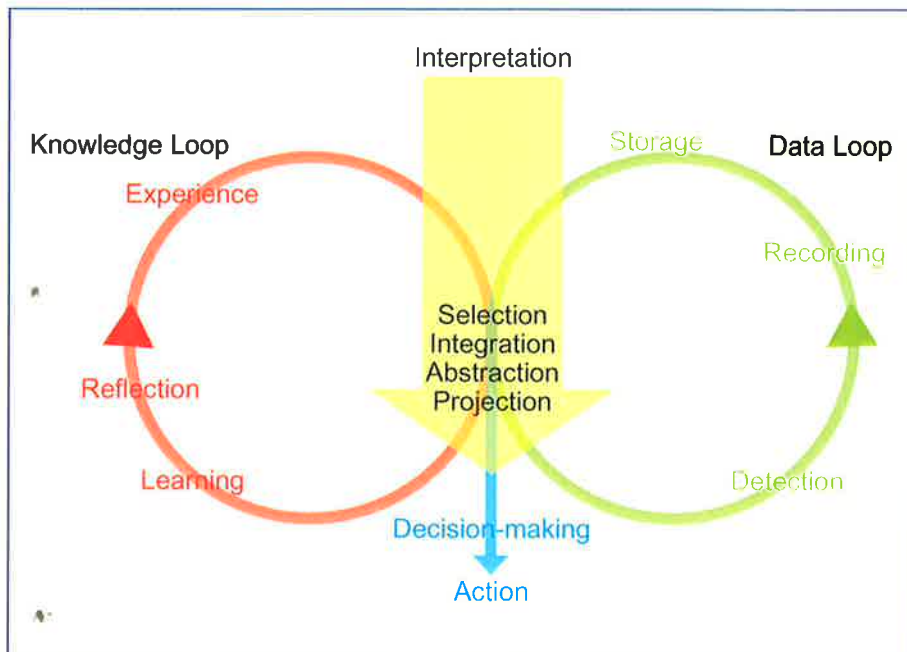


# Creating value from data

Starting from the equation 'Data + Knowledge = Information', TNO TPD's data and information group creates solutions for complex data interpretation and information integration tasks. We offer methods, tools and advanced software instruments which utilise domain knowledge to distil useful information from data, and to prepare this information for further processing. By making sense of data, we create high added value for a wide range of businesses and organisations.



TNO TPD delivers innovative and complete solutions for large companies, SMEs and the government. Our fields of knowledge are: acoustics and vibrations, models and processes, and imaging and instrumentation. Projects, both national and international, vary from system development to consultancy.



Actionable information is generated at the confluence of data and knowledge. TNO TPD's core competence lies in the interpretation of data through selection, integration, abstraction and projection (e.g. projection onto a time line).

## Value

The need to cut costs, increase speed and improve quality of even the most complex knowledge intensive processes – that is the business driver for our projects. Knowledge professionals collect, filter, integrate, analyse and interpret heterogeneous and often sub optimally structured data. They need methods and tools that support their work, generate insight, increase accuracy, and thus reduce uncertainty.

The design and realisation of knowledge-based solutions to this challenge is the core competence of the group. Our approach, based on a unique combination of sophisticated knowledge engineering methods with machine learning, statistics, text and data mining techniques, addresses a wide range of issues, in both business and science. In close collaboration with problem owners and domain specialists and taking into account our clients' existing data infrastructure and business processes, we deliver innovative,

yet tight-fitting solutions that save time and manpower, and increase quality of service.

### **What do a clinical epidemiologist and a maintenance engineer have in common?**

They both have to analyse a wide range of heterogeneous data in search of meaningful patterns that otherwise would have gone unnoticed - and they better get it right, too. TNO's combination of data/text-mining with knowledge engineering attends to exactly this need.

### **Applications**

- Smart instruments enrich physical instruments by a semantic interpretation layer around signal processing algorithms, which leads to simpler algorithms with larger flexibility and the potential to address complex issues;
- Guided trouble-shooting tools exploit various types of knowledge about properties and behaviour of equipment, installations, or even people, to test hypotheses about incidents;
- Analyst's workbenches use domain and world knowledge to facilitate the tracking and interpretation of patterns or significant incidents of low frequency in large heterogeneous data sets.

### **What do a police officer and a genomics researcher have in common?**

They both have to test intricate hypotheses on various sorts of data, each sketching an ambiguous and incomplete picture of reality. Establishing a coherent interpretation while keeping an open mind for possible alternatives is essential for a good catch - be it a criminal or a drug. TNO's Multi-Aspect Modelling technique provides just the right combination of (logical) rigour and (conceptual) flexibility.

### **Who benefits?**

- Organisations which investigate incidents, accidents, or security, safety and quality issues find our technology effective in detecting patterns in their data and discover relationships that help to test hypotheses, identify causes and consequences in their field of expertise, and support decisions about measures to be taken, suspects to be interrogated, changes in procedures to be made, etc.
- Companies that generate vast streams of data (sometimes several hundred gigabytes a day), such as production plants or medical centres use our knowledge-based technology to discover meaningful patterns and information which is virtually impossible to obtain by hand, yet can have great impact on vital decisions (e.g. process control, product development, medical diagnosis).
- Organisations that rely on the interpretation of large amounts of physical data of various kinds, such as oil companies or meteorological services distil better information from their data by approaching them from different points of view integrating physical models with pertinent 'higher level' models encoding that elusive, yet indispensable world- and domain-knowledge needed to make real sense of it all.

### **What do a designer of physical instruments and a production line manager have in common?**

They both have to guarantee high quality output complying with tight specifications. Inevitably they are confronted with uncertainty/variability in the input. TNO has the tools and the skills to help them optimise the output and determine the permissible limits.

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### **Products & Services**

#### **Consultancy**

- Workshops on knowledge-guided analysis
- Data analysis
- Problem analysis and fact-finding
- System design and project support

#### **Development**

- Refining existing methods and techniques for specific issues
- Feasibility study
- Task-, domain-, and data-modelling
- Technical design
- Developing customised modules
- Realising prototype application
- Specifications for final product
- Project management for development/deployment

#### **Training**

- Training in the application of knowledge-based methods
- Training in the use of analytical software instruments