Dare più valore alla misura: integrazione tra metrologia e l’ecosistema informativo aziendale.

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Global Trends

Figure 1. Global trends and trends in manufacturing technology (image source: WZL, RWTH Aachen).

Challenges and trends in manufacturing metrology – VDI/VDE Roadmap
Cyber Physical Production System (CPPS)

Figure 2. Concept of a cyber-physical production system.

Challenges and trends in manufacturing measurement technology – the “Industrie 4.0” concept
Manufacturing Metrology

Figure 2. Fields of application for manufacturing metrology (derived from Pfeifer and Schmitt, 2010).

Looking at the future of manufacturing metrology: roadmap document of the German VDI/VDE Society for Measurement and Automatic Control
Metrologic Requirements and Trends

Requirements and trends from the VDI 2020 Manufacturing Metrology Roadmap (updated in 2015)
Trend: Competences, Complexity, Data, Technology – Speed and Growth

Data: Correct, Correlated, Consistent, Safe, Usable

Horizontal Integration

Vertical Integration

Measurement of Process

Interface

Smart Part/Component

Supplier

My Company

Customer

Smart Part/Component

Smart Product

Blulink

Value beyond Compliance
QMIS as a Gateway

- Machine Learning (ML) – BIG DATA
- Enterprise Information System (ERP, MES, …)
- Cloud Platform

Data Collection Network
QMIS – Functions

- **Work-flow**
- **Alarm manager**
- **Integration between processes**

**Supplier Qualification**
- PPAP - Sample approval
- Supplier NC
- CAPA
- BD
- Deviations/Concessions
- Supplier Audit
- Contracting

**Instruments calibration**
- MSA

**Lot inspection:**
- Incoming-
- Internal-
- Outgoing
- Ongoing inspection
- SPC
- Cad Convert tool

**APQP**
- FMEA
- Control plan
- Project Management

**Internal Audit** (Quality, OHSAS)
- Internal NC
- CAPA
- BD

**Cost Management**
- HR – OHSAS req.
- Risks (Quality, Process, OHSAS)

**Document Management System**

**Plant/Assets Maintenance System**

**Integration with other systems (ERP, MES..)**

**External Users**
- Instruments calibration
- MSA

**Portal**
- In instruments calibration
- MSA

**KPIs**
- Work-flow
- Alarm manager
- Integration between processes

**PPAP - Sample approval**
- Service notifications (Warranty claim and repair request)
- Goods returns
- Customer NC
- CAPA
- BD
- Deviations/Concessions
- Audit from Customer

**External Users**
- Instruments calibration
- MSA

**Portal**
- In instruments calibration
- MSA
KDD – Knowledge Discovery in databases

KDD-Process (Knowledge Discovery in Databases)

Data Mining:
- Clustering
- Classification
- Frequent Pattern Mining
- Outlier Mining
Difference - Unsupervised / Supervised learning?

**Clustering: Unsupervised learning**
- The class labels of training data are unknown
- Given a set of measurements, observations etc. with the aim of establishing the existence of classes or clusters in the data.
  - Classes (=Clusters are unknown)
  - You don’t know what you are looking for

**Classification: Supervised learning**
- Supervision: The training data (observations, measurements etc) are accompanied by labels the class of the observation
  - Classes are known in advance
  - you know what you are looking for
- New data is classified based on the information extracted from the training set
INTERNATIONALIZATION

NEW SKILLS

Measurement and EDGE Technology for Blulink

Information Technology and data analysis for Marposs

INTEGRATION QUARTA3 & MARPOSS MEASURING INSTRUMENTS

QUALITY 4.0 / INDUSTRY 4.0
Thanks for your attention

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