



# **UNECE**

## **Working Party on Regulatory Cooperation and Standardization Policies (WP.6)**

### **Session Panel:**

**Digital and green transformations  
and their relation to regulatory cooperation  
and standardisation policies**

**Anthony Donnellan**  
*BIML Director*



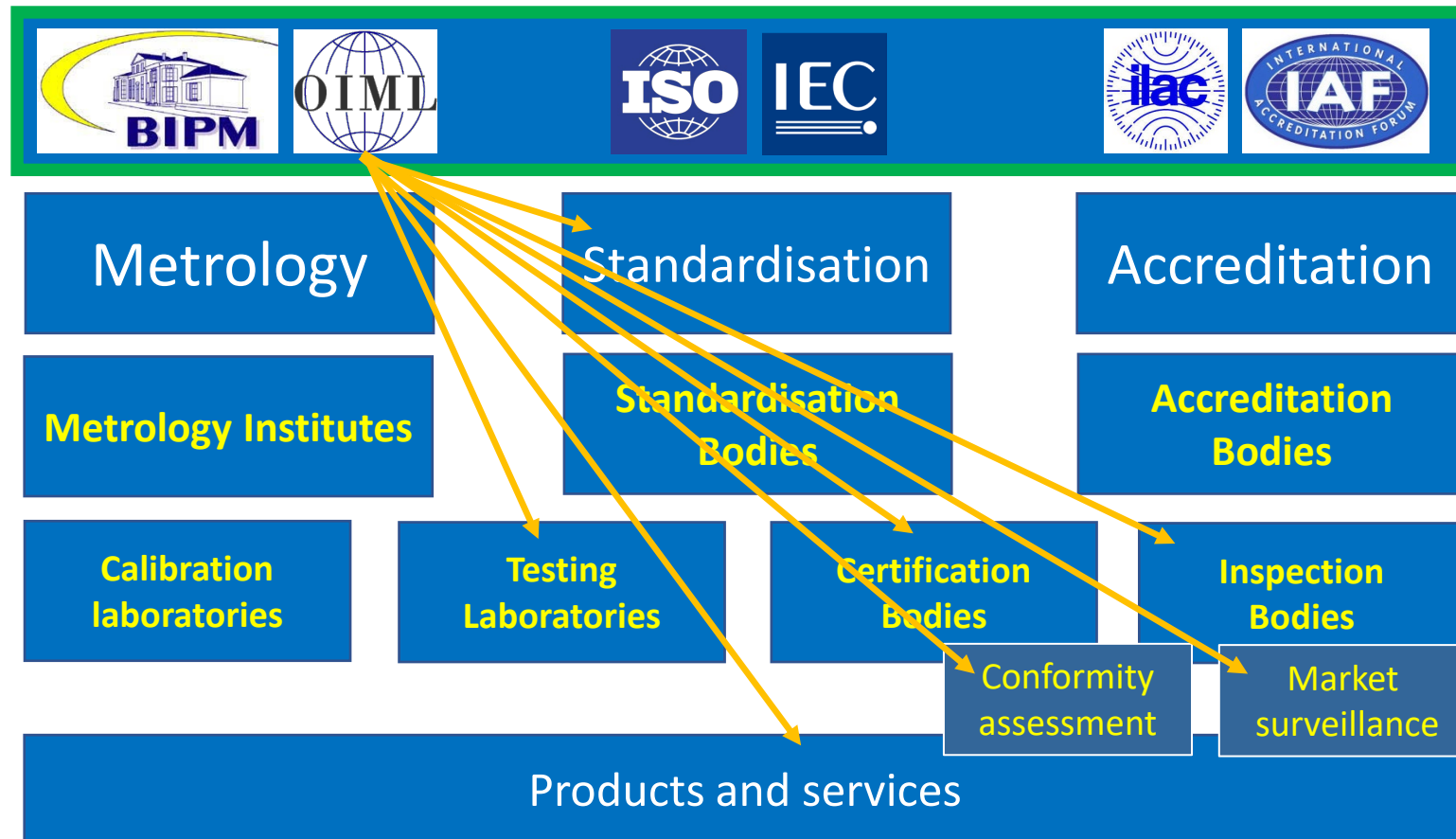
# Introduction

- Metrology, the science of measurement, both directly contributes to digitalisation and technology advancement and is influenced by it.
- A focus of international metrology is to advance priority areas through science and effective standard development in many areas including environmental sustainability, health, inclusivity through digital transformation, and trade by focussing on the three P's of the SDGs.



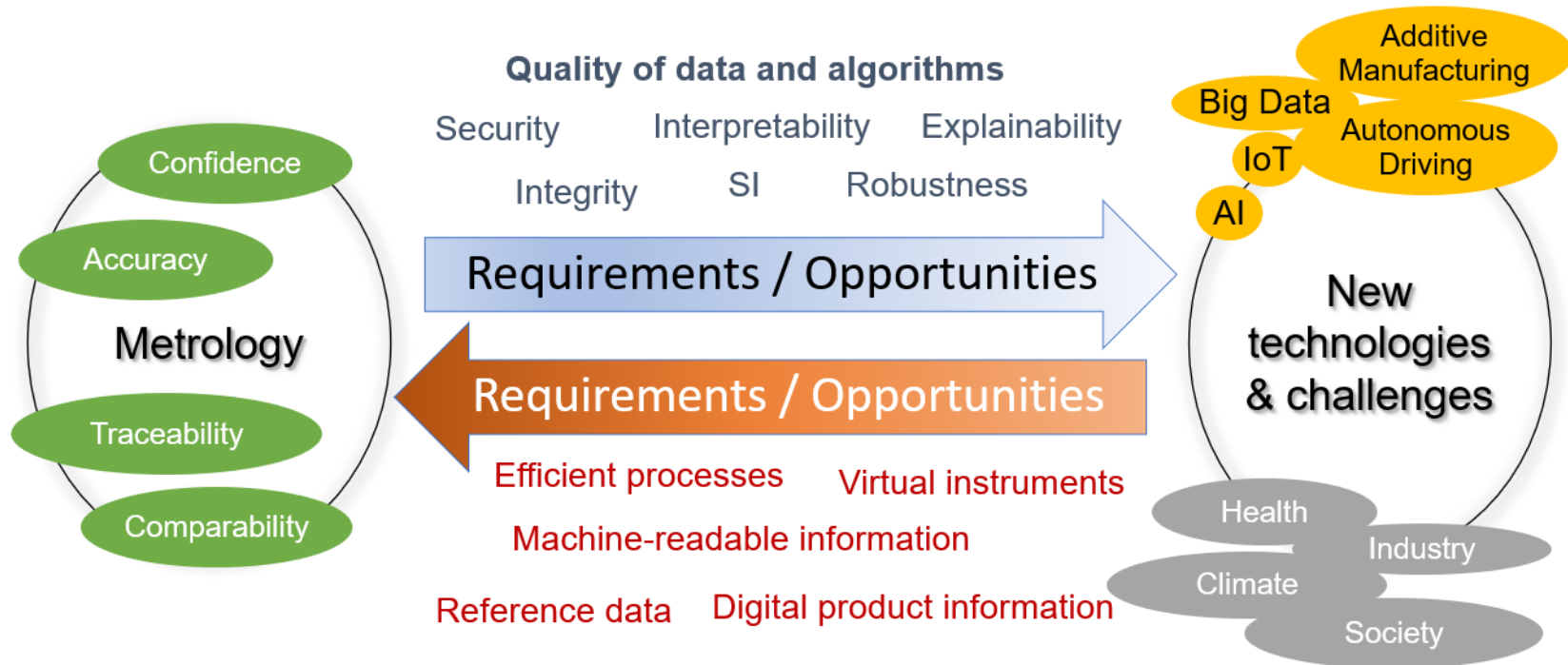


# Metrology as part of the Quality Infrastructure (QI)





# Current situation: a synopsis



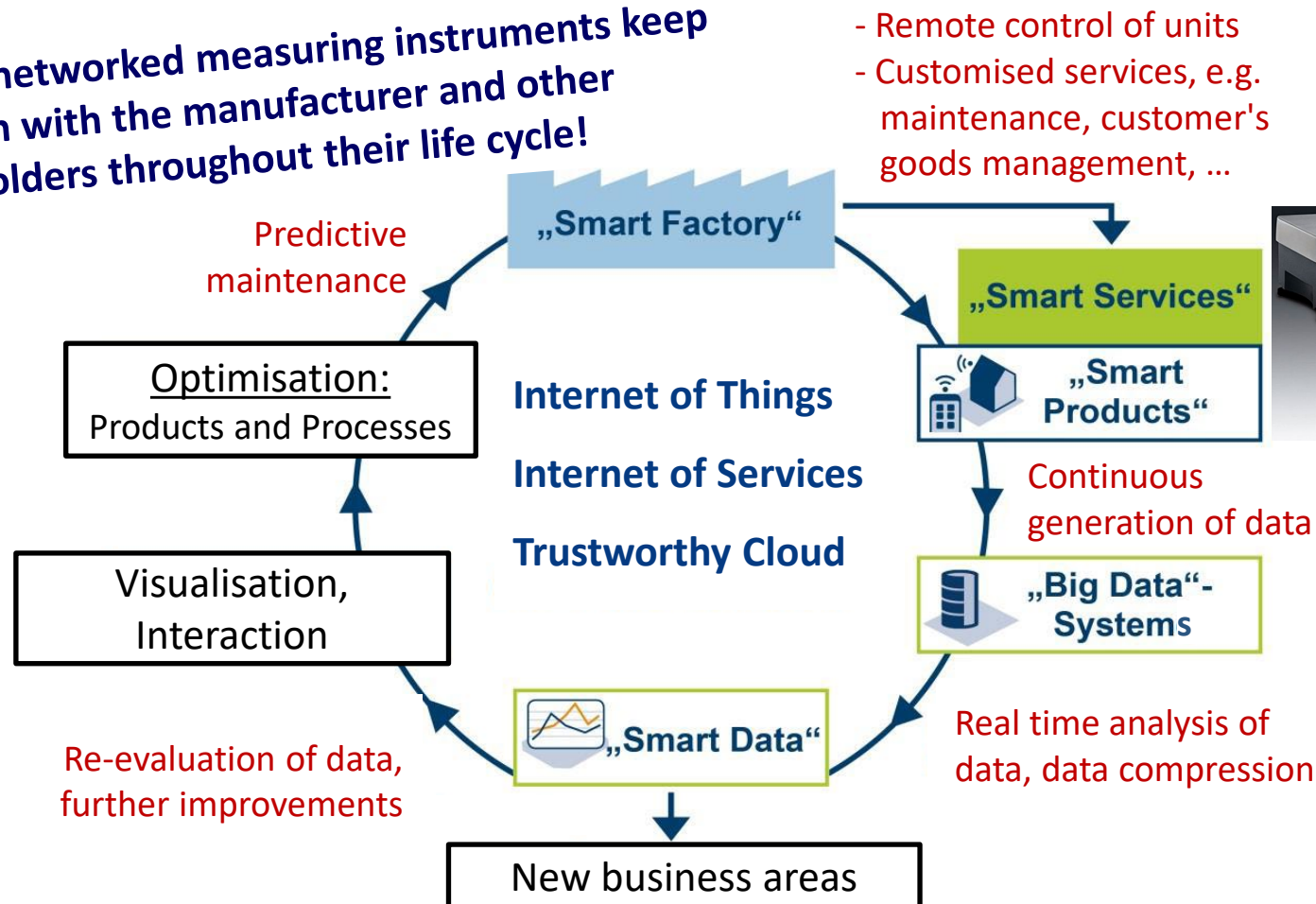
*Figure 1 Mutual requirements and opportunities in the interplay of metrology and digital transformation*

Source: "Digital Transformation in the Quality Infrastructure - Challenges and Opportunities" – SASCHA EICHSTÄDT, PTB Germany. OIML Bulletin, July 2022



# Life cycle of smart, networked instruments

Smart, networked measuring instruments keep in touch with the manufacturer and other stakeholders throughout their life cycle!

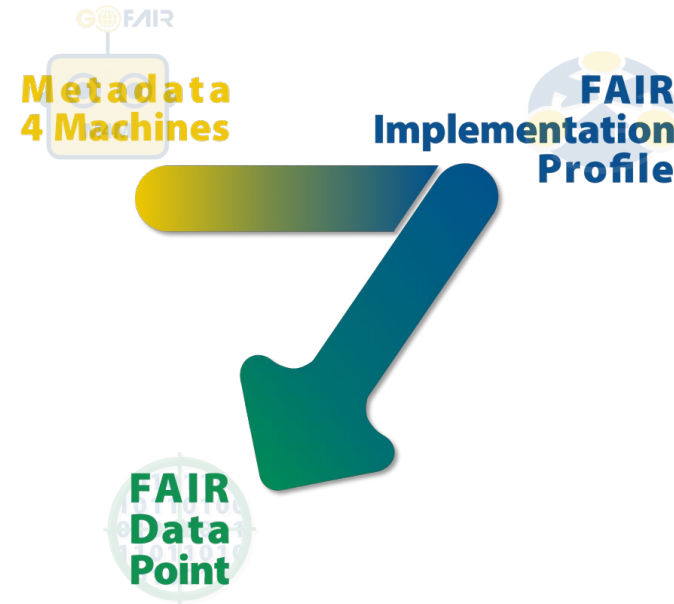


Source: Sartorius



# A framework: Findable, Accessible, Interoperable and Reusable (FAIR)

- To encourage digital openness, equality, communication and cataloguing, metrology's International Organisations are embracing the **F**indable, **A**ccessible, **I**nteroperable and **R**eusable (**FAIR**) principles.
- The FAIR Guiding Principles are a three-point framework describing the essential steps towards the end goal, a global Internet of FAIR Data and Services where data are FAIR.



Reference: <https://www.go-fair.org/how-to-go-fair/>



# The SI Digital Framework

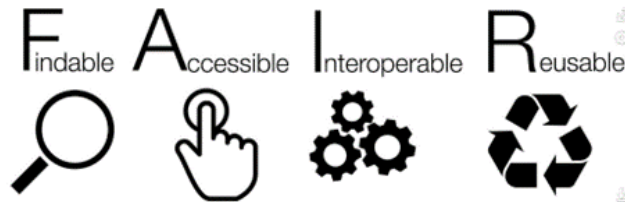
The International System of Units (SI) is the ‘language’ of measurement

It:

- ◆ Defines the units of measurement, (kilogramme, metre, second, etc.),
- ◆ Defines the prefixes such as giga, nano, mega, micro, etc.
- ◆ Provides the ‘cookbook’ on how to realise the units

***The aim of the SI digital Framework ...  
...is to make the SI as accessible by machines as it is by humans***

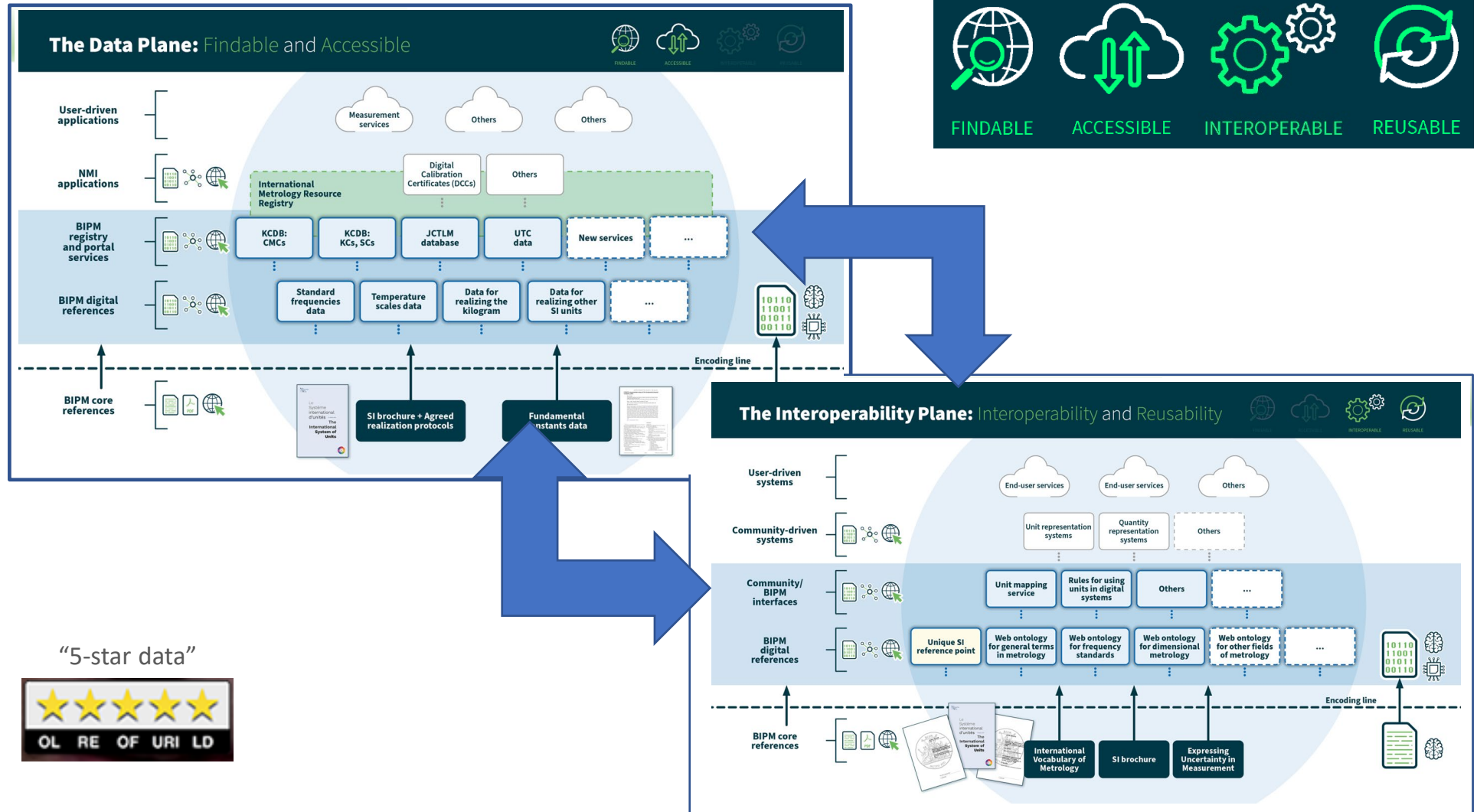
...whilst respecting the FAIR data principles



*“Transforming the International System of Units for a Digital World”*  
Approved Oct 2020 - CIPM/109-17



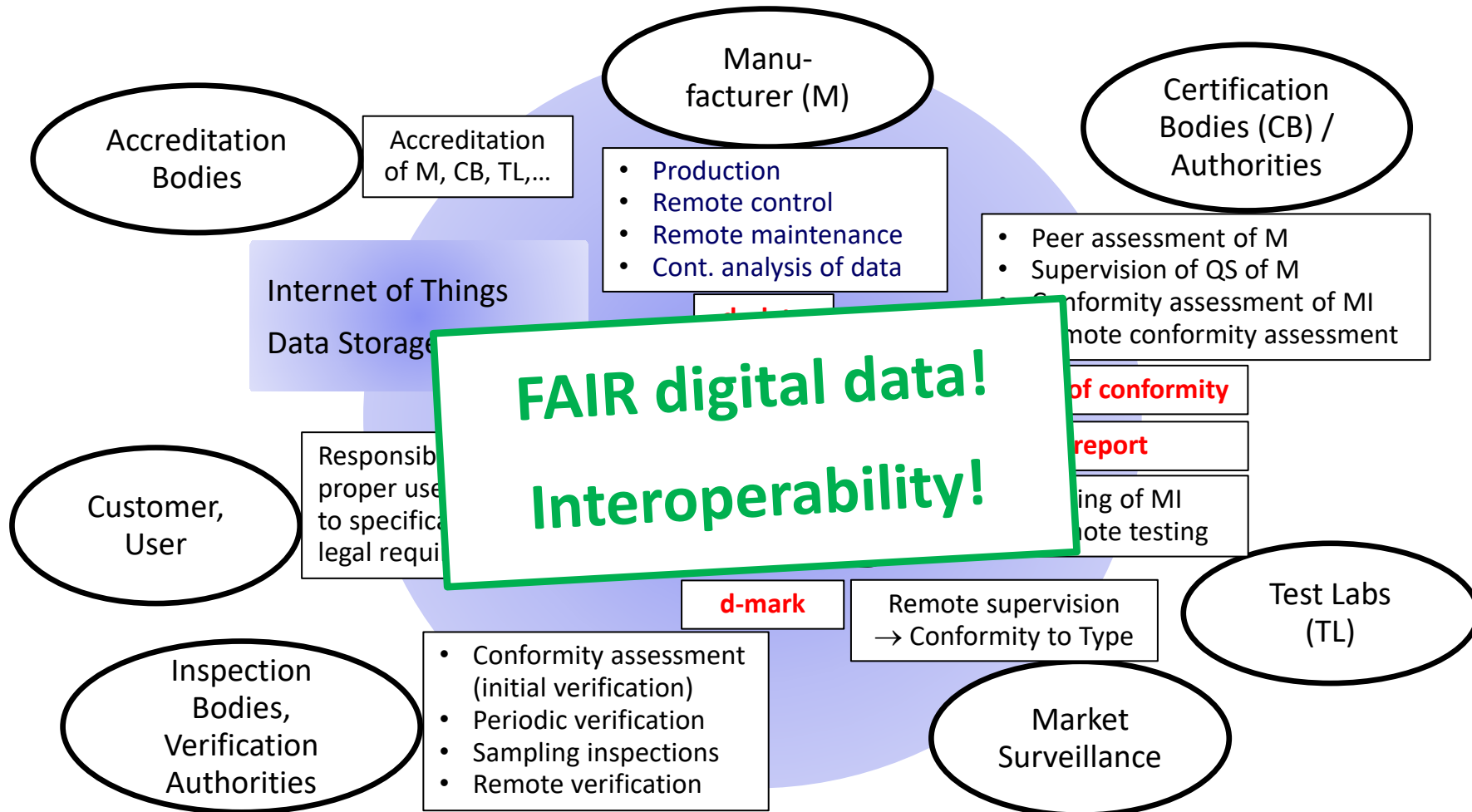
# The SI Digital Framework





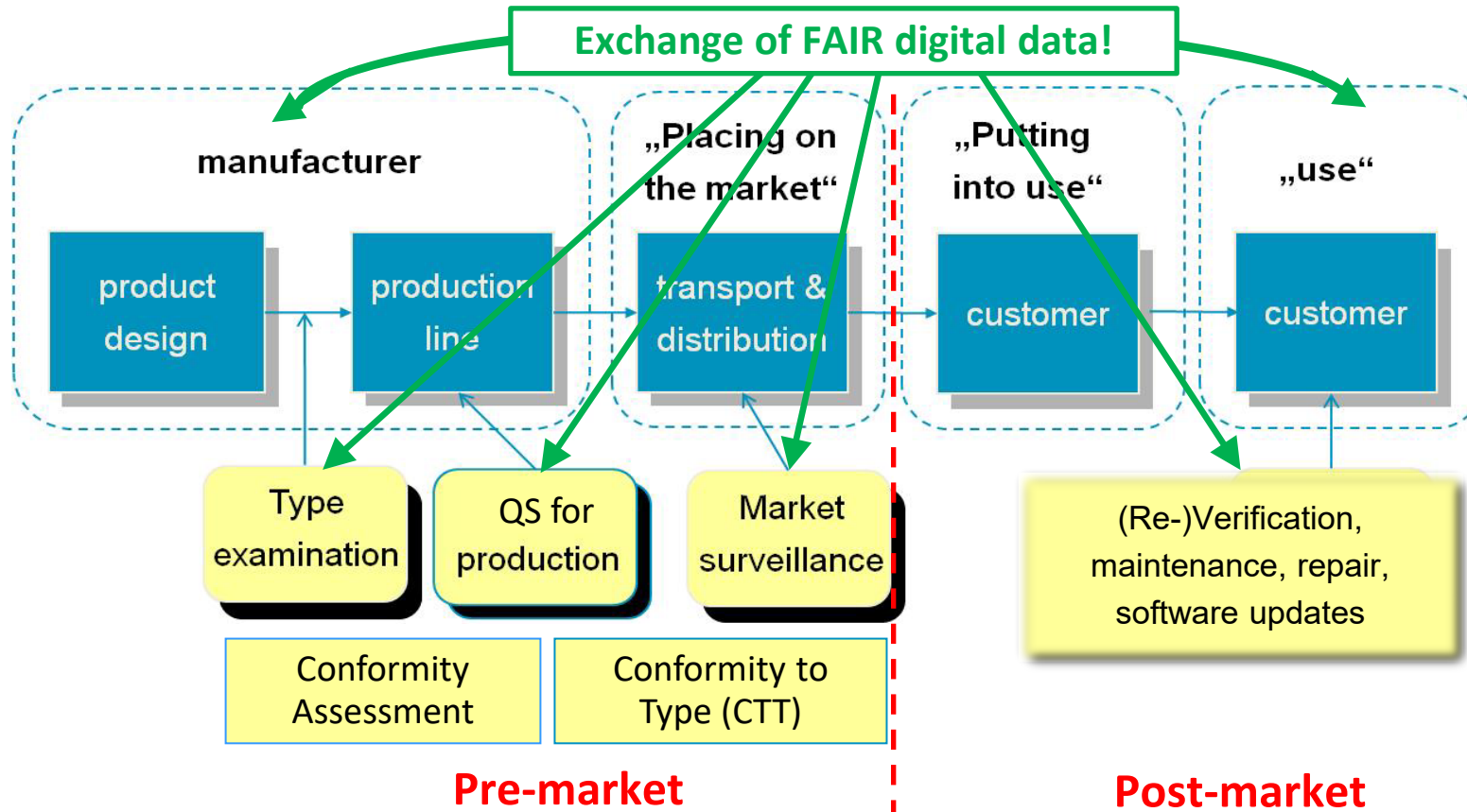


# Digital transformation of legal metrology processes





# Challenge for legal metrology: Digital transformation of the various processes during the life cycle of a product





# Example: Digital Certificate of Conformity in Metrology (D-CoCM)

- Part of the digital representation of a measuring instrument.
- Will contain type evaluation certificates, certificates of supervised manufacturers' QS for the production, and other relevant documents.
- Will provide the legally prescribed information as machine-readable data (e.g. digital plate, digital test report, digital verification mark, etc.) to enable stakeholders to perform all legally prescribed actions.
- Requires a holistic approach to address the needs of all stakeholders involved during the life cycle of an instrument.
- Is intended to be realised using FAIR digital data, based on the SI.



Digital representation
<b>D-CoCM</b>
↳ D-plate
↳ D-test report
↳ D-mark
...



# Standardisation for digital standards

- The realisation of a digitally interconnected QI also requires:
- Definition of common (meta-)data standards and commonly accepted and machine-readable terminologies (e.g., expressed as ontologies and with so-called “linked data”);
- Machine-readable information from standards, certification, accreditation and regulations;
- Application of digital twins for the assessment of products and services;
- Continuous quality and conformity assessment for an effective handling of software updates and artificial intelligence; and
- Digital interfaces to the platforms and data bases.

*Source: “Digital Transformation in the Quality Infrastructure - Challenges and Opportunities” – SASCHA EICHSTÄDT, PTB Germany. OIML Bulletin, July 2022*



# The SMARTification of QI

- Digital and automated processes based on machine-readable data.
- Digital machine-readable documents and certificates based on standardised representations of metrological data and units.
- Digital machine-readable standards.
- Interoperability based on standardised terminology, controlled vocabulary and ontologies (“one language”).
- Remote assessment and self-assessment methods based on IoT functionality for measuring instruments.
- Appropriate technology (e.g. blockchain) to provide secure access and use of sensitive data.



# Joint Statement of Intent

*on the digital transformation in the international scientific and quality infrastructure*

- The “Joint Statement” was signed by the OIML, BIPM and partner organisations in March 2022.
- It lays the foundations of how the international Quality Infrastructure organises itself and its priorities for the future.



**Signing of the Joint Statement of Intent**

Clockwise from top left:

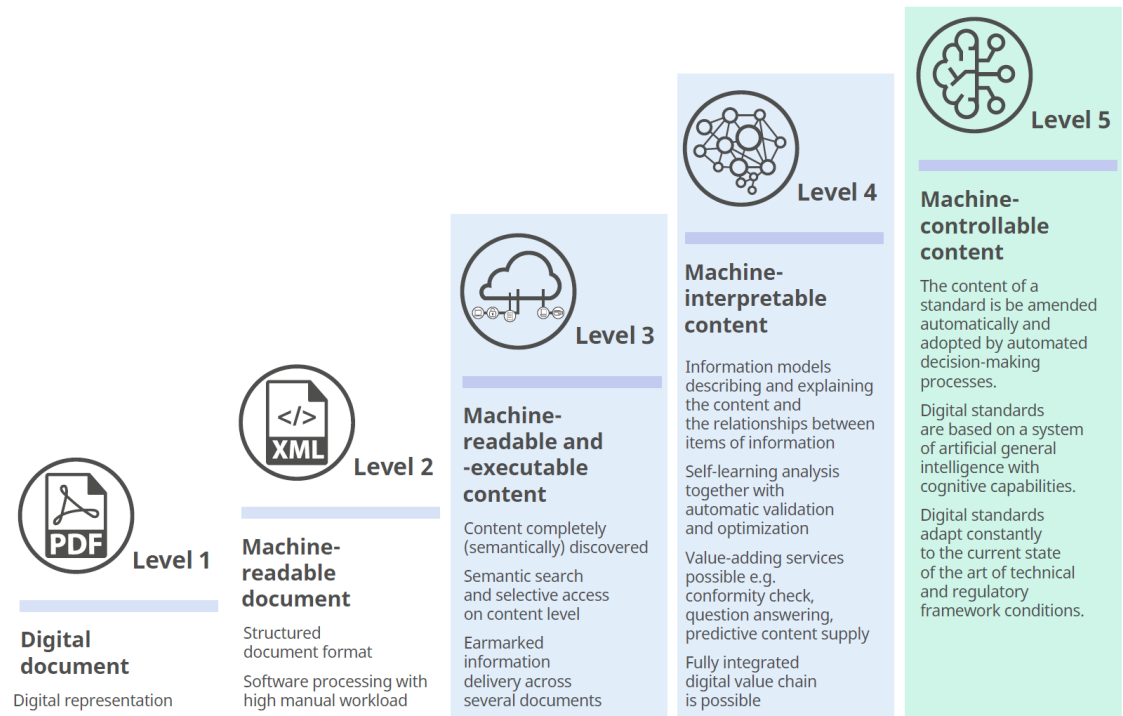
Wynand Louw, CIPM President (on behalf of the BIPM)  
Mathieu Denis, ISC Science Director and Acting CEO  
Barend Mons, CODATA President  
Roman Schwartz, CIML President (on behalf of the OIML)  
Frank Härtig, IMEKO President





# An evolution has begun

- AI and machine learning has the potential to improve processes, mitigate product risks and lead to refined products development.
- AI can lead to creative and novel approaches to product refinement.

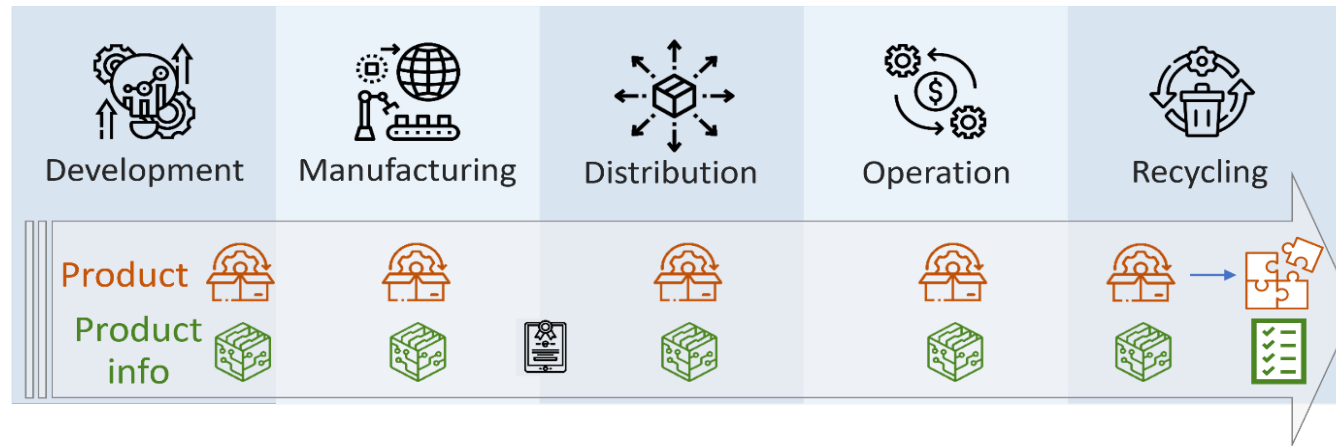


Reference: IDIS Whitepaper "SCENARIOS FOR DIGITIZING STANDARDIZATION AND STANDARDS" 2021





# The intersection of metrology, digitalisation and sustainability



*Figure 3 Product lifecycle – from development to recycling. In each part of its lifecycle, the product’s digital information must be updated and amended.*

Source: “Digital Transformation in the Quality Infrastructure - Challenges and Opportunities” – SASCHA EICHSTÄDT, PTB Germany. OIML Bulletin, July 2022



## Example: MetroCycleEU

- Metrology for the recycling of technology critical elements to support Europe's circular economy agenda.
- The aim of this project is to develop new methods for TCE measurements in urban mine waste and other environmental relevant matrix, giving industry and authorities a more robust framework for the sustainable usage of these elements as well as decision making in waste management, future pollution control and early environmental protection.
- The project brings together expertise of 14 partners from 11 countries around Europe.
- This will support the EU's Circular Economy Action Plan and help to reduce future supply risks as well as to reinforce Europe's resilience and autonomy.

MetroCycleEU



Figure 2: The "MetroCycleEU" project ([www.metrocycle.eu](http://www.metrocycle.eu)) will develop Metrology for Technology Critical Elements.



# Global recognition of the importance of metrology and the digital era

- World Metrology Day is an annual celebration of the signature of the Metre Convention on 20 May 1875.
- The theme for World Metrology Day 2022 is **Metrology in the Digital Era**.
- This theme was chosen because digital technology is revolutionising our community, and is one of the most exciting trends in society today.

The World Metrology Day project is realised jointly by the BIPM and the OIML.





Organisation Internationale de  
**Métrologie Légale**  
International Organization of  
**Legal Metrology**



# Close

