



ITUKALEIDOSCOPE

NANJING 2017

Challenges for a data-driven society

Capability Maturity Models Towards Improved Quality of the SDG Indicators Data

Ignacio Marcovecchio

United Nations University Institute on Computing and Society (UNU-CS)

ignacio@unu.edu

Nanjing, China

27-29 November 2017





About the paper

- ✓ Problematization of a space where research and actions are urgently needed
- ✓ Revision of the current initiatives on improving social statistics
- ✓ Preliminary formulation of a CMM to assess and improve the maturity of organizations within national data ecosystems
- ✓ Recommendations towards addressing the challenges of social indicators monitoring



Global Development Agenda

2000-2015 → Millennium Development Goals (MDGs)
8 goals, 18 targets, 48 indicators

2015-2030 → Sustainable Development Goals (SDGs)
17 goals, 169 targets, 230 indicators





SDG indicators

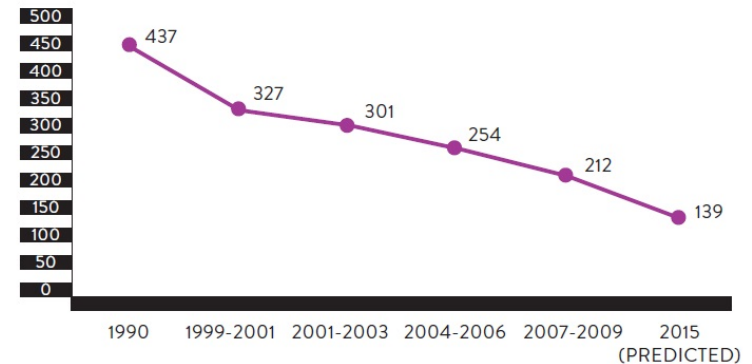
Example:

Goal 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

Indicators:

- 3.1.1 Maternal mortality ratio
- 3.1.2 Proportion of births attended by skilled health personnel

MATERNAL MORTALITY RATE (PER 100,000 LIVE BIRTHS)



Source: Office of the Registrar General of India



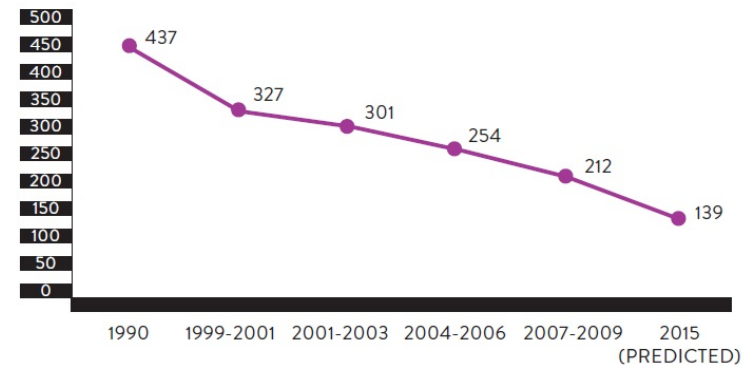
SDG indicators

Do you trust in the quality of this data?

In 25 years:

- People have changed
- Administrations have changed
- Investments have changed
- Technology has changed
- Social conducts have changed
- ...

MATERNAL MORTALITY RATE (PER 100,000 LIVE BIRTHS)



Source: Office of the Registrar General of India



The Data Revolution

An explosion in:

- Volume of data
- Speed of data production
- Number of producers of data
- Dissemination of data
- Range of things with data

90% of the data in the world has been created in the last two years

[Independent Expert Advisory Group on a Data Revolution for Sustainable Development, "A World that Counts: Mobilising the Data Revolution for Sustainable Development," 2014]



The Data Revolution for Sustainable Development

The integration of new data with traditional data to produce high-quality* information to foster and monitor sustainable development

*complete, unique, timely, valid, accurate and consistent

[Wang, R.Y., Strong, D.M. (1996) Beyond Accuracy: What Data Quality Means to Data Consumers, Journal of Management Information Systems 12(4), pp 5-33]



ITU KALEIDOSCOPE

NANJING 2017

Challenges for a data-driven society

Ecosystem

National Statistical Offices (NSOs) are key to the government efforts to harness the data revolution for sustainable development



Challenges

- Change quickly to adapt to constant changes
- Abandon expensive and inefficient production processes
- Incorporate new data sources
- Ensure that the data cycle matches the decision cycle
- Lack sufficient capacity and funding
- Vulnerable to political influence
- Risk: data divide



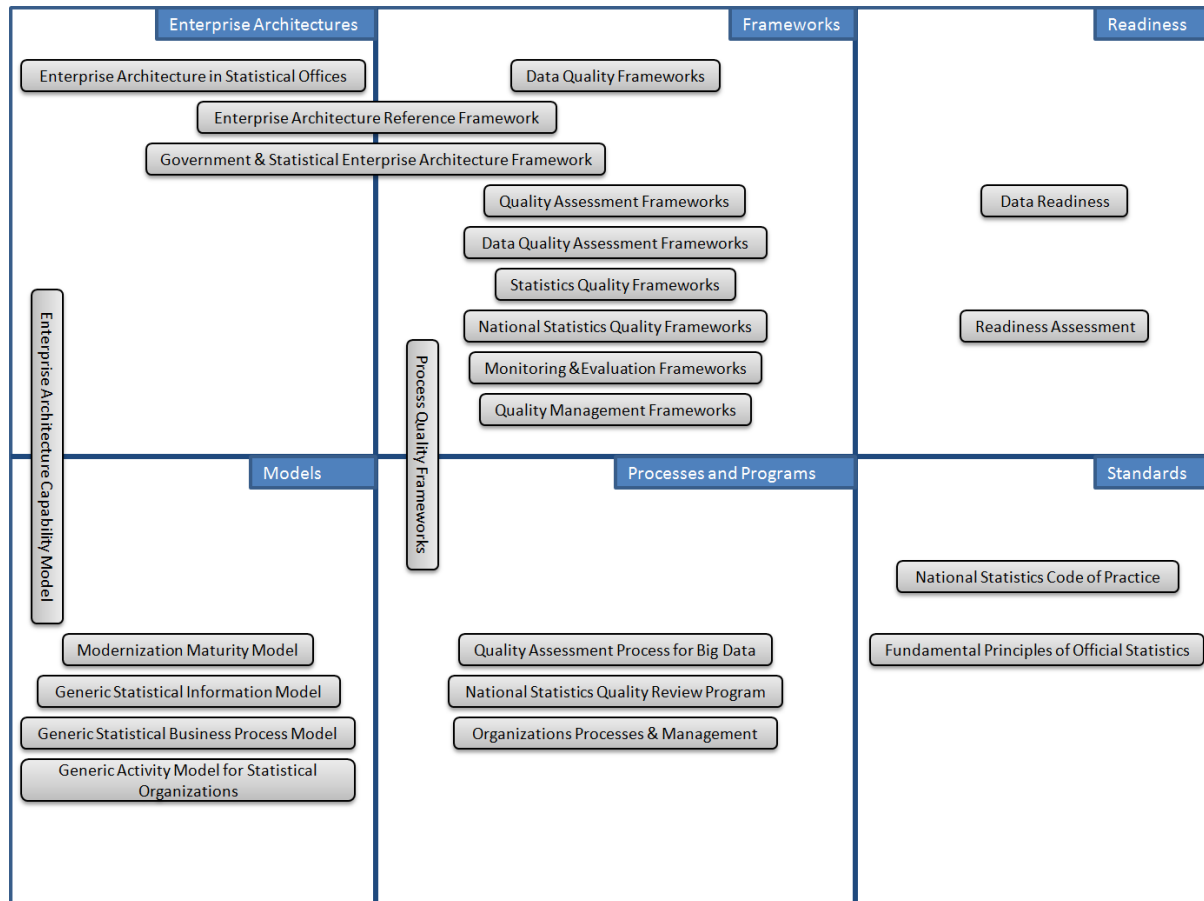
What can be done?

Mobilizing the data revolution for achieving sustainable development urgently requires actions to improve the capacity of the ecosystem (among others)

The UN and other international organizations play a key role in leading these actions



Current efforts





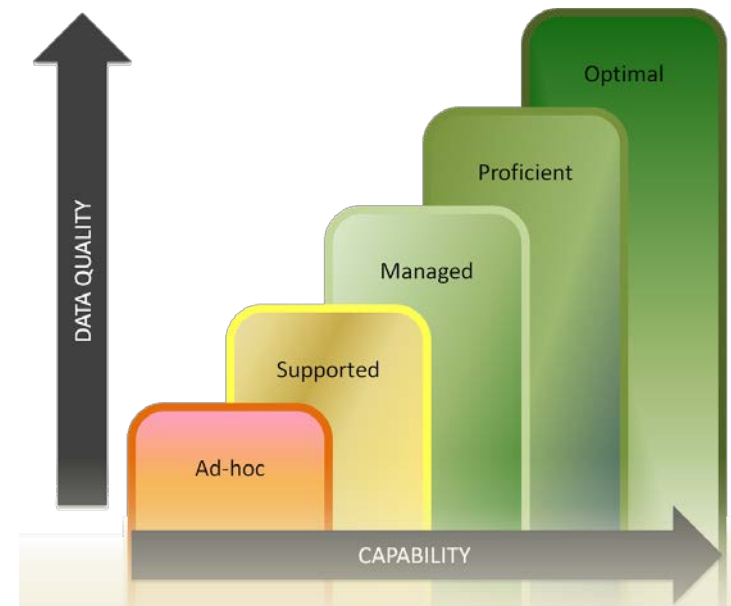
Findings

- Most of the efforts focus more on the outcomes than on the processes
- Some efforts are useful but not focused on the SDGs
- Some results can be reused and integrated
 - Example: GSBPM (Generic Statistical Business Process Model)



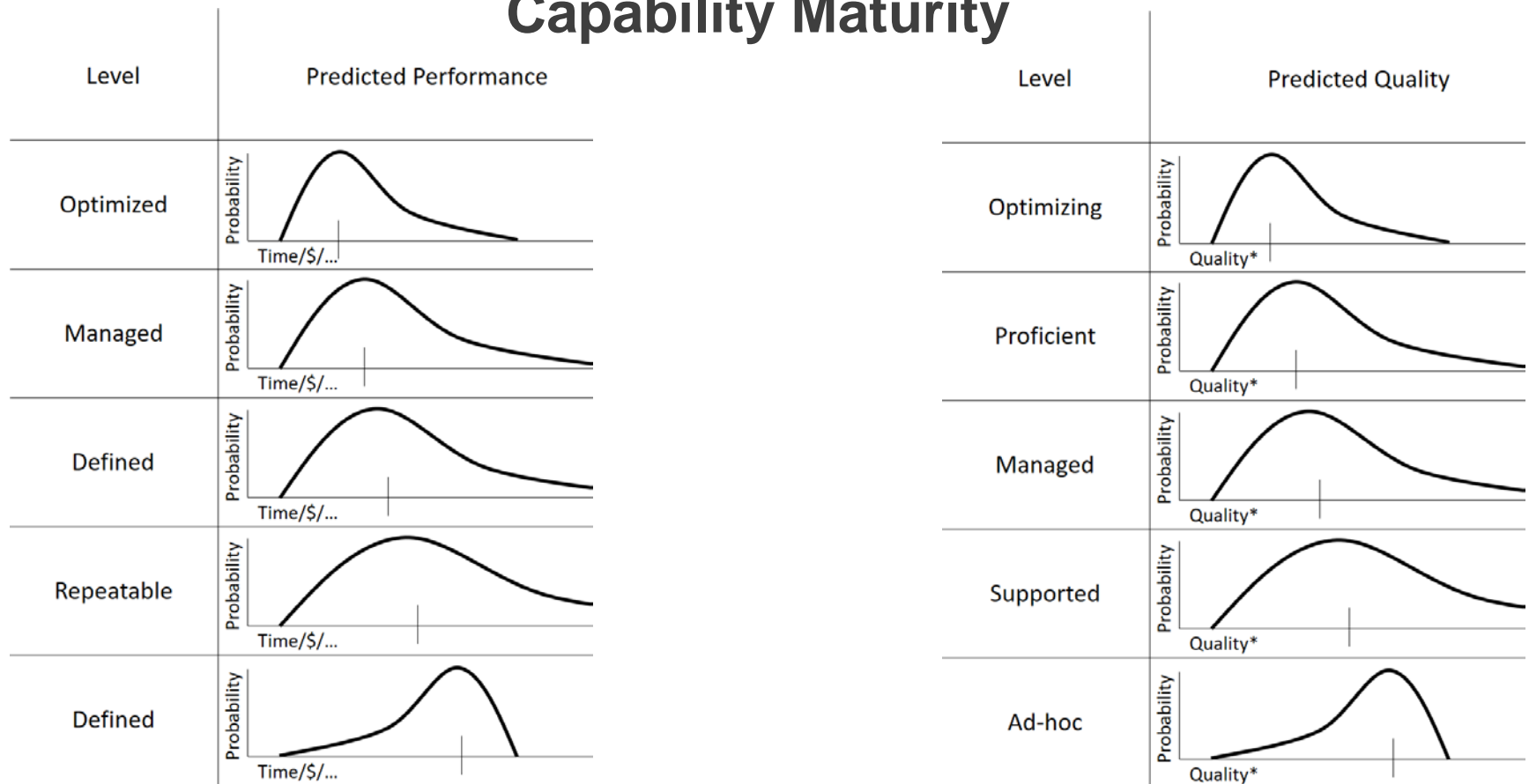
Improving the quality of the SDG indicators data

Hypothesis: The more **mature** an organization is, the higher the **quality** of information produced





Capability Maturity





Looking forward

Q: How can the quality of the SDG indicators data can be improved?

A: The capability of the national data ecosystems can be improved through a Capability Maturity Model (CMM) that can **assess** and **enhance** the capacity of the NSOs in generating SDG indicators data



Contribution

We propose a **prescriptive, multidimensional CMM**

Prescriptive: indicate the way to improve the level of maturity by enabling organizations to develop a roadmap for improvement

Multidimensional: for each phase, a number of dimensions is analyzed



Preliminary CMM

Phases	Dimensions	Levels				
		1	2	3	4	5
Specify Needs	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Research experience, information sharing	X	X	X	X	✓
Design	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Sources: unheard voices, crowd-sourced data	X	X	X	X	✓
Build	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Individual and organizational capacity	X	X	X	X	✓
Collect	Tools and techniques, platforms, systems	X	✓	✓	✓	✓
	Data exchange (SDMX), information sharing	X	X	X	✓	✓
	Ethics: confidentiality, privacy, security, retention	X	X	✓	X	✓

Collect	Data exchange (SDMX), information sharing	X	X	X	✓	✓
	Ethics: confidentiality, privacy, security, retention	X	X	✓	X	✓
Process	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	✓	✓	✓
	Quality management	X	X	X	X	✓
Analyze	Guidelines, processes, methodologies	X	✓	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Triangulation of sources, V&V, integrity	X	X	X	X	✓
Disseminate	Standards, best practices	X	✓	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Impact on policy	X	X	X	X	✓
Evaluate	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Continuous improvement	X	X	X	X	✓



Conclusions & Recommendations

- ✓ Efforts focusing in particular on the SDGs are needed
- ✓ International Organizations play an important role
- ✓ Private sector efforts might have other motivations
- ✓ Every country can benefit from a CMM
- ✓ Take advantage of existing efforts (MDGs and UPR)
- ✓ Data has to include everyone and has to be useful to everyone



Thank you!

Ignacio Marcovecchio
ignacio@unu.edu

Mamello Thinyane
mamello@unu.edu

Elsa Estevez
ece@cs.uns.edu.ar

Pablo Fillottrani
prf@cs.uns.edu.ar



ITUKALEIDOSCOPE

NANJING 2017

Challenges for a data-driven society



Preliminary CMM

Phases	Dimensions	Levels				
		1	2	3	4	5
Specify Needs	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Research experience, information sharing	X	X	X	X	✓
Design	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Sources: unheard voices, crowd-sourced data	X	X	X	X	✓
Build	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Individual and organizational capacity	X	X	X	X	✓
Collect	Tools and techniques, platforms, systems	X	✓	✓	✓	✓
	Data exchange (SDMX), information sharing	X	X	X	✓	✓
	Ethics: confidentiality, privacy, security, retention	X	X	✓	X	✓
Process	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	✓	✓	✓
	Quality management	X	X	X	X	✓
Analyze	Guidelines, processes, methodologies	X	✓	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Triangulation of sources, V&V, integrity	X	X	X	X	✓
Disseminate	Standards, best practices	X	✓	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Impact on policy	X	X	X	X	✓
Evaluate	Guidelines, processes, methodologies	X	X	✓	✓	✓
	Tools and techniques, platforms, systems	X	✓	X	✓	✓
	Continuous improvement	X	X	X	X	✓



Concepts

Maturity reflects a level of organizational development which can be used to determine the capability of organizations to perform certain activities.

Quality can be defined by its completeness, uniqueness, timeliness, validity, accuracy and consistency → crucial for appropriate decision making



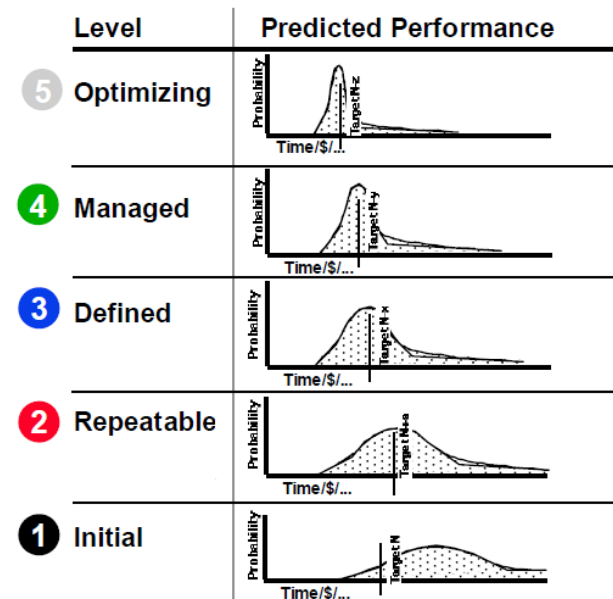
And what is “maturity”?

“A very advanced or developed form or state¹”

“Process maturity is the extent to which a specific process is explicitly defined, managed, measured, controlled, and effective²”

¹ Cambridge Dictionary

² Capability Maturity Model for Software





Why is “quality” not enough?

In different contexts, the premises and objectives are different:

- Business statistics → make profit
- Social statistics → common good

Premises for the SDGs monitoring:

- Leave no one behind
- Respect for privacy
- ...



Data quality attributes

1. Accessible
2. Accurate
3. Adequate
4. Auditable
5. Available
6. Clear
7. Coherent
8. Comparable
9. Complete
10. Cost-effective
11. Confidential
12. Consistent
13. Credible
14. Disaggregated
15. Fit
16. Integrity
17. Free of political interferences
18. Open
19. Private
20. Punctual
21. Relevant
22. Reliable
23. Timeliness
24. Transparent
25. Usable



Data quality - key principles

- Data quality and integrity
- Data disaggregation
- Data timeliness
- Data transparency and openness
- Data usability and curation
- Data protection and privacy
- Data governance and independence
- Data resources and capacity
- Data rights

[Independent Expert Advisory Group on a Data Revolution for Sustainable Development, “A World that Counts: Mobilising the Data Revolution for Sustainable Development,” 2014.]