

Supplement

ITU-T Y Suppl. 87 (01/2025)

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Supplements to the Y-series Recommendations

ITU-T Y.4910 – Maturity model of the digital management capability of industrial equipment used in smart sustainable cities

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Supplement 87 to ITU-T Y-series Recommendations

ITU-T Y.4910 – Maturity model of the digital management capability of industrial equipment used in smart sustainable cities

Summary

As a basic enabler of manufacturing activities, the digital management capability of industrial equipment is of great significance to the value creation activities of industry in smart sustainable cities (SSC). With the rapid development of advanced information and communication technologies such as the Internet of things, big data and artificial intelligence (AI), the intelligence level of industrial equipment has continuously improved. Enhancing the digital management capability of industrial equipment contributes to enhancements in production efficiency, reduction in operation costs, and the achievement of economic benefits. Therefore, digital management of industrial equipment contributes to urban innovation and sustainable development.

This Supplement 87 to ITU-T Y-series Recommendations provides a maturity model of the digital management capability of industrial equipment for SSC. The maturity model helps to identify the maturity levels, dimensions, and guidelines for the digital management capability of industrial equipment for SSC. It is designed as a practical tool for city managers and related stakeholders to study the effectiveness of digital management of industrial equipment, from resource, environment, and operation perspectives, among others. Thus, it provides overall guidance for assessing the maturity of the digital management capability of industrial equipment and helping cities achieve sustainable development goals.

History*

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Supplement 87 to ITU-T Y-series Recommendations

ITU-T Y.4910 – Maturity model of the digital management capability of industrial equipment used in smart sustainable cities

1 Scope

This Supplement to [ITU-T Y.4910] specifies a maturity model, which contains maturity levels and maturity dimensions, as well as maturity assessment methods of the digital management capability of industrial equipment for smart sustainable cities (SSC). This Supplement aims to assess and promote the use of advanced technologies and gradually improve the digital management capability of industrial equipment in SSC.

The scope of this Supplement includes:

- 1) Maturity model of digital management capability of industrial equipment for SSC;
- 2) Maturity levels of digital management capability of industrial equipment for SSC;
- 3) Maturity dimensions of digital management capability of industrial equipment for SSC;
- 4) Maturity assessment methods of digital management capability of industrial equipment for SSC.

This Supplement is not intended to compare or prescribe any commercial assessment tool for the digital management capability of industrial equipment. It is intended to be a technology-neutral Supplement.

2 References

[ITU-T Y.4910] Recommendation ITU-T Y.4910 (2023), *Maturity model of digital supply chain for smart sustainable cities*.

3 Definitions

None.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

AI	Artificial Intelligence
APS	Advanced Planning and Scheduling
ERP	Enterprise Resource Planning
MES	Manufacturing Execution System
PHM	Prognostic and Health Management
SCADA	Supervisory Control and Data Acquisition
SCM	Supply Chain Management
SSC	Smart Sustainable Cities

5 Conventions

None.

6 Overview of the maturity model of the digital management capability of industrial equipment for SSC

Figure 1 depicts a maturity model of the digital management capability of industrial equipment, which consists of maturity levels and maturity dimensions. The proposed maturity model can be used to evaluate the maturity of the digital management capability of industrial equipment. The maturity dimensions of the digital management capability of industrial equipment include five aspects: resource assurance, operational environment control, foundation management, operation and maintenance, and performance improvement. The maturity of the digital management capability of industrial equipment is categorized into five levels: initial starting level (L1), steady operation level (L2), perception and interaction level (L3), data-driven level (L4), and intelligent optimization level (L5).

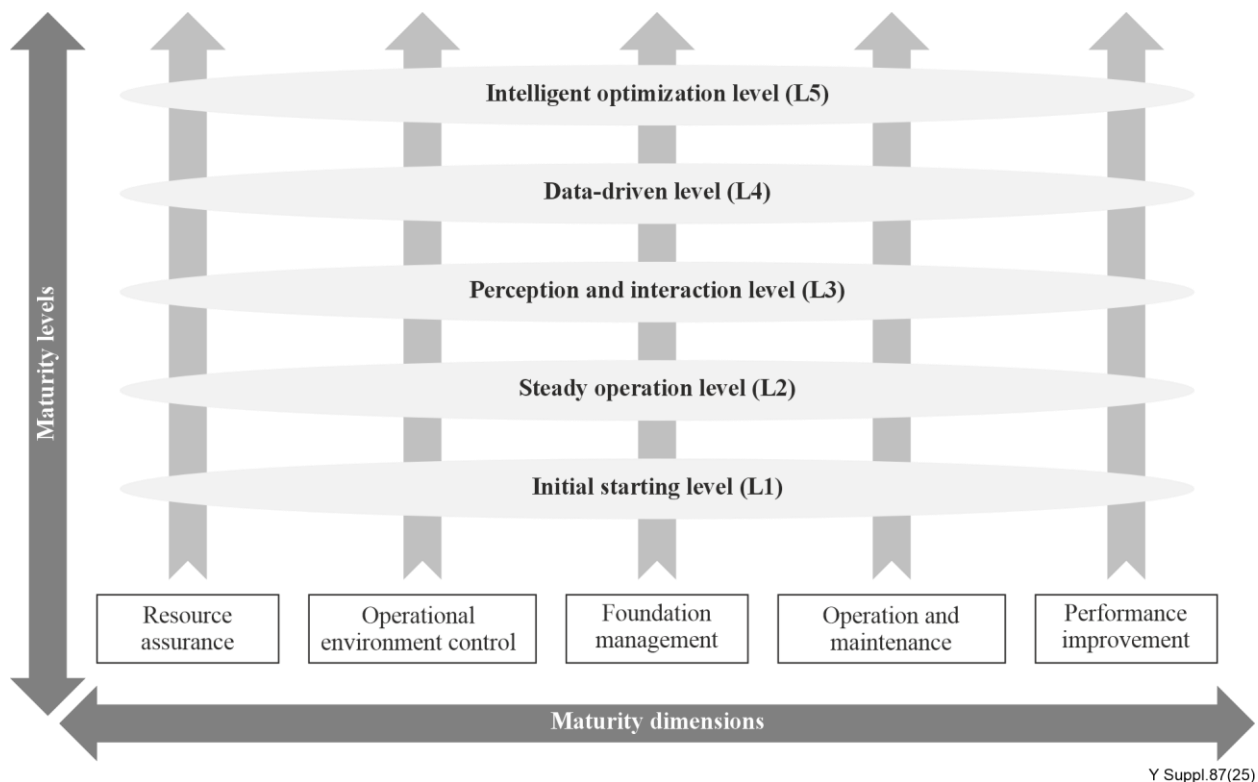


Figure 1 – Framework for the maturity model of the digital management capability of industrial equipment for SSC

Industrial equipment refers to machines and devices that are used in the manufacturing activities of the digital supply chain in SSC and have the functions of processing, measurement, power, transmission, storage, transportation, information transmission, energy transfer or conversion. In the context of the application of digital technologies, the digital management capability of industrial equipment has a significant impact on the maturity of the digital supply chain. From the perspective of maturity dimensions, the resource assurance, control of operating environment, foundation management, operation and maintenance, and performance improvement of industrial equipment all provide support for the digital supply chain, as shown in Figure 2. Furthermore, from the perspective of maturity levels, the maturity level of the digital supply chain requires that the maturity level of the digital management capability of industrial equipment reaches the corresponding level; otherwise it will not be achieved, as shown in Figure 3.

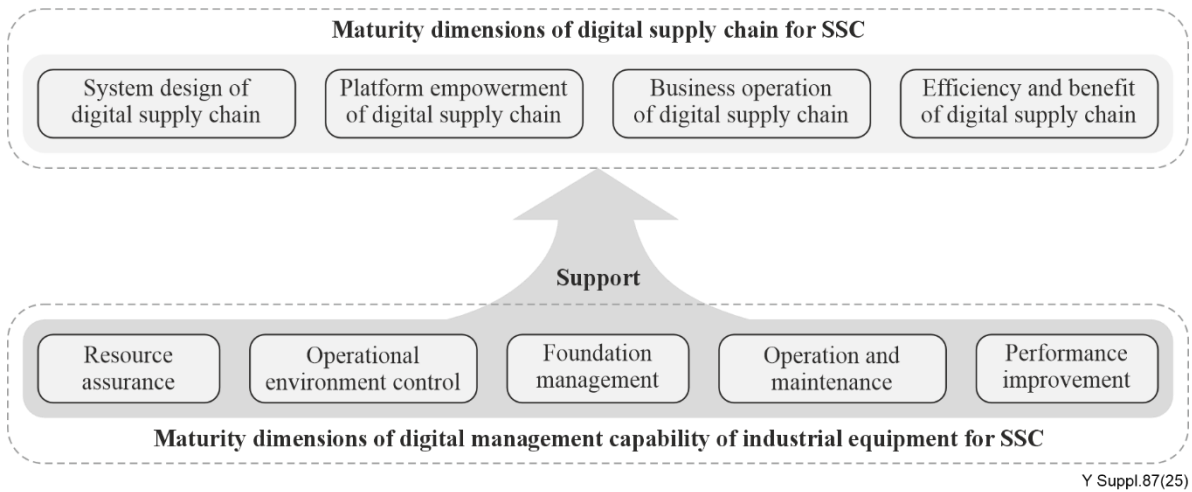


Figure 2 – Relationship between the maturity dimensions of the digital management capability of industrial equipment and the digital supply chain

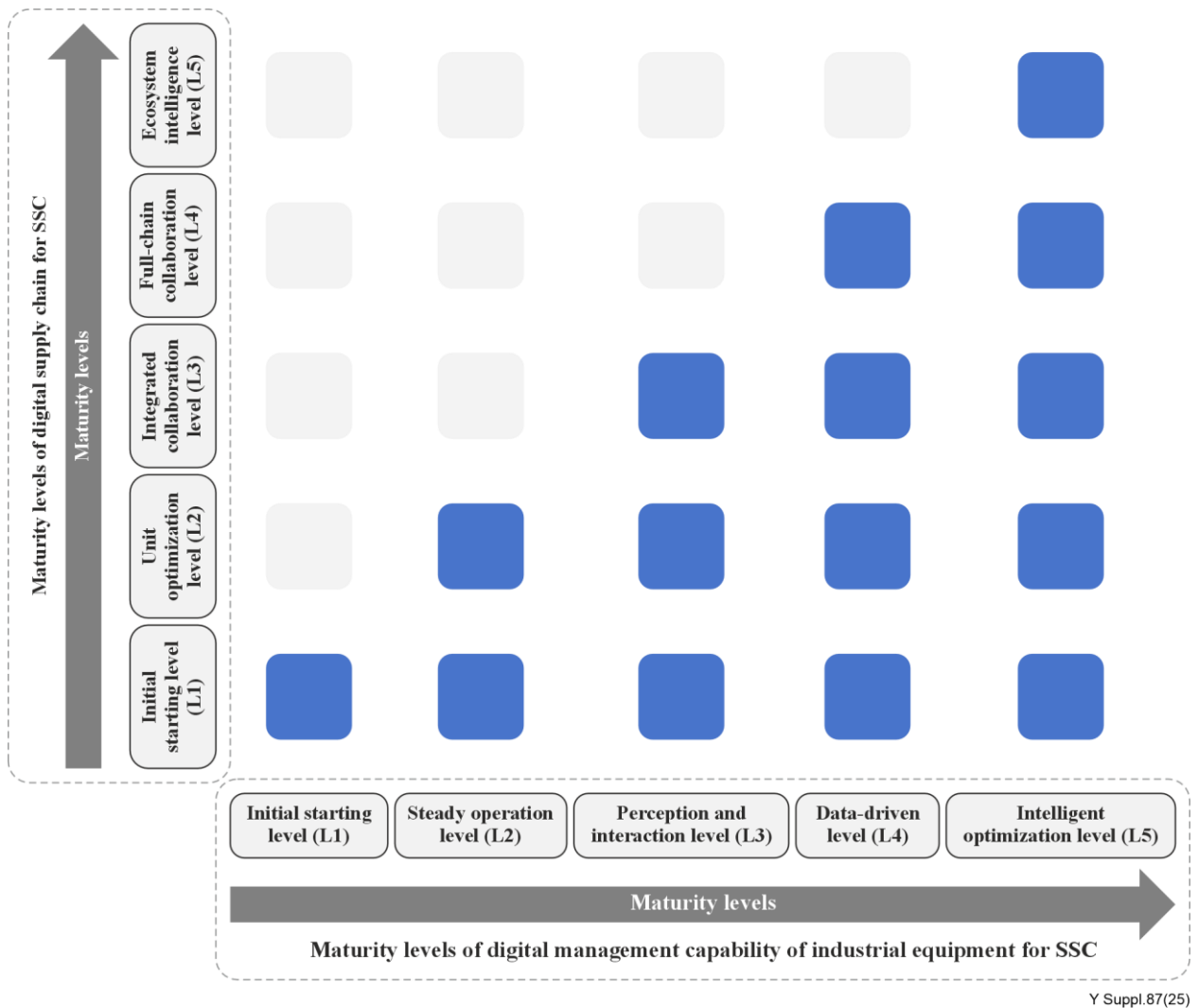


Figure 3 – Relationship between the maturity levels of the digital management capability of industrial equipment and the digital supply chain