Statistics 2.0: From the Data Revolution to the Next Level of Official Statistics

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The value added of official statistics

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$$Vtsu = Ptsu - Ctsu$$

V = value added at time t

P = value of production

C = intermediate costs

Where do we classify the production of statistics?

----> ISIC: public services

Where does the value of a service come from?

----> SNA: change in the consumer

What kind of change should happen in a consumer of statistics?

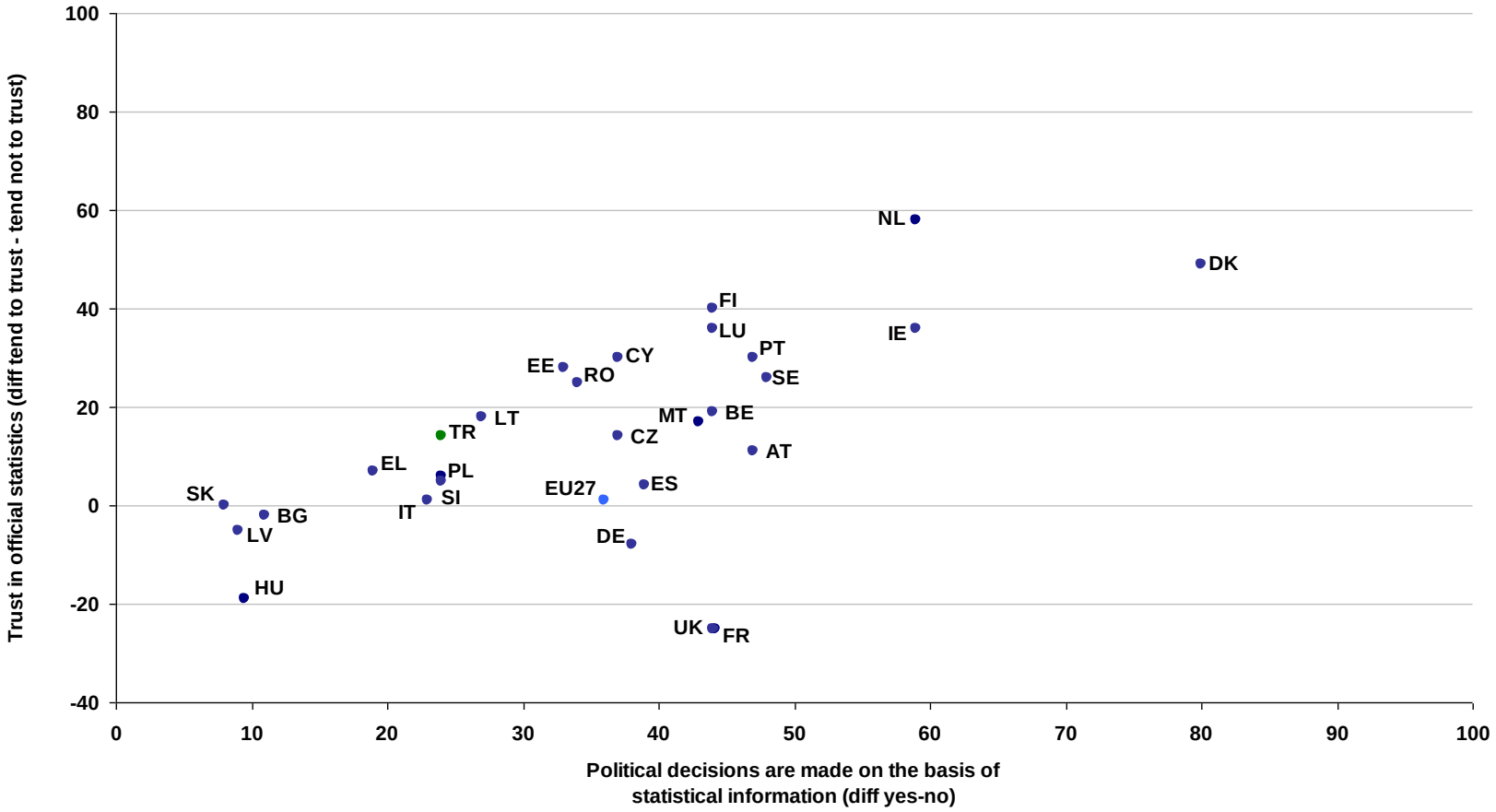
----> more knowledge

The value added of official statistics

$$Ptsu = \sum_{i=1}^{n} f_i \left[(Qsu \cdot Rmsu) \cdot Rsu_i \cdot Fsu_i \cdot Ls_i \right]$$

Q = statistics produced
Rm = role of media
R = relevance
F = trust
L = literacy
i = consumer
n = number of consumers

The value added of official statistics



The value added of official statistics

Importance of being informed						
	2007	**2009**	**2011**	**2012**	**2013**	**2014**
Very important	Na	23.0	30.4	34.0	37.4	42.8
Fairly important	Na	48.2	39.4	40.1	39.7	40.2
Not important, nor unimportant	Na	17.7	14.7	14.8	9.7	6.7
Relatively not important	Na	4.7	5.0	4.8	6.9	4.9
Not important at all	Na	5.3	5.6	4.7	4.2	4.0
Don't know/no opinion	Na	0.9	4.8	1.6	2.1	1.4
Desire of being more informed						
Yes	51.5	40.7	40.6	46.6	43.4	48.7
No	43.8	55.6	52.5	51.2	53.5	46.9
Don't know	4.7	3.7	6.9	2:1	3.2	4.4

Neuroscience and behavioural economics

The Italian Official Statistics Conference (2010)

"Statistics 2.0" is not intended to evoke the term "Web 2.0", but rather points to the need to move to a higher level of play in the "game" called statistics, on which our future depends as individuals and collectively.

As in videogames, when moving up to a higher difficulty level, not only do the obstacles become higher, unexpected events more frequent and admissible margins of error smaller, but the rules themselves may also change. And therefore, instead of being passively subjected to such a process, we have decided to bring together experts from different disciplines and representatives of society to discuss whether and how to develop new "rules of the game" and make new tools available for guaranteeing official statistics an **institutional framework**, **technologies**, **culture**, **human resources** and **alliances**, without which it runs the risk of failing in its mission.

The Italian Official Statistics Conference (2010)

- **Institutional framework:**
  - **Appointment of the President**
  - **The funding system**
  - **The role of users**
  - **Standards for the production of statistics**
  - **Rules for the dissemination of statistical information**
  - **Rules for access to information held by other organisations and data protection**
- **Technologies:**
  - **Semantic web**
  - **Communication and dissemination technologies**
  - **Redesign of statistical processes** (Stat2015 – towards a digital statistical administration)
    - Collection and processing
    - Processing and macrodata integration
    - Microdata integration (Archimede)
  - **Dissemination and communication (visualization, videos, twitter, etc.)**

The Italian Official Statistics Conference (2010)

- **Culture: transforming statisticians from "producers of information" into "generators of knowledge"**
  - **Avoiding self-limiting one's own field of activity**
  - **Being open to measuring emerging phenomena of relevance to society**
  - **Placing users' demand for knowledge at the centre of the action of statistical institutes**
  - **Establishing synergies with other sectors oriented towards knowledge creation**
  - **Looking at the young generations and at their way of learning**
- **Human resources**
  - **Advanced School for Statistics and Social and Economic Analysis**
  - **European Master's degree in official statistics**
- **Alliances**
  - **A new "pact" between the statistical system and the society**

A New World: Data Science and Data Revolution

Wikipedia (2014)

Statistics is the study of the collection, analysis, interpretation, presentation and organization of data.

It is a mathematical body of science that pertains to the collection, analysis, interpretation or explanation, and presentation of data, or as a branch of mathematics. Some consider statistics to be a distinct mathematical science rather than a branch of mathematics.

Data science is the study of the generalizable extraction of knowledge from data. It incorporates varying elements and builds on techniques and theories from many fields.

Another key ingredient that boosted the practice and applicability of data science is the development of machine learning - a branch of artificial intelligence - which is used to uncover patterns from data and develop practical and usable predictive models.

What is the data revolution

The data revolution is already happening:

- New technologies leading to **exponential increase in volume and types of data available**
- Governments, companies, researchers and citizen groups are in a ferment of **experimentation, innovation and adaptation**
- **Much greater demand for data from all sides**

But:

The data revolution is very unequally distributed between countries and people

- People, organisations and governments are **excluded because of lack of resources, knowledge, capacity or opportunity**.
- There are huge and growing inequalities in **access** to data and information and in the **ability to use** it.

There are too many gaps in current data, making some people and some issues almost invisible:

- Too many countries **still** have **poor data for MDGs**
- Data arrives **too late**
- Too many issues are still **barely covered** by existing data
- Entire groups of **people, regions** and **key issues** remain **invisible**

Why take action now?

- Seizing the opportunities and mitigating the risks created by the data revolution **requires active choices**, **especially y governments and international institutions**.

- **Without immediate action**:
  - **Gaps will widen** between developed and developing countries, between information-rich and information-poor people, and between the private and public sectors;
  - **Risks of harm and abuses of human rights will grow**.

- New goals will cover **wider range of issues** than MDGs and all countries will be asked to produce data

- **Monitoring will require substantial additional investment** to develop reliable, high-quality data:
  - On a range of **new subjects**
  - Ensuring that **no groups are excluded**
  - With an unprecedented level of **detail**

The vision for statistical systems

- **Statistical systems** are empowered, resourced and independent, to quickly adapt to the new world of data to collect, process, disseminate and use high-quality, open, disaggregated and geo-coded data, both quantitative and qualitative. They may be less about producing data and more about managing and curating data and information created outside of their organisations.

- **All public, private and civil society data producers** share data and the methods used to process them, according to globally, regionally, or nationally brokered agreements and norms. They publish data, geospatial information and statistics in open formats and with open terms of use, following global common principles and technical standards, to maintain quality and openness and protect privacy.

The vision for national governments and international organisations

- **Governments:**
  - Investments in data from domestic resources and external financing
  - Independence of statistical offices to be guarantors of quality and public interest
  - Public data is open by default

- **International organisations:**
  - Forum for stakeholders to set common standards to maintain quality and ethics in changing world of data
  - Capacity development and resource flows for developing countries
  - Coordination and leadership for effective action

The IEAG recommendations (www.undatarevolution.org)

Develop a global consensus on principles and standards

We recommend that the UN develop a comprehensive strategy and a roadmap towards a new **Global Consensus on Data**:

- To bring together the disparate worlds of public, private and civil society data and statistics providers.
- To build trust and confidence among data users.
- To adopt principles concerning legal, technical, privacy, geospatial and statistical standards.
- To facilitate openness and information exchange and promote and protect human rights.

Is this applicable also at national level?

Share technology and innovations for the common good

We recommend to create a global **Network of Data Innovation Networks**, that brings together organisations and experts:

- To create mechanisms for sharing and using technology and innovation for the common good;
- To adopt best practices for improving the monitoring of SDGs;
- To identify areas where common data-related infrastructures could address capacity problems and improve efficiency;
- To encourage collaborations;
- To identify critical research gaps and create incentives to innovate.

Is this applicable also at national level?

New resources for capacity development

Existing gaps can only be overcome through new investments and strengthening of capacities. Therefore we recommended to:

- Consider improving data a development agenda in its own right;
- Create a new funding stream to support the data revolution for sustainable development at the Third International Conference on Financing for Development;
- Assess the scale of investments, capacity development and technology transfer required, especially for LIC;
- Develop a proposal for mechanisms to leverage creativity and resources of private sector;
- Establish an education program aimed at improving people's, infomediaries' and public servants' capacity and data literacy.

Is this applicable also at national level?

Leadership for coordination and mobilisation

We proposed a UN-led **Global Partnership for Sustainable Development Data**, to mobilise and coordinate the actions and institutions required to make the data revolution serve sustainable development, **promoting several initiatives**, such as:

- A **World Forum on Sustainable Development Data** to bring together the whole data ecosystem to share ideas and experiences for data improvements, innovation, advocacy and technology transfer;
- A **Global Users Forum for Data for SDGs**, to ensure feedback loops between data producers and users, help the international community to set priorities and assess results;
- Brokering key **global public-private partnerships for data sharing**.

Is this applicable also at national level?

Exploit some quick wins on SDG data

We recommended:

- Establishing an **SDGs data lab** to support the development of a first wave of SDGs indicators;
- Developing an **SDG analysis and visualisation platform** using the most advanced tools and features for exploring data;
- Building a **dashboard** from diverse data sources on **the state of the world.**

Is this applicable also at national level?

Sustainable Development Goals: A Universal Agenda

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

UN SG'Synthesis Report

Measuring the new dynamics

- We need to reconsider how to account for sustainable production and consumption patterns in **national accounting**.
- Work on developing **alternative measures or progress, beyond GDP**, must receive the dedicated attention of the United Nations, international financial institutions, the scientific community, and public institutions.
- These metrics must be squarely focused on measuring **social progress, human wellbeing, justice, security, equality, and sustainability**.
- Poverty measures should reflect the **multi-dimensional nature of poverty**.
- New measures of **subjective wellbeing** are potentially important new tools for policy-making.
- A set of applicable indicators will also need to be identified to allow us to collect, compare, and analyse reliable data, to do so at the adequate level of disaggregation, **as of 2016**. For this purpose, Member States may decide to task the United Nations System, in consultation with other relevant experts and through a multi-stakeholder dialogue, to develop a draft set of indicators.

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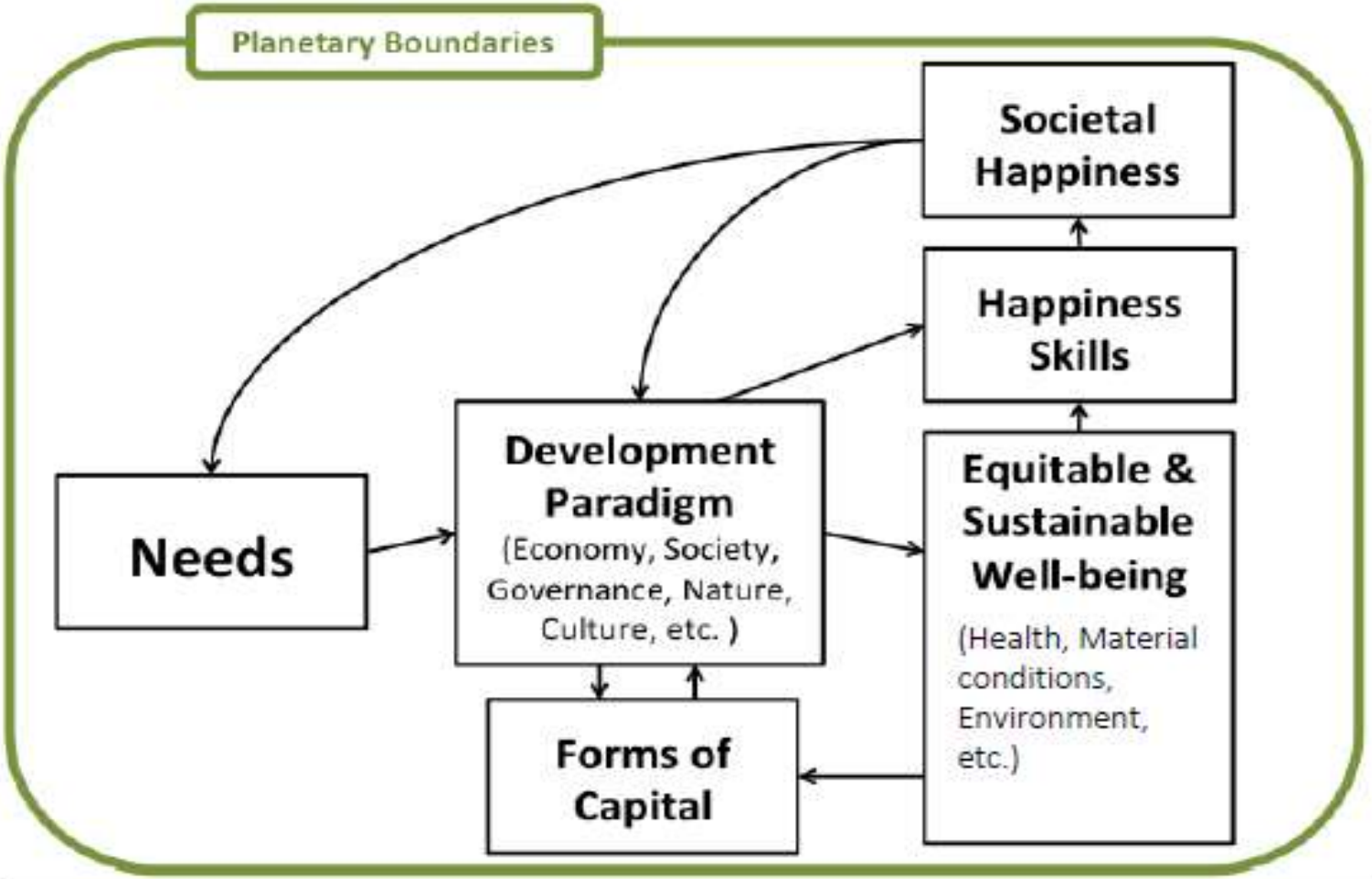


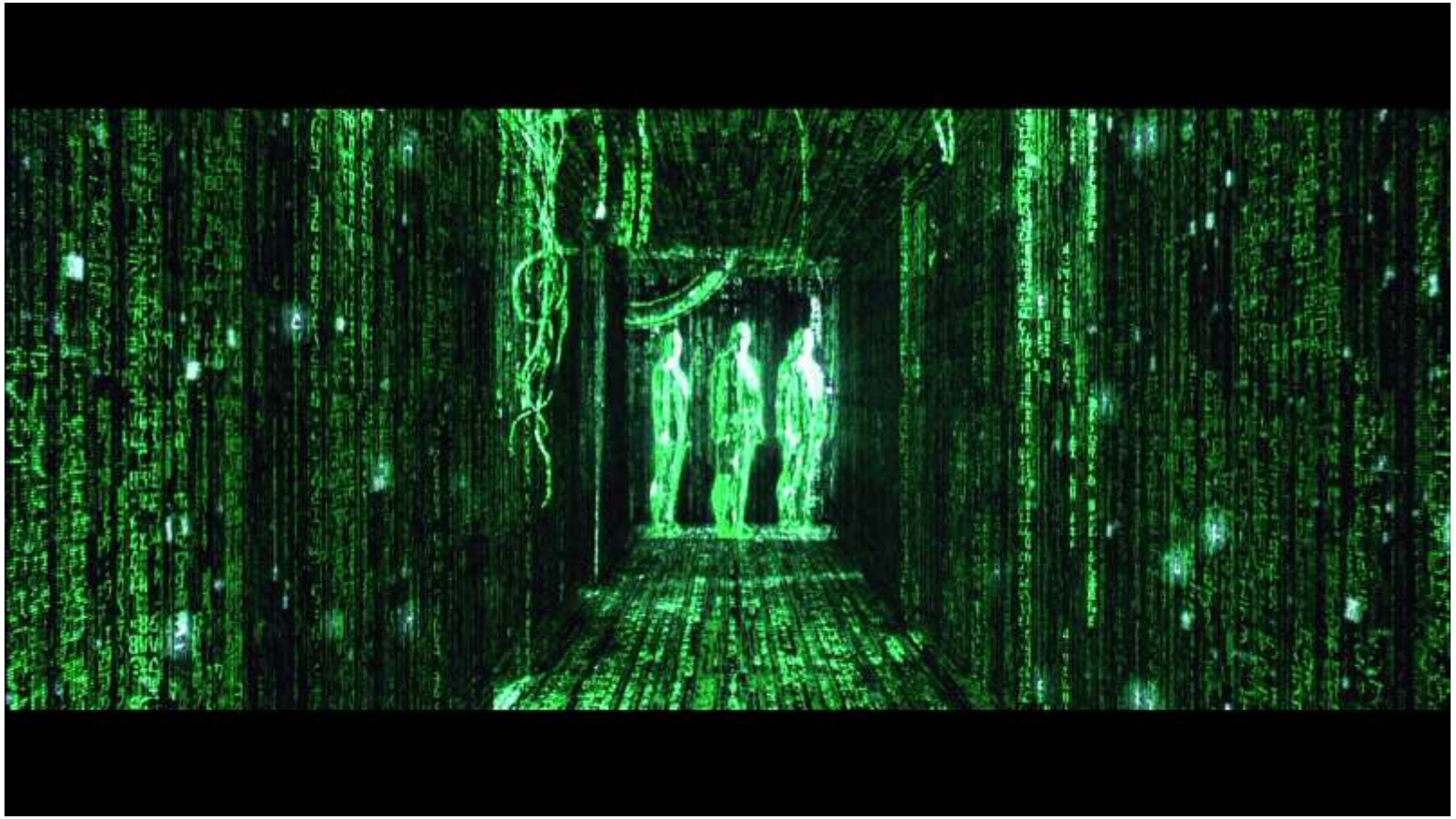
New Development Paradigm framework

The data revolution and official statisticians

The data revolution and official statisticians: emerging technologies

- Bioacousting sensing
- Digital security
- Virtual personal assistants
- Smart workspace
- Connected home
- Quantified self
- Brain-computer interface
- Human augmentation
- Quantum computing
- Software-Defined anything
- 3D Bioprinting systems
- Smart robots
- Affective computing
- Biochips
- Neurobusiness
- Prescriptive analytics
- Data science
- …

Two final recommendations: Matrix



Two final recommendations: The Hunt for Red October

UN SG'Synthesis Report

Today's world is a troubled world; one in turmoil and turbulence, with no shortage of painful political upheavals.

Societies are under serious strain, stemming from the erosion of our common values, climate change and growing inequalities, to migration pressures and borderless pandemics.

It is also a time in which the strength of national and international institutions is being seriously tested.

The nature and scope of this daunting array of enormous challenges necessitate that both inaction and business-as-usual must be dismissed as options.

If the global community does not exercise national and international leadership in the service of our peoples, we risk further fragmentation, impunity and strife, endangering both the planet itself as well as a future of peace, sustainable development and respect of human rights.

Simply put, this generation is charged with a duty to transform our societies.