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Methodology for building digital capabilities during enterprises' digital transformation

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Supplement 52 to ITU-T Y-series Recommendations

Methodology for building digital capabilities during enterprises' digital transformation

Summary

At present, propelling in-depth use of information and communication technologies (ICTs) and accelerating digital transformation to realize sustainable development have become the necessary choice for enterprises in smart sustainable cities. Many enterprises face problems and challenges to integrate ICT applications into business activities to enhance the digital capability during digital transformation. The methodology described in this Supplement can help enterprises to address these challenges and achieve the following during their digital transformation:

- making full use of ICTs to optimize business processes, improve organizational efficiency and strengthen the utilization of data resources;
- ensuring that ICT applications become consistent and coordinated with enterprises' strategies;
- using ICTs to build digital capabilities can increase the enterprises' economic benefits.

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Introduction

The rapid development of emerging ICTs and their application in industrial processes is accelerating the process of evolution from an industrial society to information society, boosting the rapid development of digital economies, which gradually become the new engine of economic growth. Moreover, this brings new opportunities and challenges for smart sustainable cities (SSCs).

Being major contributors to economic activities, enterprises are indispensable for the development of SSCs. Furthermore, it is a crucial task for SSCs to build and enhance enterprises' digital capabilities continuously in order to accelerate their digital transformation.

In order to build the digital capability based on emerging ICTs, enterprises could consider the businesses' development patterns and characteristics in the context of both industrialization and informatization processes. Enterprises could focus on production, change management and business process optimization brought about by digital capability-building activities.

This Supplement proposes a general methodology for enterprises to build digital capabilities in the context of integration of informatization and industrialization (III), which can be used to guide enterprises to make full use of emerging ICTs, to effectively explore the value of data resources as a driving factor of innovation, business process re-engineering and organizational efficiency. This Supplement can serve as a reference and basis for enterprises to accelerate digital transformation and build digital capabilities so as to achieve coordinated development in the context of building smart sustainable cities.

Supplement 52 to ITU-T Y.4000-series

Methodology for building digital capabilities during enterprises' digital transformation

1 Scope

This Supplement provides a methodology to guide enterprises to adopt digital transformation and build digital capabilities through ICT applications. The Supplement intends to help enterprises to integrate ICT applications into business activities, thus building digital capabilities. Furthermore, this Supplement will provide a methodology for enterprises to build digital capabilities in a systematic manner.

2 References

- [ITU-T X.902] Recommendation ITU-T X.902 | ISO/IEC 10746-2 (2009), *Information technology – Open Distributed Processing – Reference model: Foundations*.
- [ITU-T Y.4900] Recommendation ITU-T Y.4.900/L.1600 (2016), *Overview of key performance indicators in smart sustainable cities*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 city [ITU-T Y.4900]: An urban geographical area with one (or several) local government and planning authorities.

3.1.2 smart sustainable city [ITU-T Y.4900]: A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental, as well as cultural aspects.

3.1.3 data [ITU-T X.902]: Data are the representations of information dealt with by information systems and users thereof.

3.2 Terms defined in this Supplement

This Supplement defines the following terms:

3.2.1 integration of informatization and industrialization: The integration of informatization and industrialization (III) is an interaction, converging and merging process of informatization development course and industrialization development course, and is also the evolution path of transformation from industrial society to information society. Focusing on building new competitiveness in all areas of economy and society, the III emphasizes the interactive innovation and systematic transformation of productivity and production relationship enabled by the in-depth application of emerging ICTs, during which the data resources gradually become a new driven factor.

3.2.2 enterprise digital capability: Enterprise digital capability is the ability to provide goods and services more efficiently through technology innovation and management optimization enabled by application of emerging ICTs, under the rapidly changing market environment in the digital economy era.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

ICTs	Information and Communication Technologies
III	Integration of Informatization and Industrialization
PDCA	Plan-Do-Check-Adjust
SSCs	Smart Sustainable Cities

5 Conventions

None.

6 Core concepts for building digital capability of enterprises

In the context of continuous evolution and deepening of III, and rapid construction of digital economy systems, enterprises in SSCs should value digital transformation and digital capability building from a strategic perspective and establish a set of systematic approaches. This is used to standardize and stimulate advanced applications of emerging ICTs in enterprises' business activities, and enhance the uniformity and coordination of data value exploitation, technology application, business process re-engineering and organizational efficiency. Thus, the enterprises' reformation and innovation of production and service pattern can be accelerated, forming and continuously optimizing their digital capability and coping with the anticipated demand of a digital economy with respect to SSC.

Core concepts for enterprises to build digital capabilities are as follows:

- **Focusing on attaining sustainable competitive advantage:** In order to achieve sustainable development, it is a necessary choice for enterprises to obtain and maintain dynamic competitive advantages through building and enhancing digital capabilities.
- **Data-driven:** In the context of III, data has become a new type of production factor, and its value as enterprises' core asset is gradually being established. In order to build digital capabilities, enterprises should constantly strengthen the utilization of data resources and explore its potential as the driving force of innovation. Enterprises should also promote effective resource allocation and coordination among data, technology, business process and organizational efficiency.
- **Open and collaborative:** The application of emerging ICTs opens up opportunities and innovation potential for enterprises. Enterprises should gradually explore the value network in the digital economy era, so as to build digital capabilities based on the full use of internal and external resources.
- **Process management:** The process of digital capability building is of high complexity and very explorative. Enterprises should adopt the process method to manage digital capability-building activities, thereby ensuring that it is a sustainably and effectively controlled process.

7 General considerations for building digital capability of enterprises

The ultimate goal of promoting digital transformation and continuously building digital capability is facilitating enterprises' strategic transformation in the digital economy era. Therefore, building digital capabilities is a complex system of engineering, covering all the layers and all sorts of enterprises' activities.

Focusing on digital capability building in the digital economy era, enterprises should comprehensively consider three aspects, namely strategy, solution and process management, and

should clarify the considerations for related departments and personnel to collaboratively build digital capability. Considerations are as follows.

7.1 Considerations for strategic management and control

For the strategy aspect, enterprises should follow the rapid change in technologies and the attendant innovation in the digital economy era. This is to dynamically manage and control their strategies, so as to ensure that the strategies can be accurately identified, flexibly adjusted and effectively realized.

Enterprises should take data resource as the driving factor and take competitive advantages attainment as focus, to build digital capabilities, which are the important path and necessary means for strategy realization and continuous improvement. Hence, enterprises should convert their strategies to a series of digital capability-building activities to achieve strategic goals and ensure the uniformity and coordination between digital capability building and strategy.

7.2 Considerations for systematic solution

For the solution aspect, the realization of enterprises' digital capability is the result of combined action of data value exploitation, innovative application of emerging ICTs, business process re-engineering and organizational change, by taking data resources as the core driving factor. Therefore, for digital capability building, enterprises should develop systematic solutions covering multiple aspects including data, technology, business process and organizational efficiency, and during digital capability building, enterprises should ensure mutually matching and collaborative optimization of data value exploitation, technologies' innovative application, business process re-engineering and organizational efficiency.

7.3 Considerations for closed-loop control of digital capability-building process

For the process management aspect, based on "plan–do–check–adjust" (PDCA) approach, enterprises should construct closed-loop control and a continuous improvement mechanism for digital capability building, conduct whole-process closed-loop control over all activities of the digital capability-building life cycle, and to fully engage leaders and related personnel at all levels, conduct overall management of various resources input, and ensure the effective implementation and continuous improvement of digital capability building.

8 The methodology for building digital capability of enterprises

Based on the core concepts in clause 6 and the general considerations in clause 7, this clause further specifies the framework and methodology for building digital capability of enterprises (illustrated in Figure 1).

The methodology for building digital capability of enterprises mainly includes three parts, namely; strategic management and control method, systematic solution implementation method, closed-loop management and control method of the capability-building process.

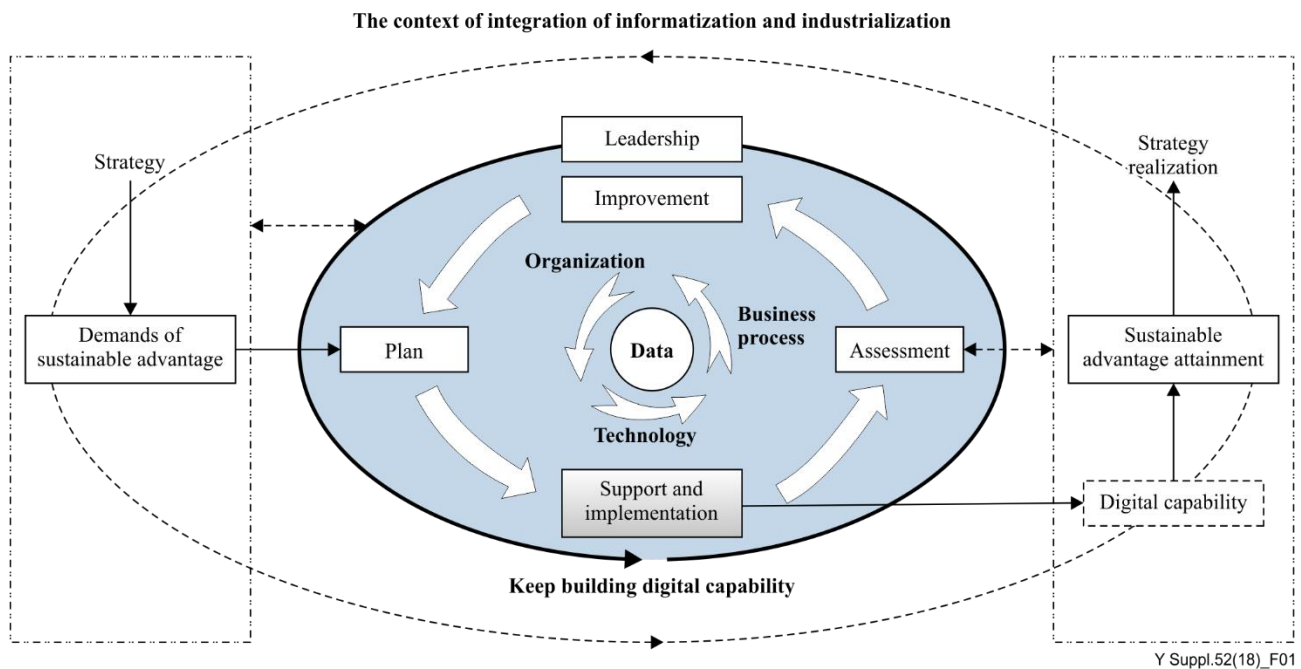


Figure 1 – The framework for building digital capability of enterprises¹

8.1 Realization method of strategic management and control

Enterprises can manage and control strategies effectively starting with two aspects; one is to improve the correctness and suitability of the direction of digital capability building, and the other is to enhance the effectiveness of the achievements derived from digital capability building. Specific methods are as follows:

- **Method of accurately identifying demands of digital capability building:** Enterprises should construct a step-by-step identification mechanism of "strategy – competitive advantage demands – digital capability demands", to accurately identify and dynamically optimize the strategy. This could then be followed by the identification of the demands of competitive advantages matched with strategy based on market benchmarking, and further identify the demands and goals of digital capability building centred on the demands of competitive advantages. This will ensure the correctness and suitability of the direction of digital capability building.
- **Method of enhancing the effectiveness of digital capability-building achievements:** Enterprises should construct a step-by-step confirmation mechanism of "fulfilment of digital capability goals – attainment of competitive advantage - realization of strategy", which can be used to successively confirm the accomplishment of digital capability goals, the attainment of competitive advantage and the realization degree of strategy. At the same time, enterprises should identify their corresponding improvement opportunities. This mechanism will ensure that the achievements of digital capability building are as expected.

8.2 Implementation method of systematic solution

The effective implementation of a digital capability building's systematic solution relies on the efficient and coordinated conduct of data development and utilization, technologies' innovative application, business process re-engineering and organizational change. Specific methods are as follows.

¹ Figure 1 is derived from Figure 1 of [b-GB/T23000-2017], which is a national standard of the People's Republic of China, named Integration of informatization and industrialization management systems—Fundamentals and vocabulary.

- **Method of data development and utilization management:** Enterprises should establish a long-term mechanism for data development and utilization, define the persons responsible, timing, methods, etc. of data development and utilization, promote the effective collection, analysis and mining of data resources, as well as ensure that data development and utilization can be matched and coordinated with the innovative application of emerging ICTs, business process re-engineering and organizational efficiency optimization.
- **Method of technologies' innovative application management:** Enterprises should establish a long-term mechanism for the application of emerging ICTs by reasonably scheduling the persons responsible timing, contents, etc. of the application of technologies. Enterprises should also effectively control technologies' application risks, as well as ensure that the application of emerging ICTs can be matched and coordinated with data development and utilization, business process re-engineering and organizational efficiency optimization.
- **Method of business process re-engineering management:** Enterprises should establish a long-term mechanism for business process re-engineering, define the persons responsible, timing, contents, methods, etc. of business process re-engineering, effectively control risks of optimizing business processes, and ensure that the business process re-engineering can be matched and coordinated with data development and utilization, application of emerging ICTs and organizational efficiency optimization.
- **Method of organizational structure optimization:** Enterprises should establish a long-term mechanism for optimization of organization and post setting, define the persons responsible, timing, contents, methods, etc. of organizational efficiency optimization, effectively control risks of optimization of organizational efficiency, and ensure that the setting of organizational structure, department and post can be matched and coordinated with data development and utilization, application of emerging ICTs and business process re-engineering.

8.3 Closed-loop management and control method of capability-building process

Enterprises should achieve closed-loop management and control of capability building through various management means including leadership inspiration, resources input management, and end-to-end control. Specific methods are as follows.

- **Method of leadership inspiration:** In order to inspire leaders at all levels, enterprises should construct an organizational system for digital capability building, covering managers from different layers and different departments. Furthermore, enterprises should identify responsibilities and authorities of related personnel, especially the senior leaders, and establish a coordination and communication mechanism covering all the departments.
- **Method of resources input management:** Enterprises should adopt a resource input mechanism covering capital, talent, physical infrastructure, ICT infrastructure, information resources and information security. In addition, the various resources should be coordinated, so as to ensure the suitability and effectiveness of input resources.
- **Method of end-to-end control:** Enterprises should adopt an end-to-end control mechanism to achieve effective control over the series of related activities including planning, implementation, assessment and improvement in the digital capability-building life cycle.

Bibliography

- [b-GB/T23000-2017] National Standard of the People's Republic of China, GB/T23000-2017, *Integration of informatization and industrialization management systems – Fundamentals and vocabulary*.
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