORKS FOR SUSTAINABLE TOURISM

This global context can help us to situate much of our understanding and work for measurement of sustainable tourism. There are of course other frameworks and ways to assess our efforts, but using the 17 SDGs as a framework for reviewing the existing methods and procedures provides some insight into the areas where measurement for sustainable tourism is beginning to focus.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

The arrival of big data is also changing the working environment for statisticians. National and regional information bureaus now play a part of a wide range of data producers, big data companies and business analytics.

Data generated not only from administrative and traditional statistical sources but from *events* intimately linked to the tourism phenomenon, surface as relevant sources of information.

Examples of these new data sources are registers from traffic loops and traffic control cameras capturing flows of vehicles, records of mobile phones, transaction data form credit cards, and sensor-based Smart City data.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

The most commonly discussed sources of big data for tourism statistic purposes may be listed as follows:

- Data offered by mobile network operators (MNOs, telecommunications service provider organization) for measuring human flows (travelers or visitors on the move).

- Phone data from the geo-positioning data captured by the device itself, from its activity sensors or from installed apps.

- The web by itself is a significant data framework source:

  - Data as traces left by people while using search engines (e.g. new gate keepers such as Google);

  - Data as records on the market and business behavior on line (web scraping produces a large amount of data on the tourism supply side);

  - Data from Social Networks: opinions, images or videos on several sites such as travel blogs.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

- Data produced by organizations and businesses. Companies have a wider set of options to spur analytics engagement and services based on data coming from companies' reservation systems (GDS, booking platforms), transaction processors from local retail stores, or records from financial systems (banks, credit cards).

- The internet of things (IoT) related data: records of physical objects being connected to the internet. The term is closely identified with RFID as the method of communication, although it also may include other sensor technologies, wireless technologies or QR codes.

- Big Open data, as the data opened by the administration, that anyone can access, use or share

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

Structured Data

- Structured data generally refers to data that has a defined length and format. Most organizations are storing large amounts of structured data in data warehouses, most of the time in relational database management system (RDMSs). The data can be queried (SQL), the datasets can also be updated with new data, and deleted, read or any other activity.

- **(a) Computer- or Machine-Generated Structured Data.**
  - Sensor data
  - Web log data
  - Point-of-sale data

- **(b) Human-Generated Data.** This is data that humans, in interaction with computers, supply.
  - Input data
  - Click-stream data

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

Semi-Structured Data

- Semi-structured data is a kind of data that falls between structured and unstructured data. Mostly data coming from Facebook, Twitter, Blogs, publically available websites, etc. makes the basis of semi-structured data. Most of the times, the social media data (User generated Content-UGC) is semistructured.

- The scope of web behavior is vast. The World Wide Web reported at December 2017 that Web contains at least 4.31 billion pages indexed and for each page there are traffic statistics ranging from the number and duration of visits to far richer information on user behavior on a large proportion of websites.

- Social media data: This data is generated from the social media platforms such as YouTube, Facebook, Twitter, LinkedIn, and Flickr.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

Unstructured Data

- Unstructured data does not have any defined, consistent fields and it may even do not have any numbers and text. Unstructured data can be divided also into either machine generated or human generated and described as flows:

- **(a) Machine-Generated Unstructured Data Examples**
  - Satellite images
  - Scientific dataPhotographs and video
  - Radar or sonar data

- **(b) Human-generated Unstructured Data Examples**
  - Mobile and Voice data
  - Web behavior and content: This comes from any site delivering unstructured content, like YouTube, Flickr, or Instagram.
  - Image and Video Data. Examples of image data use cases: One of the most common use case is the thumb print recognition which is now available in our phones. It may be mention the human face mining techniques for marketing or security purposes.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

Collaborative Economy in Tourism

- In the context of policy making, it is worth to elaborate on the interface between big data and the new phenomenon of "shared economy. In this respect of tourism statisticians and its relationship with technological and analytical advances, it may be relevant to pay attention to new tourism consumption and production patterns that the traditional statistical methods straggle to size accurately.

NEW DATA SOURCES: BIG DATA and THE COLLABORATIVE ECONOMY

Collaborative Economy in Tourism

- Last decades have evidence that technology is driving a shift towards networks and platform-based social and economic models.

- In tourism, the value of the experience is not only created by the firm and its customers but is embedded in a larger social and physical context of what is being experienced. Value, therefore, can be co-created by all stakeholders involved during the practice of the experience, when knowledge is shared between them. This co-creation of value allows for knowledge transfer because customers, providers and other actors are engaged in joined practice. The new environment has endorsed collaborative tourism or tourism peer to peer market practices, a new trend in the way of traveling based upon sharing basic resources such as accommodation, transport means or personal experiences with other travelers through platforms where the host publishes his/her offer and the tourist makes the booking.

THE PRELIMINARY CONCLUSIONS

- Big Data is not just data but also tools and methods that are largely developed and mastered to yield insights, standards, and stakeholder's involvement. Letouzé has argued that Big Data contains *Capacities* (tools and methods) and a *Community* (producers, analysts and users), constituting a complex system in its own. According to this concept Big Data will impact outcomes through its effect on people's empowerment. Therefore, the different stakeholders for big data, which includes owners and users, should ideally emerge into a big data ecosystem to support policy making.

THE PRELIMINARY CONCLUSIONS

- This overview of big data sources with relevance for tourism statistics makes it clear that the new sources are just starting to emerge and there may be more to come. The new environment in one or the other way, affects the life cycle of the data, and in particular the quality of statistics produced. The sheer volume of data and observations does not guarantee quality. The unwanted bias in most big data sources are without a doubt some of the more complicated challenges for statisticians.

THE PRELIMINARY CONCLUSIONS

- The granularity and time sensitive characteristics of the data may facilitate a more detailed geographical analysis than those permitted nowadays by official statistics. In this sense, the nature of the new data may help to address the sub-national, destination and/or location level information requirements. Ideally, the statistical framework will provide coherence between national and sub-national perspectives. Intensifying a dialogue with users about their data expectations and requirements of data at various scales, including related data sources, will be feasible.

DATA ≠ KNOWLEDGE

OBSERVATORIES

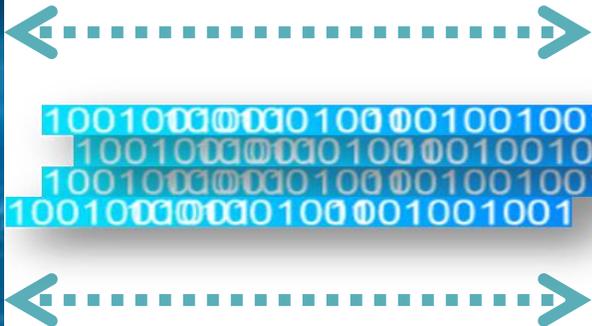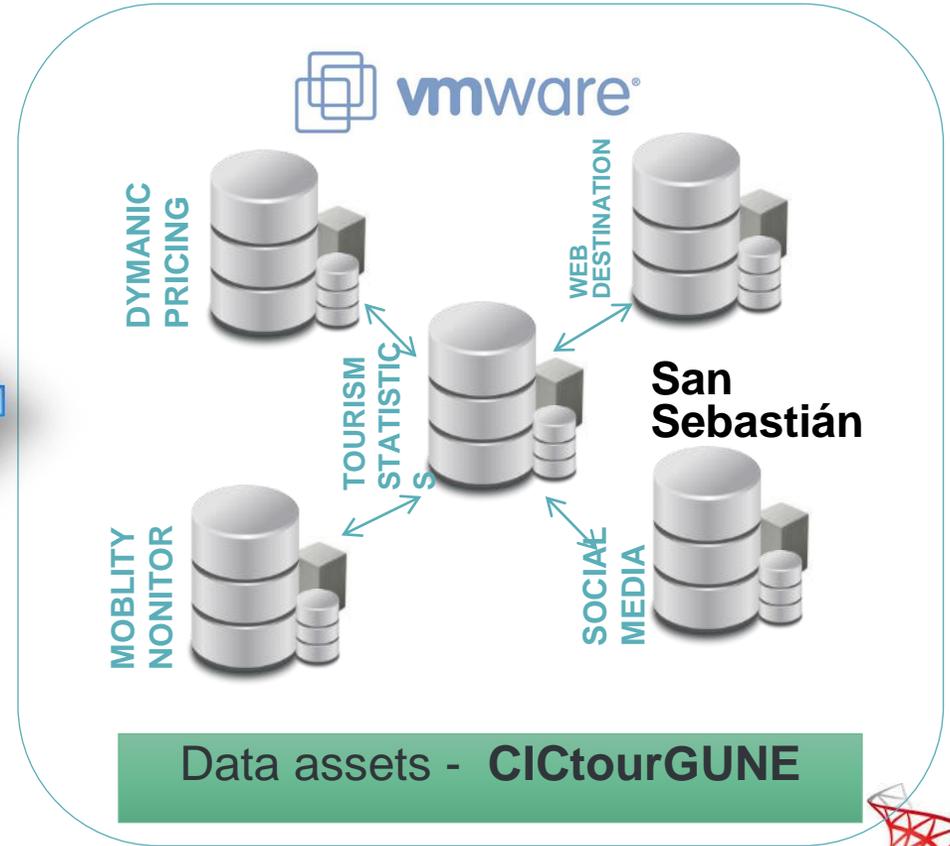| Cloud	Physical

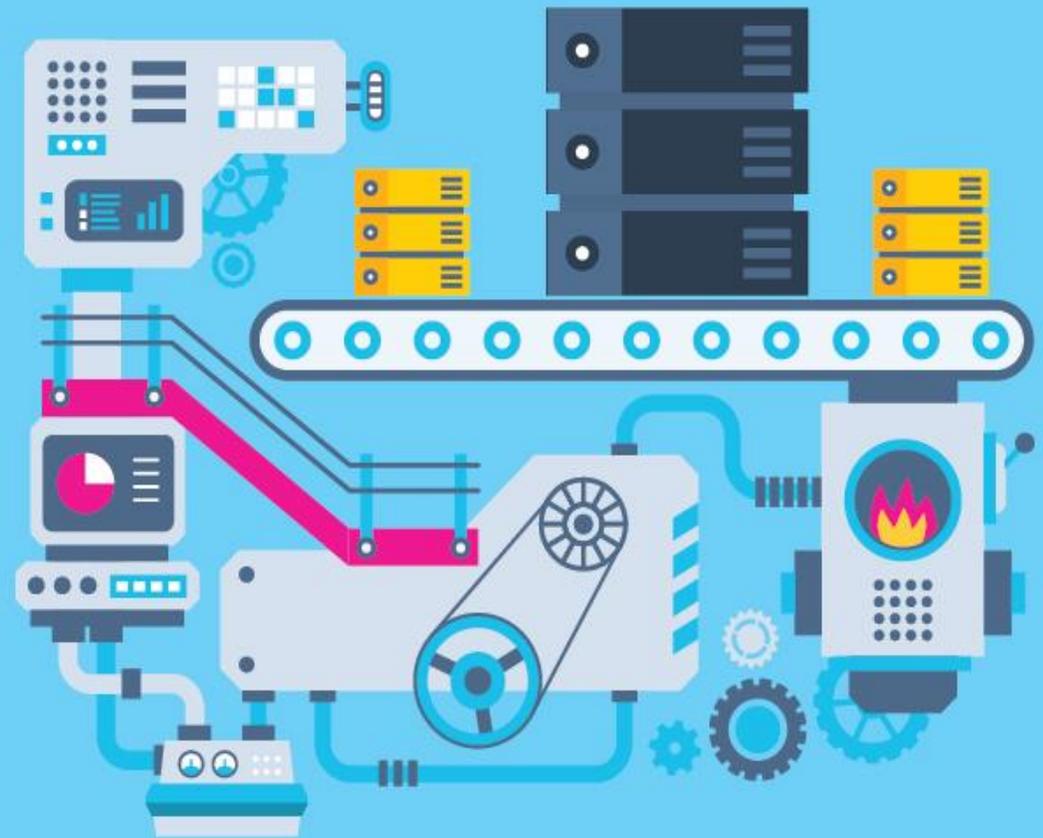**Technological infrastructure**

TEHNOLOGY DATA

Digital footprint

**> 1.000.000 +
records day**

amazon webservices™

vmware®

DYMANIC PRICING

WEB DESTINATION

TOURISM STATISTICS

San Sebastián

MOBLITY NONITOR

SOCIAL MEDIA

Data assets - **CICtourGUNE**

mongoDB

MySQL®

Microsoft®
SQL Server®

Why do you need a Big Data factory?

Thank you

aurkenealzua@deusto.es

aurkene.alzua@lurmetrika.com