



BSI Standards Publication

Industrial-process measurement, control and automation — Smart manufacturing

Part 2: Use cases

National foreword

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TECHNICAL REPORT



Industrial-process measurement, control and automation – Smart manufacturing – Part 2: Use cases





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TECHNICAL REPORT



**Industrial-process measurement, control and automation – Smart
manufacturing –
Part 2: Use cases**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTRODUCTION

In recent years, one observes that an increasing number of “buzzwords” are in discussion in the manufacturing area. The scope of the various “buzzwords” is not clearly defined, moreover, the scope addressed by the “buzzwords” is not congruent but overlapping. Each stakeholder involved in these discussions has another perspective to the various topics and the discussions address very different levels of detail and consider different contexts. This is illustrated in Figure 1.

“Smart Manufacturing is one of the buzzwords that addresses multiple stakeholders. The overall community is convinced that “Smart Manufacturing” will significantly affect the manufacturing industries and, therefore, standardization will consolidate the vision of “Smart Manufacturing” from different manufacturing industries sectors viewpoints. The discussions within standardization are sufficiently formal or precise in order to later have any claim regarding compliance to standards. Thus, standardization will consolidate the definitions and understanding of the “buzzwords” for its own usage.

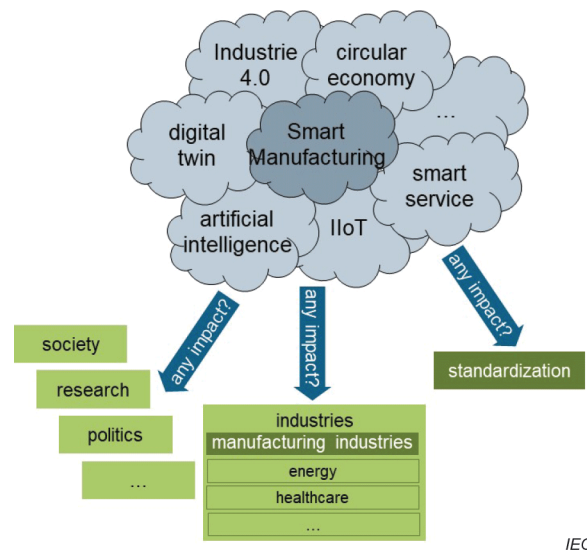


Figure 1 – Related subjects to Smart Manufacturing

In order to analyze the impact of “Smart Manufacturing” on standardization, the approach chosen is the collection and evaluation of use cases to obtain a sufficiently representative description of “Smart Manufacturing”. These use cases are described from the perspective of the manufacturing value chains. They illustrate what could be conceivable in the future in the context of “Smart Manufacturing”. Thus, a use case itself is explainable¹ to a manufacturing company. Experts in standardization will afterwards analyze these use cases to decide whether

- a specific use case provides no (new) input for standardization;
- a specific use case provides needs to maintain existing standards (this can be related to the content or the application areas);
- a specific use case provides input for additional measures to be elaborated in by standardization projects.

¹ A typical employee of a manufacturing company is not familiar with formal methods used to describe use cases as accurately as possible or even uses different terms, for example plant versus factory versus production system. Thus an explanation of the use cases is necessary.

Based on this approach the use cases will contribute to the following topics:

- Consolidation of the vision “Smart Manufacturing”: The use cases will describe the basic principles of traditional and future manufacturing value chains and will work out the additional, new opportunities enabled by digitalization.
- Consolidation of terms and concepts: The use cases will facilitate to come to agreements on basic terms and concepts. The description of terms and concepts will be in an application context and not here in a terms and definitions section.
- Justification of a general need for standardization: Based on the use cases, the fundamental gaps will be identified. It is intended to close the gaps that have not yet been filled up. Possibly, however, it is effective to first suitably upgrade the installed base based on already established standards.
- Elaboration of recommendations for standardization on an abstract level: Based on the use cases, the requirements – and not solution concepts – for standardization will be extracted to achieve a consensus for maintenance or new development of standards. It is intended to derive the recommendations from the use cases and ensure backward traceability to the use cases.

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – SMART MANUFACTURING –

Part 2: Use cases

1 Scope

This Technical Report has the goal of analyzing the impact of “Smart Manufacturing” on the daily operation of an industrial facility. It focusses on the perspective of automation and control of the production system, but also on the supporting processes of ordering, supply chain management, design, engineering and commissioning, operational technology, life cycle management, and resource management.

These recommendations are accomplished on the basis of several carefully selected use cases that are familiar to manufacturing industry. Therefore, each use case is described, followed by an analysis of the possible influence of “Smart Manufacturing” and the assessment of the impact on existing and future standardization.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 General

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

NOTE In 3.2, all conceptual constituents of uses cases including their context are defined in a way that the document is self-explanatory. The definitions are fully aligned with IEC TR 63283-1 (65/683/DTR).

From these conceptual constituents the examples introduced in the various use cases are distinguished. These concrete roles are consolidated in 3.3, 3.4, 3.5 and 3.6 to provide a consistent cross reference of all concrete roles involved in the individual use cases of this document. For the sake of clarity, a distinction is made between business, human and technical roles. A technical role can be represented by a subject or an object, where a subject is an entity doing something, and an object is having something done to it. Thus, subjects have capabilities in the sense of having the ability to perform actions.

3.2 General terms and definitions

3.2.1

actor

entity that communicates and interacts

Note 1 to entry: These actors can include people, software applications, systems, databases, and even the power system itself.

[SOURCE: IEC 62559-2: 2015, 3.2]