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Competence of standards professionals —

Part 1:
In companies

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

International Workshop Agreement IWA/30-1 was approved at a workshop hosted by KATS (Korean Agency for Technology and Standards) and KSA (Korean Standards Association), held in Jeju, Korea, in May 2019.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Competence development and education for people performing a job or tasks related to standardization activities is naturally one of the key interests of national standards bodies, standards-developing organizations and industries involved in standardization activities, as well as for education providers such as universities, professional associations and consultancy firms. Effective competence development should be based on the competence requirements of these companies and standards-developing organizations.

This rationale is why efforts have been made to develop knowledge or skill sets and qualification programmes for standards professionals at the international, regional and national levels. At the international level, ISO created a task force team under the Technical Management Board (TMB) to develop capability requirements for chairs, secretaries and project editors. At the regional level, relevant projects and activities have been carried out with published results, such as APEC's Education Guideline 5[25] and a research project undertaken by the European Commission (EC). At the national or organizational level, several countries or organizations have already tried to define a knowledge system, required skill sets and a qualification programme for standards professionals, including China, Japan, Korea and the United States.

These efforts have presented a need for competence requirements for standards professionals. To deliver objectivity in this document, a global survey was carried out to identify the common and specific competences required and then recommended for standards professionals in companies and standards-related organizations. This document is based on APEC's Education Guideline 6[26], the responses to the global survey and an analysis of the responses. It presents the tasks and the related competences for standards professionals in two separate parts: in companies (this document) and in standards-related organizations (ISO/IWA 30-2).

This document includes the following topics:

— the structure of tasks and sub-tasks of standards professionals in companies;

— the common competences for standards professionals in companies;

— the competences by task for standards professionals in companies;

— a career roadmap for standards professionals in companies.

This document does not cover the certification of persons or qualifications for personnel issues. Also, this document in principle does not focus on competence for conformity assessment tasks because this aspect is defined in other existing ISO and IEC documents, e.g. ISO/IEC 17025.

This document is also the result of collecting the practices of different interested parties and common competence requirements. It is a voluntary guidance document intended for global use. This document, in its present or revised form, is intended to serve as a stepping stone for competence development and education programmes for both ISO and its members.

Competence of standards professionals —

Part 1:
In companies

1 Scope

This document specifies the competence, consisting of knowledge, skills and attributes, needed to perform the tasks of standards professionals.

This document is applicable to all personnel involved in some aspect of standardization in companies.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
attribute
inherent characteristic of a person

EXAMPLE   Visual acuity; sensitivity to others; openness.

[SOURCE: ISO/IEC TS 17027:2014, 2.10]

3.2
competence
ability to apply *knowledge* (3.3), *skills* (3.5) and *attributes* (3.1) to achieve intended results

Note 1 to entry: "Competence" can also be referred to as "competency".

[SOURCE: ISO 9000:2015, 3.10.4, modified — "attributes" and Note 1 to entry have been added.]

3.3
knowledge
facts, information, truths, principles or understanding acquired through experience or education

[SOURCE: ISO/IEC TS 17027:2014, 2.56]

3.4
responsibility
obligation to act and take decisions to achieve required outcomes

[SOURCE: ISO/IEC 38500:2015, 2.22]

3.5
skill
ability acquired through education, training, experience or other means to perform a *task* (3.8) or an activity with a specific intended outcome

[SOURCE: ISO/IEC TS 17027:2014, 2.74, modified — The wording in the definition has been reordered.]

3.6
standards professional
person who has the *competence* (3.2) to perform a job or *tasks* (3.8) related to standardization activities in a company or an organization performing standardization activities

3.7
standards-related organization
organization that carries out standardization activities such as planning and evaluation, development, adoption, publication and/or dissemination of standards

Note 1 to entry: A standards-related organization is defined as a broader term than a standards-developing organization. Standards-related organizations include organizations involved in any part of the life cycle of standards, including planning, developing, publishing, disseminating, applying and evaluating. They include industry, national, regional and international organizations, both governmental and non-governmental organizations, and both formal and less formal organizations including consortia or fora.

Note 2 to entry: Some of the primary activities and staff of standards-related organizations are related to standards, but other activities of standards-related organizations may apply. The number of staff involved in standards in regulatory agencies or trade associations is limited, but their *tasks* (3.8) are described in this document. In that context, standards-related organizations may include governmental agencies and non-governmental organizations that have and undertake any standards-related function or division.

3.8
task
set of activities undertaken in order to achieve a specific goal

Note 1 to entry: These activities can be physical, perceptual and/or cognitive.

Note 2 to entry: While goals are independent of the means used to achieve them, tasks describe particular means of achieving goals.

[SOURCE: ISO 9241-11:2018, 3.1.11]

3.9
company standard
standard that is adopted by a company and made available within the company

Note 1 to entry: Company standard can be established in a subdivision of a company, e.g. an individual factory, workshop or office.

4   Tasks and competences

4.1   Tasks

The tasks of standards professionals in companies generally include, but are not limited to, five tasks that can be repeated or expanded throughout planning, developing and applying the standards.

The five tasks of standards professionals in companies are:

a)   T1: Standardization planning and evaluation;

b)   T2: Standards development in companies;

c)   T3: Standards development in external standardization organizations;

d) T4: Applying company standards;

e) T5: Applying standards developed by external standardization organizations.

NOTE   T# represents a specific task.

Standardization in companies may include, but is not limited to, five tasks based on the feedback process of ISO Management System Standards: Plan-Do-Check-Act (PDCA).

In conducting standardization tasks in companies, standards professionals should meet the expectations of research and development (R&D), product development, procurement, manufacturing and other divisions.

Standardization tasks in companies may involve the company standards themselves and/or additionally certain external standards, such as domestic, national, regional and international standards.

NOTE   The tasks of standards professionals in companies can vary depending on what they perform in their standardization activities.

To perform the tasks of standards professionals successfully, these professionals need a certain competence. Competence can be defined as knowledge, skills and attributes, as shown in Figure 1.
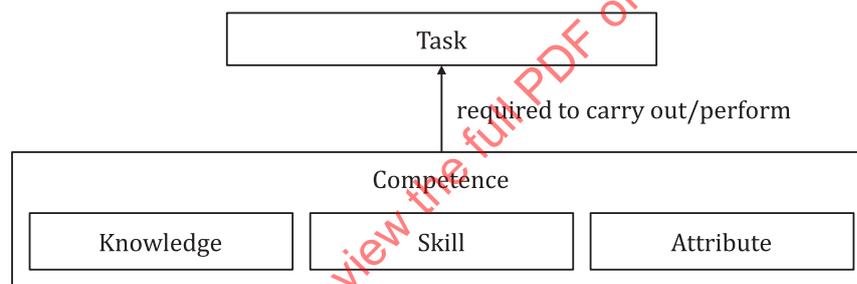
Figure 1 — Relationship between task and competence

4.2   Knowledge

The 18 recommended types of knowledge for standards professionals in companies are:

a)   K1: Technical knowledge in a specified sector;

b)   K2: Knowledge of existing standards/technical regulations in a specified sector;

c)   K3: Knowledge of the company standardization principles;

d)   K4: Knowledge of methodologies/methods for strategy development;

e)   K5: Knowledge of methodologies for performance management;

f)   K6: Knowledge of methods for standard/technology analysis and needs analysis;

g)   K7: Knowledge of the process and methods to establish a standardization plan(s);

h)   K8: Knowledge of the company standardization system;

i)   K9: Knowledge of the drafting rules for company standards;

j)   K10: Knowledge of the process and procedure for standards development;

k)   K11: Knowledge of international standardization activities and related organizations;

l) K12: Knowledge of the process and methods for an impact analysis of standards application;

m) K13: Knowledge of the validation methods for company standards;

n) K14: Knowledge of external standards related to products and technology;

o) K15: Knowledge of the requirements and process for certification;

p) K16: Knowledge of statistical methods;

q) K17: Knowledge of conformity assessment (testing, inspection, certification);

r) K18: Knowledge of metrology (legal metrology, industrial metrology, scientific metrology).

NOTE   K# represents a specific type of knowledge.

4.3   Skills

The 16 recommended skills for standards professionals in companies are:

a) S1: Ability to establish a standardization strategy aligned with the company strategy;

b) S2: Ability to conduct performance measurement and analysis for standardization;

c) S3: Ability to determine whether a standard(s) needs to be newly established or revised;

d) S4: Ability to identify standards needs from a standardization environment analysis;

e) S5: Ability to develop technical/engineering standards;

f) S6: Ability to develop Management System Standards;

g) S7: Ability to check on the justification of standards;

h) S8: Ability to measure the effectiveness and/or efficiency of standards;

i) S9: Ability to derive agreement on proposed standards;

j) S10: Ability to undertake an impact analysis for company standards;

k) S11: Ability to teach and explain company standards;

l) S12: Ability to search and purchase external standards;

m) S13: Ability to prepare and respond to a certification audit;

n) S14: Ability to take action for a performance assessment;

o) S15: Ability to take action for a nonconformity;

p) S16: Language and communication skills.

NOTE   S# represents a specific skill.

4.4   Attributes

The 20 recommended attributes for standards professionals in companies are:

a) A1: Accurate/precise/meticulous;

b) A2: Adaptable/adjustable/flexible/versatile;

c) A3: Analytical/logical/systematic;

d) A4: Attentive/good listener;

e) A5: Collaborative/cooperative/synergic;

f) A6: Courteous/well-mannered/polite/respectful;

g) A7: Culturally broad-minded/non-discriminatory/unprejudiced;

h) A8: Decisive (able to reach timely conclusions);

i) A9: Diplomatic;

j) A10: Friendly/outgoing;

k) A11: Globally minded (able to work with people worldwide);

l) A12: Intellectual/fast learner;

m) A13: Observant/eagle-eyed;

n) A14: Open-minded;

o) A15: Patient/uncomplaining/tolerant;

p) A16: Perceptive/insightful/incisive;

q) A17: Responsible/accountable;

r) A18: Results-oriented/willing to improve and/or learn;

s) A19: Self-reliant/self-directed;

t) A20: Strong-willed/persistent.

NOTE   A# represents a specific attribute.

5 Competence of standards professionals

5.1 General

Standards professionals should have the competence to conduct and support standardization activities at the company level based on their profile or assigned tasks so as to achieve the objectives of their company.

They do not have to be technical experts about the company's products, services and processes, but they should have sufficient knowledge about these areas to understand how these can benefit from standards and standardization, and to carry out the applicable standardization tasks.

The competence of standards professionals can be defined as adeptly using required or recommended technical and non-technical knowledge, managerial and operational skills, and personal attributes including behaviours and attitudes.

5.2 Common competences

5.2.1 Common knowledge

The common knowledge recommended for standards professionals in companies is defined in Table 1.

Table 1 — Common knowledge recommended for standards professionals

Knowledge	Description
K1: Technical knowledge in a specified sector	Standards professionals should have basic technical and/or professional knowledge of a specific industry or a related field, at a level sufficient to understand the added value of standards and standardization, and to be able to carry out the applicable standardization tasks.
K2: Knowledge of existing standards/technical regulations in a specified sector	Standards professionals should have knowledge of relevant existing standards and/or technical regulations in a specified sector. NOTE International Standards can be searched for using ISO's Online browsing platform[31].
K3: Knowledge of the company standardization principles	Standards professionals should understand the principles and how to develop and apply company standards appropriately to the whole process of developing and manufacturing products and services. For the terms and definitions of standardization, see ISO/IEC Guide 2. EXAMPLE Company standardization principles include: — alignment with the corporate strategy; — fitness for purpose; — coherence/uniformity/consistency; — compatibility/interchangeability/interoperability; — expression of the particular state of the art; — compliance with technical regulations, etc. NOTE 1 Company standardization can involve engineering standards, production standards, administrative and financial norms, codes of practice for manufacturing and maintenance, and codes for conducting activities such as market surveys and cost estimates. NOTE 2 For additional information on company standardization, see Reference [42].
K14: Knowledge of external standards related to products and technology	Standards professionals should have good knowledge of external standards related to products and technology. EXAMPLE External standards include: — International Standards (e.g. ISO, IEC); — regional standards (e.g. EN); — national standards; — industrial standards (association standards); — forum/consortium standards.

5.2.2   Common skills

The common skills recommended for standards professionals in companies are defined in Table 2.

Table 2 — Common skills recommended for standards professionals

Skills	Description
S3: Ability to determine whether a standard(s) needs to be newly established or revised	Standards professionals should be able to analyse technological and environmental changes in industry and take appropriate decisions about whether it is necessary to develop and revise a standard(s) based on knowledge of relevant existing standards and/or technical regulations in a specified sector.

Table 2 *(continued)*

Skills	Description
S1: Ability to establish a standardization strategy aligned with the company strategy	Standards professionals should be able to understand the company strategy and business environment and establish a standardization strategy in such a way as to strengthen the national and global competitiveness of the company.
	Standards professionals should be able to write a standardization strategy for the company and to add standardization elements to the overall company strategy.
	Standards professionals should be able to communicate the strategic relevance of standardization in a convincing way.
S5: Ability to develop technical/ engineering standards	Standards professionals should be able to develop a standard by applying relevant rules for the structure and drafting of standards according to the internal procedure.
	EXAMPLE Technical/engineering standards in companies include product standards, service standards, process standards, testing standards and inspection standards.
	NOTE The company establishes and maintains one or more procedures or standards to specify the company standardization system in general (e.g. procedure for standardization, standard for standards).
S2: Ability to conduct performance measurement and analysis for standardization	Standards professionals should be able to measure and analyse the performance of standards development and application.

5.2.3   Common attributes

The common attributes recommended for standards professionals in companies are defined in Table 3.

Table 3 — Common attributes recommended for standards professionals

Attributes	Description
A5: Collaborative/cooperative/ synergic	Standards professionals should be able to facilitate cooperation among interested parties to reach consensus, which is an essential procedural principle and the necessary condition for the development of standards.
A1: Accurate/precise/ meticulous	Standards professionals should be able to manage a whole process for standards development from preparation to completion according to agreed target dates in accordance with the development plan.
A3: Analytical/logical/ systematic	Standards professionals should have extensive analytical ability and talent for a logical and systematic approach to integrating technical and non-technical knowledge into drafted standards that will be both accepted and widely used.
A2: Adaptable/adjustable/ flexible/versatile	Standards professionals should have good flexibility and ongoing adaptability to adjust and work with people from different cultural and technical backgrounds both inside and outside of a company.

5.3   Competence for T1: "Standardization planning and evaluation"

5.3.1   Description of T1

T1: "Standardization planning and evaluation" may include, but is not limited to, the following sub-tasks or processes:

a)   T1-1: Set and implement a medium- to long-term standardization strategic plan to align with and support the company strategy;

b)   T1-2: Develop and implement an action plan(s) based on medium- to long-term strategies;

c) T1-3: Conduct an environment scan and determine the context for standardization;

d) T1-4: Review and evaluate the standardization strategic plan in line with the current company strategy to provide new opportunities or mitigate risks.

NOTE   T#-# represents a specific sub-task. Subtask codes are used in the career roadmap given in Annex C.

The competence required or recommended for T1: "Standardization planning and evaluation" can be defined using knowledge (see 5.3.2), skills (see 5.3.3) and attributes (see 5.3.4).

5.3.2   Knowledge for T1

The knowledge recommended for T1 "Standardization planning and evaluation" is defined in Table 4.

Table 4 — Knowledge recommended for T1

Knowledge	Description
K10: Knowledge of the process and procedure for standards development	Standards professionals should have a basic understanding of the rules and procedures associated with standards development, and be able to provide appropriate advice. EXAMPLE Standards professionals developing standards with ISO and IEC are able to apply the ISO/IEC Directives[33][34][35][36][37].
K6: Knowledge of methods for standard/technology analysis and needs analysis	Standards professionals should have knowledge of the various methods for standards and how to conduct technology and related needs analysis.
K4: Knowledge of methodologies/methods for strategy development	Standards professionals should have a basic understanding of strategic management and basic knowledge about the benefits and costs of standardization. Standards professionals should understand how standardization can contribute to business and society and have knowledge about how to integrate standardization into other managerial areas such as product and service portfolio management, marketing management, production management, purchase management, human resources management, quality management, environmental management, and occupational health and safety management. Standards professionals should have a basic understanding of the methodologies/methods associated with the strategy development process and be able to provide appropriate advice. NOTE For methodologies/methods for the development of a strategy and roadmap for standardization, the following techniques can be used: — environmental analysis (context analysis); — PEST analysis; — SWOT analysis; — risk assessment, etc.
K7: Knowledge of the process and methods to establish a standardization plan(s)	Standards professionals should have basic knowledge of the process and methods to establish a standardization plan(s) based on the company standardization strategies.
K17: Knowledge of conformity assessment (testing, inspection, certification)	Standards professionals should have good knowledge of testing, inspection, certification (products, management systems, persons) and accreditation. For the definition of the term "conformity assessment", see ISO/IEC 17000.

5.3.3   Skills for T1

The skills recommended for T1: "Standardization planning and evaluation" are defined in Table 5.

Table 5 — Skills recommended for T1

Skills	Description
S8: Ability to measure the effectiveness and/or efficiency of standards	Standards professionals should be able to measure whether the standards can achieve the planned results and how many resources are needed to get the results.
S6: Ability to develop Management System Standards	Standards professionals should be able to develop and revise Management System Standards in companies, e.g. ISO 9001, ISO 14001 and ISO 45001. For the terms and definitions of a quality management system, see ISO 9000. NOTE 1 For additional information on the use of Management System Standards, see Reference [38]. NOTE 2 For additional information on the development of a quality manual, documented procedures and work instructions, see ISO/TR 10013. NOTE 3 For additional information on development of quality plans, see ISO 10005.
S11: Ability to teach and explain company standards	Standards professionals should be able to teach or explain how to develop and apply company standards effectively.
S9: Ability to derive agreement on proposed standards	Standards professionals should be able to derive agreement on proposed standards in a strategic and diplomatic manner.
S16: Language and communication skills	Standards professionals should be able to communicate in the official language(s) for standardization to promote standards development. NOTE Language skills in the national language(s) and/or English are essential. In international standardization, additional language skills are beneficial. For example, the official languages of ISO and IEC are English, French and Russian, but meetings are conducted in English by default in accordance with the ISO/IEC Directives Part 1: 2019, 4.3[33][34][35][36]. Language skills are needed to support clear communication and to ensure that standards written in the national language or English can be translated into other languages in an unambiguous way.
S4: Ability to identify standards needs from a standardization environment analysis	Standards professionals should be able to identify and prioritize the need to develop or revise standards based on an analysis of technical and environmental changes.

5.3.4   Attributes for T1

The attributes recommended for T1: "Standardization planning and evaluation" are defined in Table 6.

Table 6 — Knowledge recommended for T1

Attributes	Description
A11: Globally minded (able to work with people worldwide)	Standards professionals should be able to understand and respect the political, social and cultural environments of others to ensure that the views of all are heard and understood.
A8: Decisive (able to reach timely conclusions)	Standards professionals should be able to reach timely conclusions and provide decisive guidance during the process of standards development even in situations of conflict.
A18: Results-oriented/willing to improve and/or learn	Standards professionals should be results-oriented and willing to improve the effectiveness of the standards development process.
A4: Attentive/good listener	Standards professionals should be able to pay close attention to issues in an acceptable manner.
A17: Responsible/accountable	Standards professionals should be able to take responsibility for the overall management of standards development, including providing advice on the process, meeting preparation and networking.

5.4   Competence for T2: "Standards development in companies"

5.4.1   Description of T2

T2: "Standards development in companies" may include, but is not limited to, the following sub-tasks or processes:

a)   T2-1: Develop a work plan for company standards;

b)   T2-2: Amend/modify the existing standards in accordance with company guidelines;

c)   T2-3: Draft new standards for new products and new technology in accordance with company guidelines;

d)   T2-4: Review, verify and validate the draft of company standards;

e)   T2-5: Manage and operate the company standards development process;

f)   T2-6: Audit and evaluate the implementation and use of (external and company) standards.

The competence required or recommended for T2: "Standards development in companies" can be defined using knowledge (see 5.4.2), skills (see 5.4.3) and attributes (see 5.4.4).

5.4.2   Knowledge for T2

The knowledge recommended for T2: "Standards development in companies" is defined in Table 7.

Table 7 — Knowledge recommended for T2

Knowledge	Description
K7: Knowledge of the process and methods to establish a standardization plan(s)	See the description of K7 in 5.3.2 (Knowledge for T1).
K10: Knowledge of the process and procedure for standards development	See the description of K10 in 5.3.2 (Knowledge for T1).
K11: Knowledge of international standardization activities and related organizations	Standards professionals should have a broad range of practical knowledge for how International Standards are proposed, developed, voted on and published.
K9: Knowledge of the drafting rules for company standards	Standards professionals should have substantial knowledge of principles and rules for the type, structure and drafting of company standards.
K4: Knowledge of methodologies/methods for strategy development	See the description of K4 in 5.3.2 (Knowledge for T1).
K16: Knowledge of statistical methods	Standards professionals should have knowledge of statistical methods/techniques that can be applied extensively in the field of standardization. NOTE For additional information on statistical methods/techniques related to standardization, see ISO/TR 18532.

5.4.3 Skills for T2

The skills recommended for T2: "Standards development in companies" are defined in Table 8.

Table 8 — Skills recommended for T2

Skills	Description
S6: Ability to develop Management System Standards	See the description of S6 in 5.3.3 (Skills for T1).
S9: Ability to derive agreement on proposed standards	See the description of S9 in 5.3.3 (Skills for T1).
S4: Ability to identify standards needs from a standardization environment analysis	See the description of S4 in 5.3.3 (Skills for T1).
S8: Ability to measure the effectiveness and/or efficiency of standards	See the description of S8 in 5.3.3 (Skills for T1).
S7: Ability to check on the justification of standards	Standards professionals should be able to show or prove to be right for the reasonable needs of standards.
S11: Ability to teach and explain company standards	See the description of S11 in 5.3.3 (Skills for T1).

5.4.4 Attributes for T2

The attributes recommended for T2: "Standards development in companies" are defined in Table 9.

Table 9 — Attributes recommended for T2

Attributes	Description
A11: Globally minded (able to work with people worldwide)	See the description of A11 in 5.3.4 (Attributes for T1).
A17: Responsible/accountable	See the description of A17 in 5.3.4 (Attributes for T1).
A4: Attentive/good listener	See the description of A4 in 5.3.4 (Attributes for T1).
A8: Decisive (able to reach timely conclusions)	See the description of A8 in 5.3.4 (Attributes for T1).
A9: Diplomatic	Standards professionals should be able to manage and operate inter-divisions or international relations by considering different needs and objectives.

5.5 Competence for T3: "Standards development in external standardization organizations"

5.5.1 Description of T3

T3: "Standards development in external standardization organizations" may include, but is not limited to, the following sub-tasks or processes:

a) T3-1: (National/domestic) Participate in standards development committees;

b) T3-2: (National/domestic) Provide inputs to standards development;

c) T3-3: (International/foreign) Participate in standards development committees;

d) T3-4: (International/foreign) Provide inputs to standards development.

The competence required or recommended for T3: "Standards development in external standardization organizations" can be defined using knowledge (see 5.5.2), skills (see 5.5.3) and attributes (see 5.5.4).

5.5.2 Knowledge for T3

The knowledge recommended for T3: "Standards development in external standardization organizations" is defined in Table 10.

Table 10 — Knowledge recommended for T3

Knowledge	Description
K10: Knowledge of the process and procedure for standards development	See the description of K10 in 5.3.2 (Knowledge for T1).
K11: Knowledge of international standardization activities and related organizations	See the description of K11 in 5.4.2 (Knowledge for T2).
K7: Knowledge of the process and methods to establish a standardization plan(s)	See the description of K7 in 5.3.2 (Knowledge for T1).
K4: Knowledge of methodologies/methods for strategy development	See the description of K4 in 5.3.2 (Knowledge for T1).
K6: Knowledge of methods for standard/technology analysis and needs analysis	See the description of K6 in 5.3.2 (Knowledge for T1).
K18: Knowledge of metrology (legal metrology, industrial metrology, scientific metrology)	Standards professionals should have basic understanding of metrology (e.g. quantities and units) referencing measurements. For explanations and examples of quantities and units, see Reference [37]. For the terms and definitions of metrology, see ISO/IEC Guide 99.

5.5.3 Skills for T3

The skills recommended for T3: "Standards development in external standardization organizations" are defined in Table 11.

Table 11 — Skills recommended for T3

Skills	Description
S16: Language and communication skills	See the description of S16 in 5.3.3 (Skills for T1).
S9: Ability to derive agreement on proposed standards	See the description of S9 in 5.3.3 (Skills for T1).
S7: Ability to check on the justification of standards	See the description of S7 in 5.4.3 (Skills for T2).
S6: Ability to develop Management System Standards	See the description of S6 in 5.3.3 (Skills for T1).
S8: Ability to measure the effectiveness and/or efficiency of standards	See the description of S8 in 5.3.3 (Skills for T1).
S4: Ability to identify standards needs from a standardization environment analysis	See the description of S4 in 5.3.3 (Skills for T1).

5.5.4   Attributes for T3

The attributes recommended for T3: "Standards development in external standardization organizations" are defined in Table 12.

Table 12 — Attributes recommended for T3

Attributes	Description
A11: Globally minded (able to work with people worldwide)	See the description of A11 in 5.3.4 (Attributes for T1).
A4: Attentive/good listener	See the description of A4 in 5.3.4 (Attributes for T1).
A14: Open-minded	Standards professionals should be willing to consider new ideas without prejudice.
A18: Results-oriented/willing to improve and/or learn	See the description of A18 in 5.3.4 (Attributes for T1).
A9: Diplomatic	See the description of A9 in 5.4.4 (Attributes for T1).
A6: Courteous/well-mannered/ polite/respectful	Standards professionals should be respectful and courteous when communicating and developing standards with people from all backgrounds.
A10: Friendly/outgoing	Standards professionals should be friendly and socially confident.
A16: Perceptive/insightful/ incisive	Standards professionals should provide thoughtful insights and be good at understanding issues or figuring issues out.

5.6   Competence for T4: "Applying company standards"

5.6.1   Description of T4

T4: "Applying company standards" may include, but is not limited to, the following sub-tasks or processes:

a)   T4-1: Develop plans for standards application and impact analysis;

b)   T4-2: Operate a training programme on how to apply company standards;

c)   T4-3: Disseminate company standards (online, offline);

d)   T4-4: Monitor the application of company standards;

e)   T4-5: Assess or audit conformity with company standards.

The competence required or recommended for T4: "Applying company standards" can be defined using knowledge (see 5.6.2), skills (see 5.6.3) and attributes (see 5.6.4).

5.6.2 Knowledge for T4

The knowledge recommended for T4: "Applying company standards" is defined in <u>Table 13</u>.

Table 13 — Knowledge recommended for T4

Knowledge	Description
K8: Knowledge of the company standardization system	Standards professionals should have substantial knowledge of the company standardization system, including: — the types of standards; — the structure and/or hierarchy of standards; — the processes/procedures of the establishment, revision and withdrawal of standards; — the validation of standards; — the application of standards; — training on standards; — conformity with standards, etc.
K13: Knowledge of the validation methods for company standards	Standards professionals should have knowledge of the methods for the review, verification and/or validation of company standards for products, services, processes and management systems. EXAMPLE 1 Checklist is a simple method for the review of standards. EXAMPLE 2 Compliance audit is a method for the validation of standards. NOTE For additional information on the validation of standards, see Reference [27].
K15: Knowledge of the requirements and process for certification	Standards professionals should have good knowledge of the requirements and process for certification. Standards professionals should have good knowledge of product certification and management system certification. NOTE For additional information on product certification, see ISO/IEC 17067.
K17: Knowledge of conformity assessment (testing, inspection, certification)	See the description of K17 in 5.3.2 (Knowledge for T1).
K5: Knowledge of methodologies for performance management	Standards professionals should have knowledge of the methodologies to measure and manage the performance of planning, monitoring and reviewing an employee's work objectives and overall contributions to the organization. EXAMPLE Performance indicators for standardization activities in a company include: — the number of standards established, revised and/or withdrawn; — the rate of standards' revision; — the rate of standards' application/use; — the rate of standards' conformity, etc.
K12: Knowledge of the process and methods for an impact analysis of standards application	Standards professionals should have knowledge of the process and methods to conduct an impact analysis when applying standards.

5.6.3 Skills for T4

The skills recommended for T4: "Applying company standards" are defined in Table 14.

Table 14 — Skills recommended for T4

Skills	Description
S11: Ability to teach and explain company standards	See the description of S11 in 5.3.3 (Skills for T1).
S8: Ability to measure the effectiveness and/or efficiency of standards	See the description of S8 in 5.3.3 (Skills for T1).
S14: Ability to take action for a performance assessment	Standards professionals should be able to take action on the results of a performance assessment.
S13: Ability to prepare and respond to a certification audit	Standards professionals should be able to prepare for a certification audit and respond to it. NOTE For additional information on audits for management systems, see ISO 19011.
S7: Ability to check on the justification of standards	See the description of S7 in 5.4.3 (Skills for T2).
S10: Ability to undertake an impact analysis for company standards	Standards professionals should be able to analyse the estimated impact of the implementation of new or revised company standards in accordance with internal rules. EXAMPLE Where there is a company standard for a specific material being revised, an analysis will be made to identify or determine the following. — What is the stock of the material? — When will the revision be effective? — Which process needs to be changed? — What needs to be discussed with the supplier?, etc.

5.6.4 Attributes for T4

The attributes recommended for T4: "Applying company standards" are defined in Table 15.

Table 15 — Attributes recommended for T4

Attributes	Description
A17: Responsible/accountable	See the description of A17 in 5.3.4 (Attributes for T1).
A4: Attentive/good listener	See the description of A4 in 5.3.4 (Attributes for T1).
A18: Results-oriented/willing to improve and/or learn	See the description of A18 in 5.3.4 (Attributes for T1).
A8: Decisive (able to reach timely conclusions)	See the description of A8 in 5.3.4 (Attributes for T1).
A14: Open-minded	See the description of A14 in 5.5.4 (Attributes for T3).
A7: Culturally broad-minded/ non-discriminatory/ unprejudiced	Standards professionals should be open and unprejudiced when working with people or groups from different cultures.
A19: Self-reliant/self-directed	Standards professionals should be able to organize themselves.
A20: Strong-willed/persistent	Standards professionals should be able to continue firmly or obstinately on a course of action in spite of difficulty or opposition.

5.7 Competence for T5: "Applying standards developed by external standardization organizations"

5.7.1 Description of T5

T5: "Applying standards developed by external standardization organizations" may include, but is not limited to, the following sub-tasks or processes:

a) T5-1: Identify and analyse the external standards required for the company;

b) T5-2: Incorporate external standards into company standards;

c) T5-3: Identify and meet the requirements of external standards;

d) T5-4: Prepare and acquire certification for products, services and/or management systems.

The competence required or recommended for T5: "Applying standards developed by external standardization organizations" can be defined using knowledge (see 5.7.2), skills (see 5.7.3) and attributes (see 5.7.4).

5.7.2 Knowledge for T5

The knowledge recommended for T5: "Applying standards developed by external standardization organizations" is defined in Table 16.

Table 16 — Knowledge recommended for T5

Knowledge	Description
K15: Knowledge of the requirements and process for certification	See the description of K15 in 5.6.2 (Knowledge for T4).
K17: Knowledge of conformity assessment (testing, inspection, certification)	See the description of K17 in 5.3.2 (Knowledge for T1).
K7: Knowledge of the process and methods to establish a standardization plan(s)	See the description of K7 in 5.3.2 (Knowledge for T1).
K8: Knowledge of the company standardization system	See the description of K8 in 5.6.2 (Knowledge for T4).
K11: Knowledge of international standardization activities and related organizations	See the description of K11 in 5.4.2 (Knowledge for T2).
K12: Knowledge of the process and methods for an impact analysis of standards application	See the description of K12 in 5.6.2 (Knowledge for T4).
K13: Knowledge of the validation methods for company standards	See the description of K13 in 5.6.2 (Knowledge for T4).

5.7.3 Skills for T5

The skills recommended for T5: "Applying standards developed by external standardization organizations" are defined in Table 17.

Table 17 — Skills recommended for T5

Skills	Description
S13: Ability to prepare and respond to a certification audit	See the description of S13 in 5.6.3 (Skills for T4).
S8: Ability to measure the effectiveness and/or efficiency of standards	See the description of S8 in 5.3.3 (Skills for T1).
S7: Ability to check on the justification of standards	See the description of S7 in 5.4.3 (Skills for T2).
S16: Language and communication skills	See the description of S16 in 5.3.3 (Skills for T1).
S15: Ability to take action for a nonconformity	Standards professionals should be able to take action on nonconformity issues raised from an audit.
S12: Ability to search and purchase external standards	Standards professionals should be able to identify, search and acquire standards established by external standards bodies.
	NOTE External standards bodies can be organizations at the international, regional, national or industrial level.

5.7.4 Attributes for T5

The attributes recommended for T5: "Applying standards developed by external standardization organizations" are defined in Table 18.

Table 18 — Attributes recommended for T5

Attributes	Description
A17: Responsible/accountable	See the description of A17 in 5.3.4 (Attributes for T1).
A11: Globally minded (able to work with people worldwide)	See the description of A11 in 5.3.4 (Attributes for T1).
A8: Decisive (able to reach timely conclusions)	See the description of A8 in 5.3.4 (Attributes for T1).
A4: Attentive/good listener	See the description of A4 in 5.3.4 (Attributes for T1).
A14: Open-minded	See the description of A14 in 5.5.4 (Attributes for T3).
A12: Intellectual/fast learner	Standards professionals should be able to engage in critical thinking, research and reflection about society, propose solutions for technical problems and learn things quickly.
A13: Observant/eagle-eyed	Standards professionals should be able to adhere strictly to the rules of standards development and drafting.
A15: Patient/uncomplaining/tolerant	Standards professionals should be able to accept or tolerate delays, problems or suffering without becoming too anxious.

Annex A
(informative)

Survey questionnaire to identify the competence of standards professionals in companies

A.1 General

To identify the competence requirements for standards professionals, KATS and KSA conducted a survey. The first round of the survey was conducted from October to December 2017 on 21 economies in Asia-Pacific Economic Cooperation (APEC) as part of the APEC project "Inspiring Next Generation of Standards Professional Development: Phase 2. Developing Career Path and Career Map"[26]. The second round was conducted from August to October 2018, following the formal approval of this document by the ISO/TMB in May 2018. Of 448 total responses, 408 responses, either fully or partially completed, were analysed and are reflected in this document to an offer objective reasoning of the required or recommended knowledge, skills and attributes for standards professionals.

The survey began with its purpose, terms and definitions followed by detailed questions, which asked about the importance of tasks, responsible divisions and positions of these tasks, and the associated knowledge, skills and attributes per task.

The survey included two types of questions. The survey questions on competence for standards professionals in companies (see Q1 to Q6 in A.2) included five tasks identified in companies, including 18 knowledge, 16 skills and 20 attributes competence. The survey questions on competence for standards professionals in standards-related organizations (see ISO/IWA 30-2:2019, A.2, Q7 to Q16) included nine tasks identified in standards-related organizations, including 20 knowledge, 29 skills and 20 attributes competencies. Questions Q17, Q18 and Q19 (see A.2) are common questions for both types.

NOTE   The term was changed from "standards-speciality organization" to "standards-related organization" at the second ISO/IWA 30 workshop.

A.2 Survey questions on competence for standards professionals in companies

Q1. Which TASKS (see 4.1) are important related to standardization in your company? (Company task 1/5 "Standardization planning and evaluation".)

   Q1.1 Please select the most relevant division/department responsible in your company for company task 1/5 "Standardization planning and evaluation".

   Q1.2 Which sub-tasks are important in company task 1/5 "Standardization planning and evaluation"?

   Q1.3 Which sub-tasks require more experience in company task 1/5 "Standardization planning and evaluation"?

   Q1.4 Which of the types of KNOWLEDGE (see 4.2) are important in company task 1/5 "Standardization planning and evaluation"?

   Q1.5 Which of the SKILLS (see 4.3) are important in company task 1/5 "Standardization planning and evaluation"?

Q1.6 Which of the ATTRIBUTES (see 4.4) are important in company task 1/5 "Standardization planning and evaluation"?

Q2. Which TASKS (see 4.1) are important related to standardization in your company? (Company task 2/5 "Standards development in companies".)

Q2.1 Please select the most relevant division/department responsible in your company for company task 2/5 "Standards development in companies".

Q2.2 Which sub-tasks are important in company task 2/5 "Standards development in companies".

Q2.3 Which sub-tasks require more experience in company task 2/5 "Standards development in companies".

Q2.4 Which of the types of KNOWLEDGE (see 4.2) are important in company task 2/5 "Standards development in companies".

Q2.5 Which of the SKILLS (see 4.3) are important in company task 2/5 "Standards development in companies".

Q2.6 Which of the ATTRIBUTES (see 4.4) are important in company task 2/5 "Standards development in companies".

Q3. Which TASKS (see 4.1) are important related to standardization in your company? (Company task 3/5 "Standards development in external standardization organizations".)

Q3.1 Please select the most relevant division/department responsible in your company for company task 3/5 "Standards development in external standardization organizations".

Q3.2 Which sub-tasks are more important in company task 3/5 "Standards development in external standardization organizations"?

Q3.3 Which sub-tasks require more experience in company task 3/5 "Standards development in external standardization organizations"?

Q3.4 Which of the types of KNOWLEDGE (see 4.2) are important in company task 3/5 "Standards development in external standardization organizations"?

Q3.5 Which of the SKILLS (see 4.3) are important in company task 3/5 "Standards development in external standardization organizations"?

Q3.6 Which of the ATTRIBUTES (see 4.4) are important in company task 3/5 "Standards development in external standardization organizations"?

Q4. Which TASKS (see 4.1) are important related to standardization in your company? (Company task 4/5 "Applying company standards".)

Q4.1 Please select the most relevant division/department responsible in your company for company task 4/5 "Applying company standards".

Q4.2 Which sub-tasks are more important in company task 4/5 "Applying company standards"?

Q4.3 Which sub-tasks require more experience in company task 4/5 "Applying company standards"?

Q4.4 Which of the types of KNOWLEDGE (see 4.2) are important in company task 4/5 "Applying company standards"?

Q4.5 Which of the SKILLS (see 4.3) are important in company task 4/5 "Applying company standards"?

Q4.6 Which of the ATTRIBUTES (see 4.4) are important in company task 4/5 "Applying company standards"?

Q5. Which TASKS (see 4.1) are important related to standardization in your company? (Company task 5/5 "Applying standards developed by external standardization organizations".)

Q5.1 Please select the most relevant division/department responsible in your company for company task 5/5 "Applying standards developed by external standardization organizations".

Q5.2 Which sub-tasks are more important in company task 5/5 "Applying standards developed by external standardization organizations"?

Q5.3 Which sub-tasks require more experience in company task 5/5 "Applying standards developed by external standardization organizations"?

Q5.4 Which of the types of KNOWLEDGE (see 4.2) are important in company task 5/5 "Applying standards developed by external standardization organizations"?

Q5.5 Which of the SKILLS (see 4.3) are important in company task 5/5 "Applying standards developed by external standardization organizations"?

Q5.6 Which of the ATTRIBUTES (see 4.4) are important in company task 5/5 "Applying standards developed by external standardization organizations"?

Q6. In your company, do you think there are any other important tasks and sub-tasks related to standardization?

Q6.1 What is the task related to standardization? Please provide details.

Q6.2 What sub-tasks relate to the task you have written? Please provide details.

Q6.3 Which sub-tasks require more experience in the task?

Q6.4 Which of the types of KNOWLEDGE (see 4.2) are important in the task you have written?

Q6.5 Which of the SKILLS (see 4.3) are important in the task you have written?

Q6.6 Which of the ATTRIBUTES (see 4.4) are important in the task you have written?

Q17. What should be considered or discussed when International Standards for the competence requirements of standards professionals are proposed and developed?

Q18. Please share your ideas or suggestions for the development of career path and competence requirements.

Q19. Respondent ID.

Annex B
(informative)

Summary of ISO/IWA 30 survey results

B.1 Survey results for knowledge

Table B.1 shows the ISO/IWA 30 survey results by rank for knowledge in the five tasks of standards professionals in companies.

Table B.1 — Survey results for knowledge

	Knowledge	T1	T2	T3	T4	T5	Total rank[a]
K2	Knowledge of existing standards/technical regulations in a specified sector[c]	1	1	1	2	1	1[b]
K1	Technical knowledge in a specified sector[c]	2	2	2	1	2	2[b]
K3	Knowledge of the company standardization principles[c]	4	4	6	3	4	3[b]
K14	Knowledge of external standards related to products and technology[c]	9	7	5	9	3	4[b]
K11	Knowledge of international standardization activities and related organizations	10	5[d]	4[d]	7[d]	9[d]	5
K4	Knowledge of methodologies/methods for strategy development	6[d]	7[d]	8[d]	11	7[d]	6
K7	Knowledge of the process and methods to establish a standardization plan(s)	7[d]	3[d]	6[d]	16	7[d]	6
K17	Knowledge of conformity assessment (testing, inspection, certification)	7[d]	10	10	7[d]	6[d]	8
K10	Knowledge of the process and procedure for standards development	3[d]	5[d]	3[d]	18	14	9
K6	Knowledge of methods for standard/technology analysis and needs analysis	4[d]	12	8[d]	14	13	10
K8	Knowledge of the company standardization system	11	10	17	4[d]	9[d]	10
K15	Knowledge of the requirements and process for certification	13	13	19	6[d]	4[d]	12
K9	Knowledge of the drafting rules for company standards	16	7[d]	11	11	14	13
K12	Knowledge of the process and methods for an impact analysis of standards application	12	16	12	11[e]	9[d]	14
K5	Knowledge of methodologies for performance management	13	14	12	9[d]	14	15

[a] The total rank is based on the sum of the ranks of each knowledge for the five tasks.

[b] The four knowledge with highest total rank have been chosen as common competences considering the survey results.

[c] Common knowledge.

[d] Knowledge for a specific task.

[e] Any knowledge that does not have a rank by task from 1 to 9 has been allocated after the experts' review.

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Table B.1 *(continued)*

Knowledge		T1	T2	T3	T4	T5	Total rank[a]
		Rank by task					
K13	Knowledge of the validation methods for company standards	19	15	15	5[d]	9[d]	16
K18	Knowledge of metrology (legal metrology, industrial metrology, scientific metrology)	13	17	12[e]	14	17	17
K16	Knowledge of statistical methods	17	18[e]	15	17	18	18

[a]   The total rank is based on the sum of the ranks of each knowledge for the five tasks.

[b]   The four knowledge with highest total rank have been chosen as common competences considering the survey results.

[c]   Common knowledge.

[d]   Knowledge for a specific task.

[e]   Any knowledge that does not have a rank by task from 1 to 9 has been allocated after the experts' review.

B.2   Survey results for skills

Table B.2 shows the ISO/IWA 30 survey results by rank for skills in the five tasks of standards professionals in companies.

Table B.2 — Survey results for skills

Skills		T1	T2	T3	T4	T5	Total rank[a]
		Rank by task					
S3	Ability to determine whether a standard(s) needs to be newly established or revised[c]	2	3	1	5	1	1[b]
S1	Ability to establish a standardization strategy aligned with the company strategy[c]	1	2	4	3	4	2[b]
S5	Ability to develop technical/engineering standards[c]	2	1	2	7	2	3[b]
S2	Ability to conduct performance measurement and analysis for standardization[c]	7	7	6	2	5	4[b]
S8	Ability to measure the effectiveness and/or efficiency of standards	4[d]	7[d]	9[d]	3[d]	5[d]	5
S6	Ability to develop Management System Standards	5[d]	4[d]	8[d]	11	10	6
S7	Ability to check on the justification of standards	11	7[d]	7[d]	9[d]	5[d]	7
S11	Ability to teach and explain company standards	6[d]	7[d]	11	1[d]	14	7
S9	Ability to derive agreement on proposed standards	7[d]	5[d]	4[d]	13	14	9
S16	Language and communication skills	9[d]	11	3[d]	15	8[d]	10
S13	Ability to prepare and respond to a certification audit	14	13	13	7[d]	2[d]	11
S4	Ability to identify standards needs from a standardization environment analysis	9[d]	6[d]	9[d]	13	14	12
S10	Ability to undertake an impact analysis for company standards	12	12	13	12[e]	11	13
S15	Ability to take action for a nonconformity	13	13	16	10	9[d]	14
S14	Ability to take action for a performance assessment	14	15	15	6[d]	12	15
S12	Ability to search and purchase external standards	16	16	12	16	12[e]	16

[a]   The total rank is based on the sum of the ranks of each skill for the five tasks.

[b]   The four skills with highest total rank have been chosen as common competences considering the survey results.

[c]   Common skill.

[d]   Skill for a specific task.

[e]   Any skill that does not have a rank by task from 1 to 9 has been allocated after the experts' review.