



Per Nymand-Andersen
 Adviser, European Central Bank

Big data: A strategic asset for central banks policies



“Learning never exhausts the mind” Leonardo da Vinci

1 **Pretty Big Data - Reflections for policy purposes**



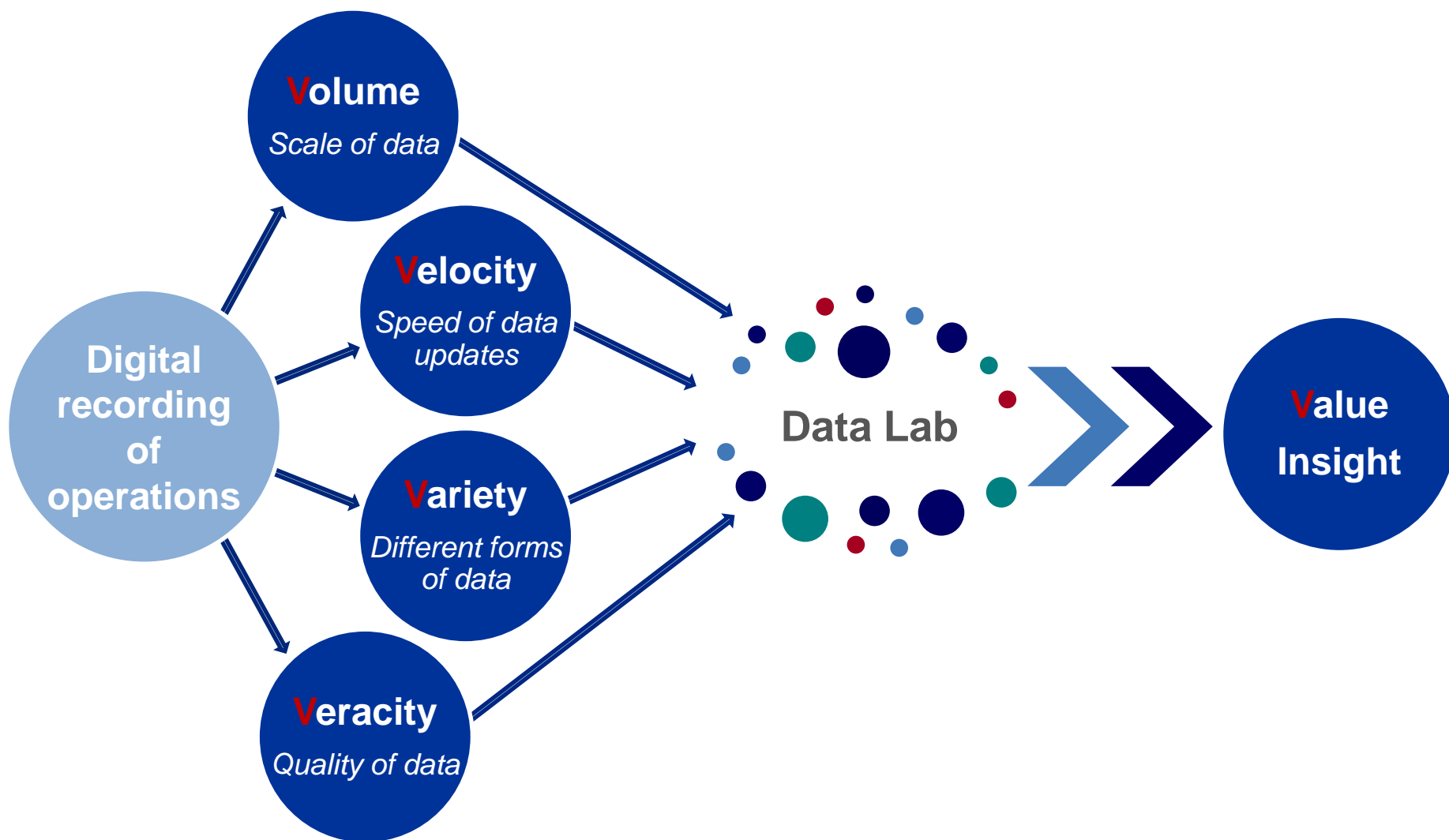
2 **Paradigm shifts - Moving to micro level & granular data**



3 **Discovery - Collaboration and partnership**



Disclaimer: The opinions expressed in this presentation are not necessarily those of the European Central Bank (ECB) or the European System of Central Banks (ESCB)



2017 This Is What Happens In An Internet Minute



Sources for digital exploration

- Accessing
- Structuring datasets
- Linking data sets
- Slice & dice across time and datasets
- Performing querying

Staying fit with Heraklit

Which preparations are needed today to have the capacity and functionality needed in 5 years time?

- From experimenting to central banking tool kits?
- Linking current and past data
- Querying variety of formats
- Technical independent

Source: Cumulus Media,

<http://www.businessinsider.de/everything-that-happens-in-one-minute-on-the-internet-2017-9?r=US&IR=T>

Data mania versus phobia – a paradigm of records

Digital transformation in finance and economics



E- trade



Settlement systems



Credit cards



Mobile transaction



Lending & financing



Big data



- Fintech
- DLT
- D-coins
- S-contracts



Price scans



S-media

Data Scientist



Data Analytics



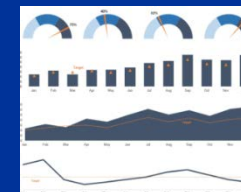
Data lab



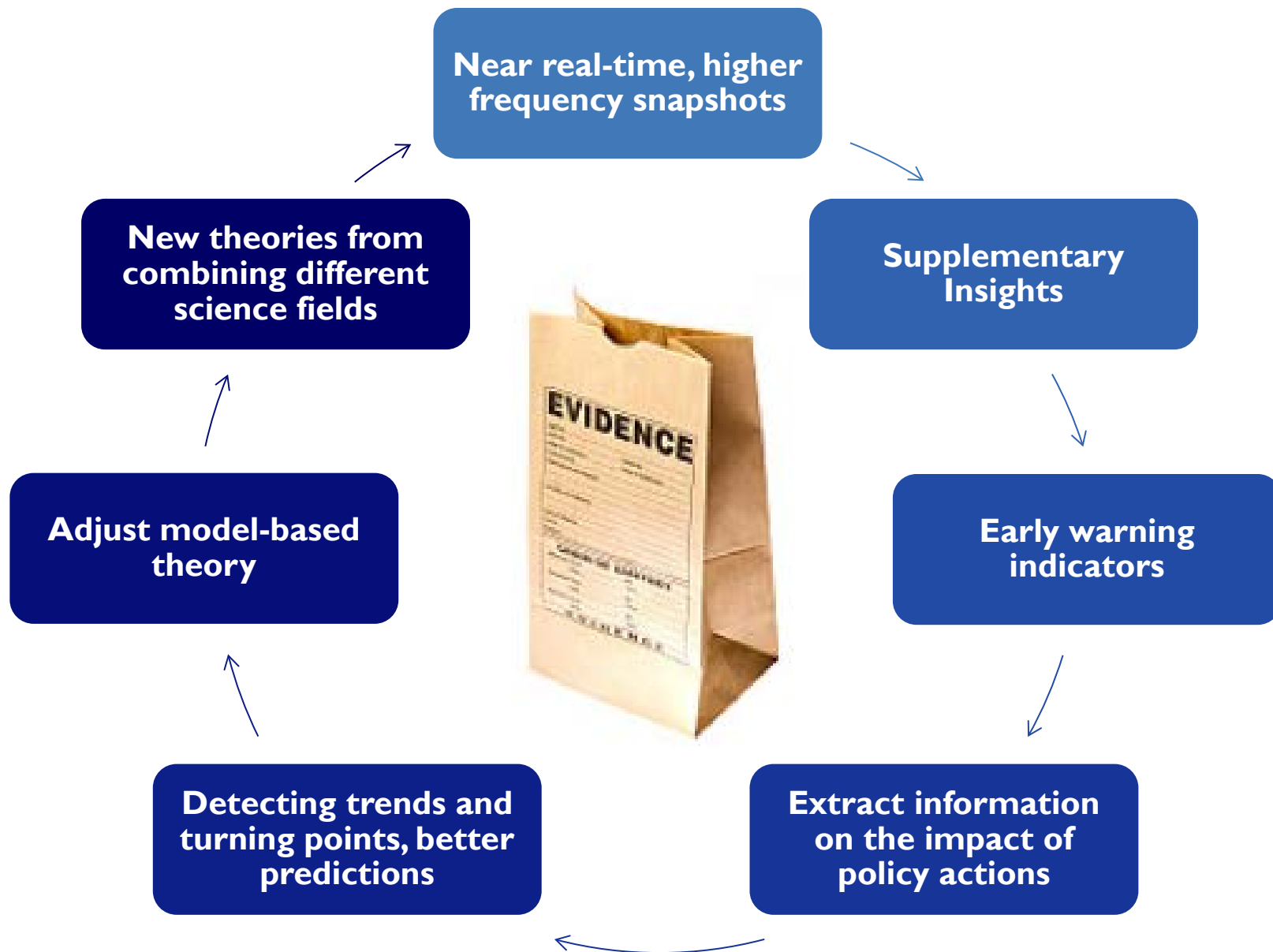
Systematic acquire, Process, summarize

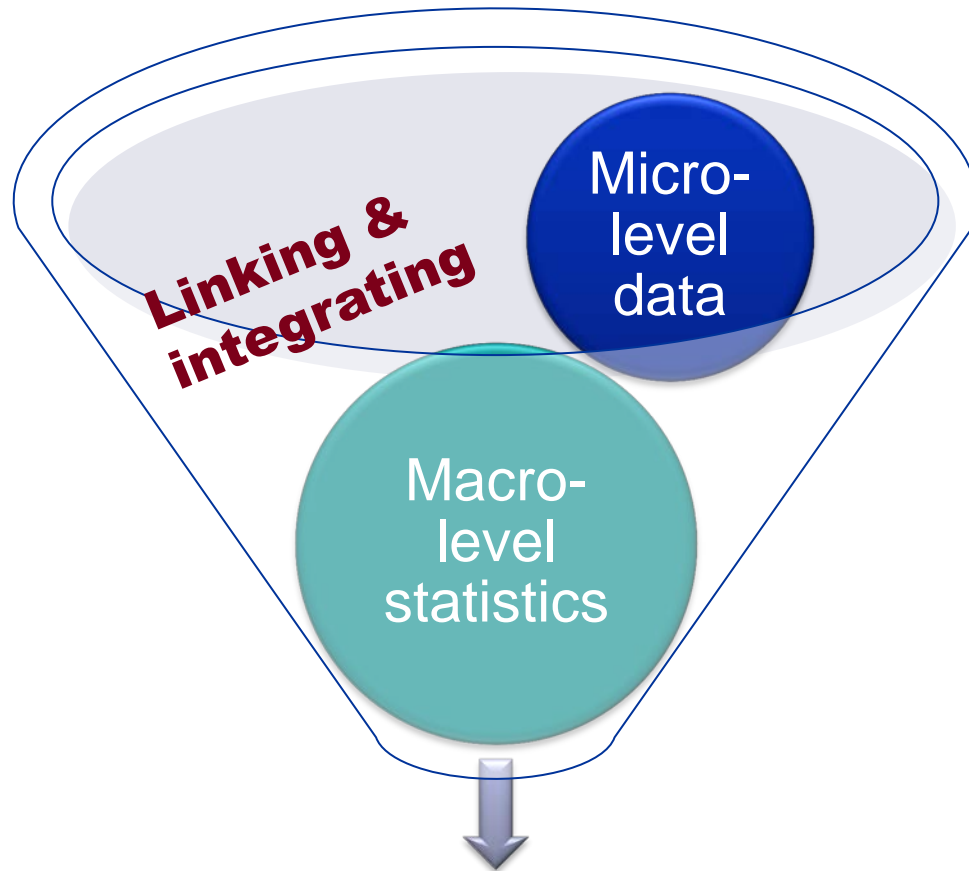


Statistical algorithm and data explorations



Packaging data for Insights & business





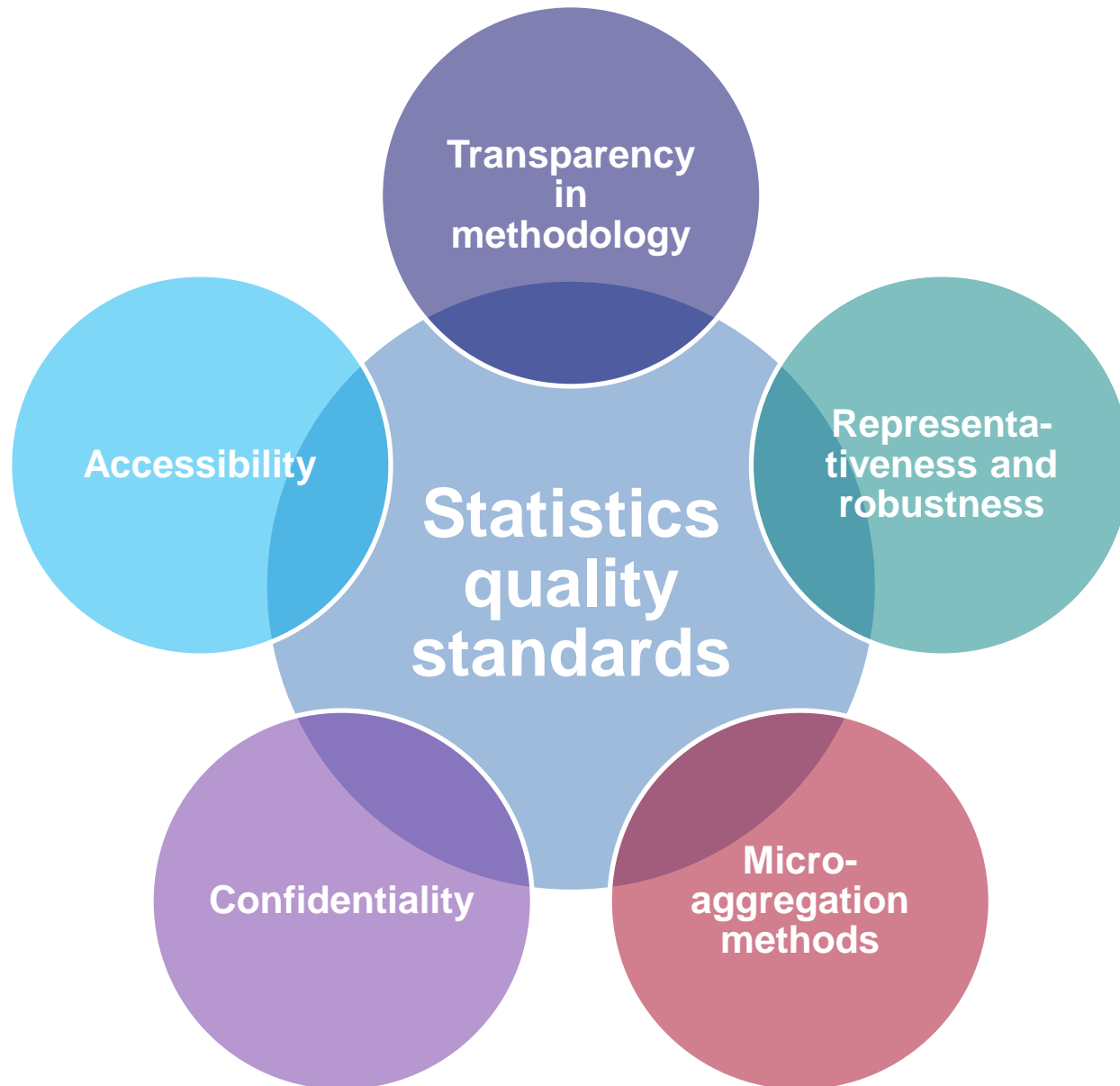
Statistics & Analytics

Micro-level statistics

- Security-by-security statistics
- Holdings of individual securities
- Money market transactions (MMSR)
- Loans by loans register (Ana Credit)
- Register of Financial Institutions
- Individual bank supervisory data

Macro-level statistics

- Balance sheet statistics
- Monetary aggregates (M1 – M3)
- Securities issues
- Banks interest rates
- Government finance
- Euro area financial accounts



“Measure what is measurable, and make measurable what is not so.” Galileo Galilei

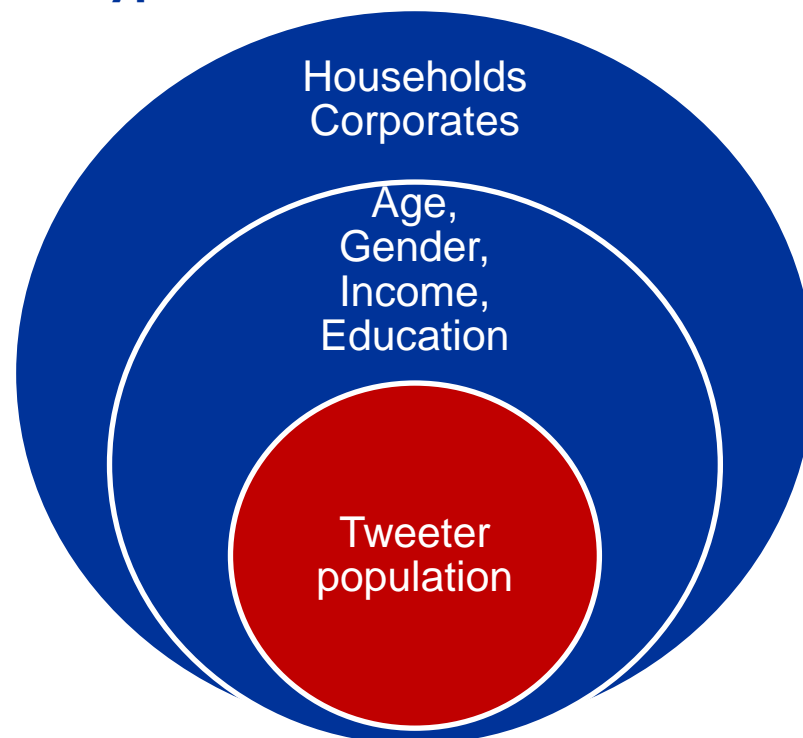
Big Data analytics – from experimenting to tool-kits

One misperception of big data is that we **do not need** to worry about **sample bias and representativeness**, as large volumes of information supersede standard sampling theory, since big data provide census-type information



Digital
recording of
operations

**Census
of data?**



21% of online adults use Twitter

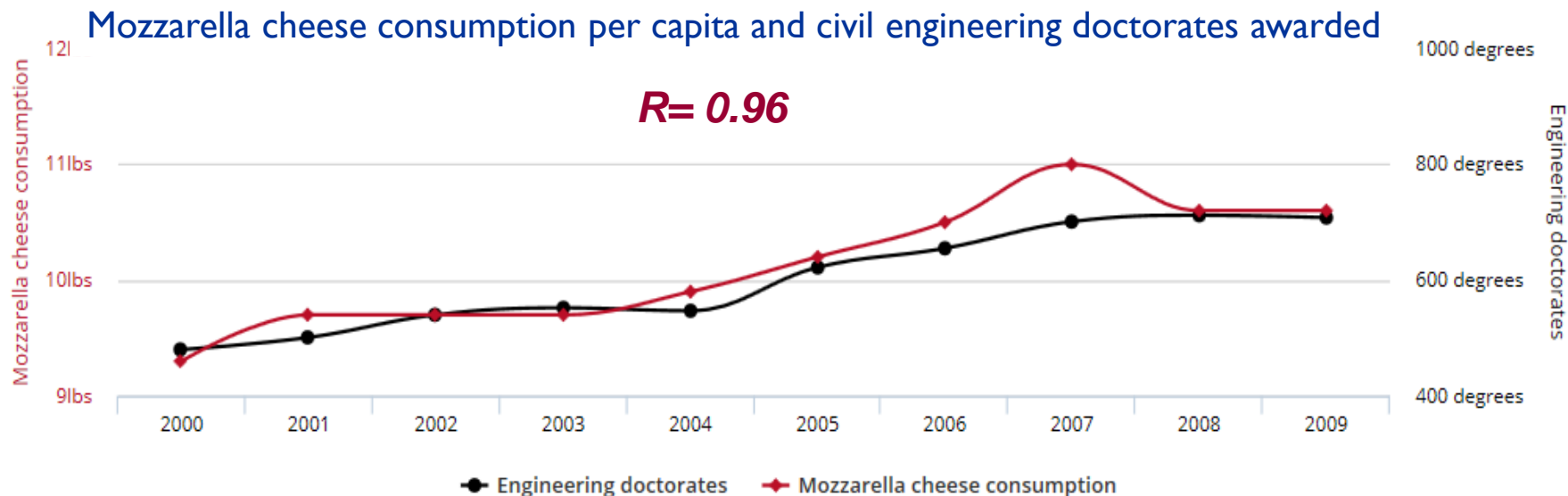
**Unit
Measurement**

Not people - but tweets (re-tweets)

**Event
driven**

Volume changes may not refer to units (nor changes in demand)

Correlation is *not* (necessary) causation



Data sources: U.S. Department of Agriculture and National Science Foundation

No conclusion can be drawn simply on the basis of correlations between two variables. The similarity is a coincidence. We *should* say that there is no causation

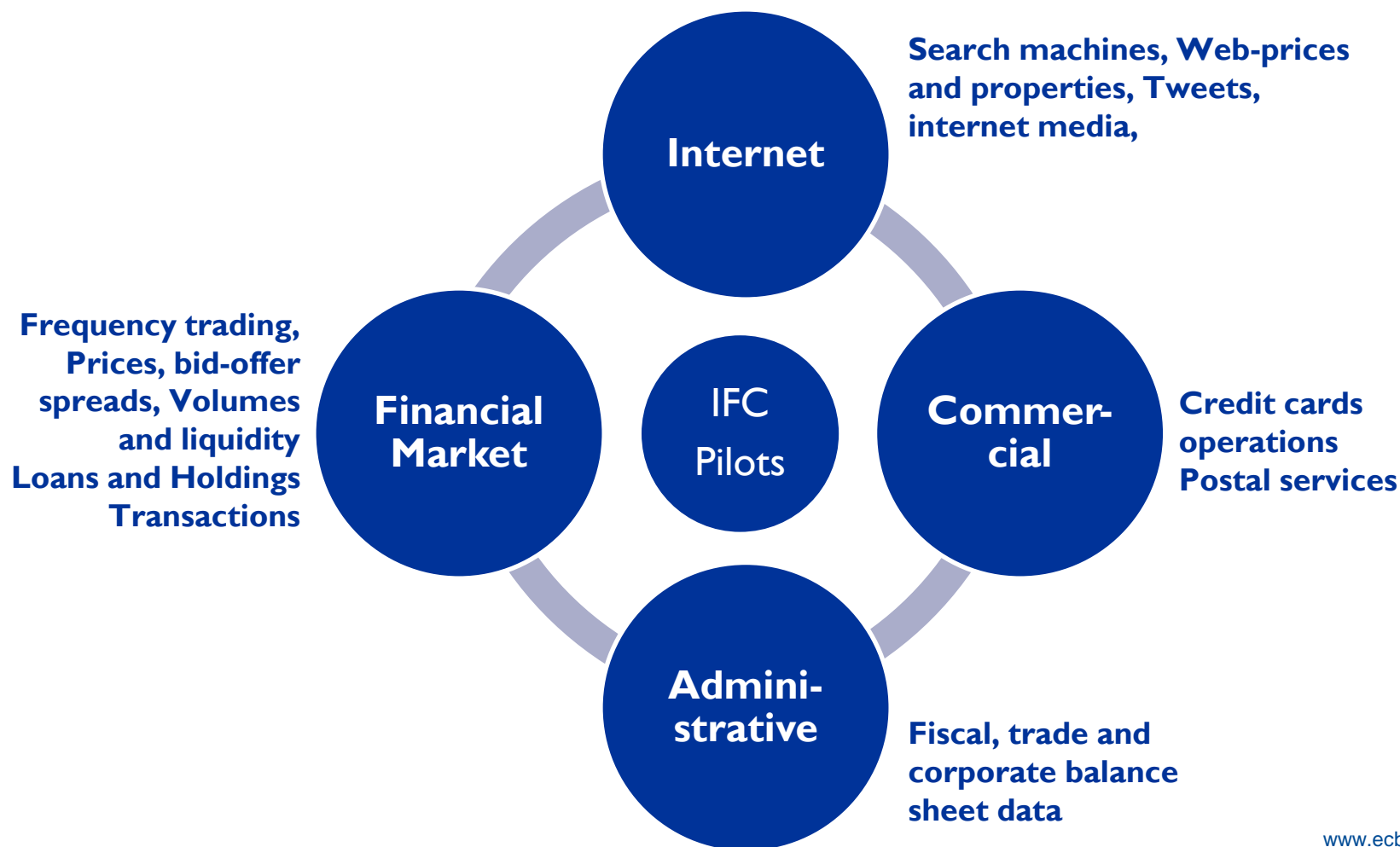


“The invalid assumption that correlation implies cause is probably among the two or three most serious and common errors of human reasoning”

Stephen Jay Gould, American evolutionary biologist and author, 1981

Irving Fisher Committee – Collaboration among central banks

Skills, tools and insights



1 **There is a business case within economics and finance**



2 **Moving to micro level data does not challenge our statistics quality concepts**



3 **Call for collaboration, enhancing skills to create value**



Thank you for your attention



Any questions?

Annex: [ECB Paper Series](#) as an outlet for big data research

ECB STATISTICS PAPER SERIES

Gaining insights - Growing understanding – Spreading knowledge

**New
release**

SPS no. 26

SNAPSHOT OF STATISTICS

SPS author Henri Maurer publishes

QUALITY ENHANCEMENTS IN GOVERNMENT FINANCE STATISTICS

“Mistrust against Government Finance Statistics in the Excessive Procedure Deficit was (unduly) exacerbated by the Greek bond crisis. It was a duty to analyse and communicate properly on the topic”



Henri Maurer, DG-S

WHAT ABOUT YOU WRITING
A PIECE FOR AN UP COMING ISSUE?

WHERE TO FIND MORE
INFORMATION?

The **ECB Statistics Paper Series** is a channel for statisticians, economists, researchers and other professionals to publish innovative work undertaken in the area of statistics and related methodologies of interest to central banks.

Check out the paper series on the
ECB website: www.ecb.europa.eu

Or contact us:
statisticspaperseries@ecb.europa.eu

- **An outlet for big data research:**
 - **“Nowcasting GDP with electronic payments data”** by Galbraith J & Tkacz G.
 - Electronic payment transactions can be used in nowcasting current gross domestic product growth
 - finds that debit card transactions contribute most to forecast accuracy
 - **“Social media sentiment and consumer confidence”** by Daas P & Puts M
 - Relationships between the changes in consumer confidence and Dutch public social media?
 - Could be used as an indicator for changes in consumer confidence and as an early indicator
 - **“Quantifying the effects of online bullishness on international financial markets”** by Mao H & Counts S, Bollen J.
 - Develops a measure of investor sentiment based on Twitter and Google search queries
 - Twitter and Google bullishness are positively correlated to investor sentiment