

Skill Standards for IT Professionals, Version 3 2008

Part 1: Overview

English Edition Release 1.0 2010

**IT Skill Standards Center
IT Human Resources Development Headquarters
INFORMATION-TECHNOLOGY PROMOTION AGENCY (IPA), JAPAN**

Ministry of Economy, Trade and Industry

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Preface

“Skill Standards for IT Professionals” (hereafter “ITSS”) was published by the Ministry of Economy, Trade and Industry (METI) in December 2002.

Since then, it has come into widespread use as indices of skills of human resources among companies in the IT service industry.

In order to promote spread and utilization of ITSS, the IT Skill Standards Center (hereafter “ITSS Center”) was established in the INFORMATION TECHNOLOGY PROMOTION AGENCY (IPA) by METI in July 2003. With cooperation of Professional Community, IPA continues to reinforce enrichment of ITSS, training and development, and assessment of IT professionals by utilizing ITSS. A major revision released in April 2006, “ITSS V2”.

The main points of the revisions are listed below.

- Basic Structure Clarification:
Divide into a “Career” part and a “Skills” part.
- Document Content Restructure:
Reference with the directives, such as ISO, and restructure contents.
- Assessment Criteria Clarification:
Redefine KPIs as entry-criteria¹ of each level.
Change descriptive patterns for easy understanding.
Specify a number of successful results to enrich contents.
- Skill Description:
Create a skill dictionary as an at-a-glance table.
- Specialty Fields:
Redefine some specialty fields in IT Architect, Project Management, and Operation.

The ITSS Center carries on to improve ITSS in accordance with change of business situations and technology trends. As irregular version upgrade might hamper convenience for ITSS users, we regularly revise ITSS every year as shown in Figure 1-1.

The ITSS Center flexibly and quickly reflects recommendations from the Professional Community and others for improvement to ITSS. A release cycle of a revision version of ITSS is basically in Octobers, after the ITSS Center compiles its draft revisions proposed by the Professional Community by Marchs, and modifies the draft revisions based on various surveys by Septembers.

¹ The entry-criteria are the minimum and indispensable requisites for each level. The KPIs in ITSS include and define conditions (requirements, a number of successful results, etc.) necessary for assessment.

[Revision cycle]

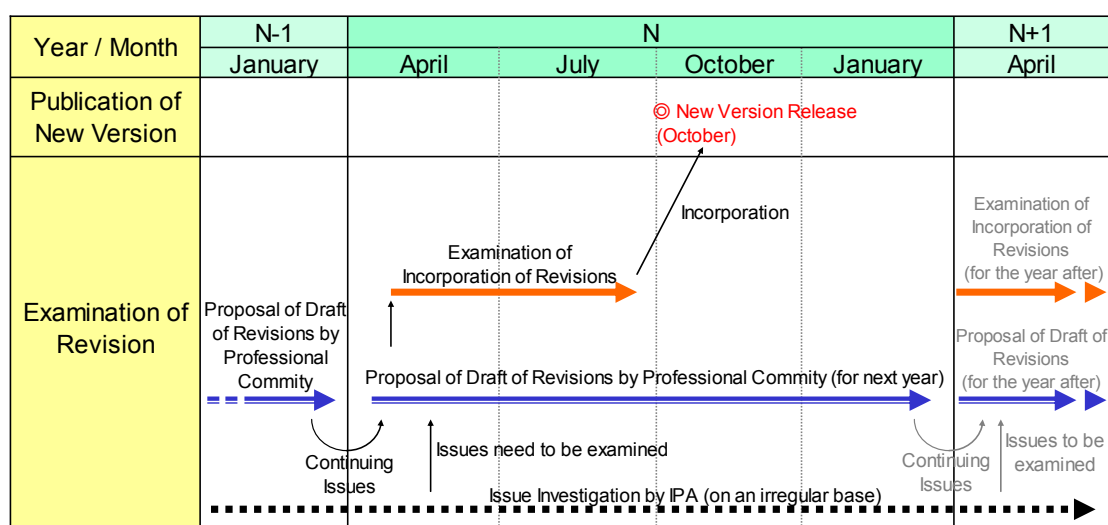


Figure 1-1. Revision Cycle

When major changes are made to ITSS, a new version is released with a version number. When minor changes such as skill or knowledge item changes are made to ITSS, a revised version is released with a version number and a year of its revision.

April 2006

●Revisions in ITSS V2 2006

Changes made to ITSS V2 in this first revision are as follows.

- (1) Change a job category “Operation” to “IT Service Management.”
- (2) The “IT Service Management” has four specialty fields, and there are 36 specialty fields in ITSS in total.

The official name of this revised version is the “Skill Standards for IT Professionals V2 2006.”

October 2006

●Revisions in ITSS V3

“Human Resource Development Working Group” (hereafter “HRD WG”)² was set up by the Information Service and Software Subcommittee in Information Economy Committee of Industrial Structure Council in METI in October 2006. HRD in advanced information technology of future Japan has been discussed. The result was reported in “Human Resource Development in Advanced Information Technology” (hereafter “HRD WG Report”)² in July 20, 2007.

The HRD WG Report proposed to develop the Common Career/Skill

² A report by Human Resource Development Working Group in Information Service and Software Subcommittee in Information Economy Committee of Industrial Structure Council in METI: Development of Human Resource in Advanced Information Technology”(July 20, 2007): <http://www.meti.go.jp/press/20070720006/10070720006.html>

Framework. The Common Career/Skill Framework shows the careers and skills required for advanced information technology.

To develop the objective human resources assessment mechanism compliant with the Common Career/Skill Framework, the Information Technology Engineer Examination (hereafter “ITEE”) will be changed drastically. ITSS³, ETSS⁴ and UISS should be revised to be consistent with the Common Career/Skill Framework. Consequently, a level will be determined by this mechanism.

Of seven levels in the Common Career/Skill Framework, level 1, 2 and 3 are determined by passing ITEE. Level 4 is determined by as such work experience further to pass the exam (Figure 1-2).

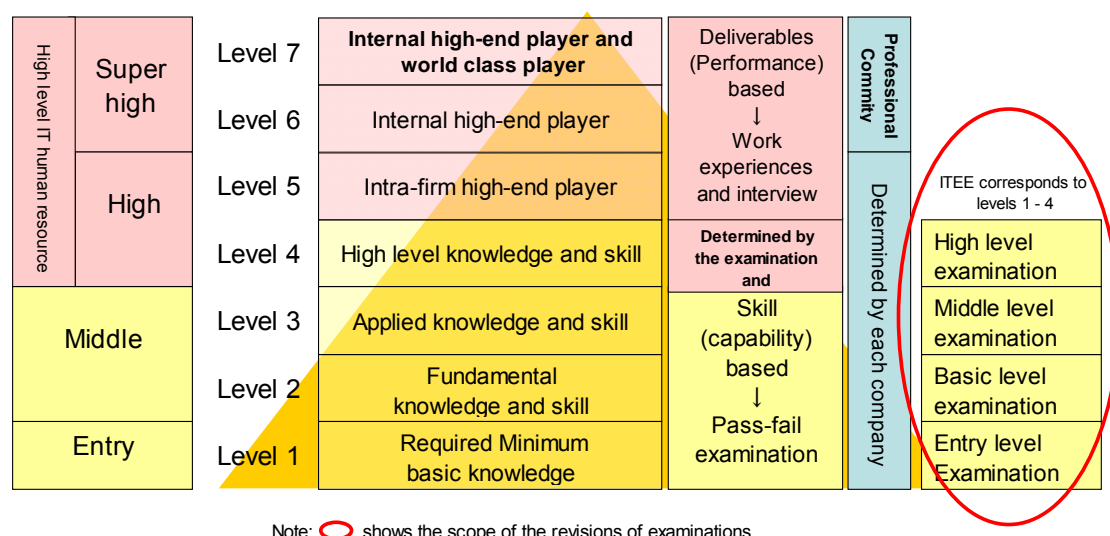


Figure 1-2. Level Determination Based on the Common Career/Skill Framework

According to the HRD WG discussion, ITSS Center has revised ITSS based on the 2006 improvement proposal by Professional Community.

[Highlights in ITSS V3]

- (1) In levels 1 and 2, job categories are integrated into one category for each level.
- (2) Levels 1, 2, and 3 will be determined by passing ITEE.
- (3) Change of specialty fields
Specialty fields in “Consultant,” “IT Specialist,” and “Application Specialist” are redefined based on the 2006 improvement proposal by the Professional Community.

This revision mainly dealt with level 1, 2 and 3. In level 1 and 2, job categories are integrated into one category. Profiles in level 1, 2, and 3 are changed to be consistent with ITEE

Individuals should develop themselves from low levels, to higher levels referring to

³ ETSS: Embedded Technology Skill Standards is the clarification and systematization of skills necessary to develop embedded software, and provide “measures”(common standards) useful for developing and utilizing engineers with embedded software skills.

⁴ UISS: Users’ Information Systems Skill Standards is for the optimum deployment of information system function in business organizations, and for understanding and developing specifically human resources necessary for that.

ITSS. It is important for them to acquire basic skills in their daily duties before learning specialized skills after.

The consistency in levels between ITEE and ITSS made ITEE available as assessment means for level 1, 2 and 3. Consequently, this is the first step to increase transparency and objectivity of the assessment.

March 2008

●Revisions in ITSS V3 2008

The ITSS Center revised part of ITSS to materialize the proposals in the HRD WG Report.

[Highlights in ITSS V3 2008]

1. Achievement of Consistency With the Common Carrer/Skill Framework
Ensure consistency between the Common Carrere/Skill Framework and job categories of ITSS [references from the Common Carrere/Skill Framework].
2. Utilization of ITEE as Measure of Level Assessment (For Level 4)
Characterize clearly ITEE as an assessment tool for ITSS level 4 to provide the objective mechanism of human resource assessment.
3. Revision of “Training Road Map”
Revise a “Training Road Map” to correspond with definitions of job categories of each level 1 and level 2, for ITSS V3 has integrated job categories of each level 1 and level 2 into one job category for each level.

These revisions have made ITEE more flexible as an assessment tool for level 4.

October 2008

●Revision history

| | |
|--------------------------------|-------------------------|
| -1 st April 2006 | First version |
| -31 st October 2006 | Version 2 2006 released |
| -31 st March 2008 | Version 3 released |
| -31 st October 2008 | Version 3 2008 released |

Introduction

(1) Background of ITSS Development

A background of developing ITSS is the fact that human resources (hereafter “HR”) have become recognized as a significant management resource more than ever along with remarkable change of business environment.

Today in the IT industry, there are various types of business opportunities ranging from a single “product” like hardware or software to a “service” such as proposing business strategies or solutions on a request of customers. Giving this factor, quality of the IT industry depends on skills of HR. As a “service” accounted for sales and profits has increased, skill development and skill management of each individual are directly linked with competitiveness of an IT service company.

Various usages of information technology in response to spread of internet technology have diversified and deepened customers’ needs. What costumers demand to information services is systematization that widely covers business sectors by using information technology. This includes streamlining of operation processes based on customers’ business characteristics, sophisticated outsourcing such as Business Process Outsourcing (BPO). IT service companies need to be not merely suppliers of products but to be partners who create business value with their customers.

In such business circumstance, demands for HR with high specialties have been increasing. This has reinforced importance of HRD to improve company competitiveness in a strategic and systematic way.

It is decisive for companies to formulate business strategies that enable them to play to their own strength with foresight of environment changes and future business trends, and to forward HRD and reorganization of internal structure based on business strategies. To do so, it is necessary to take into consideration of environment changes (e.g., technological innovation) and to achieve specific objectives by combining skills appropriately to meet customers’ needs.

The importance of HRD has been recognized very well; however, it was challenging to realize effective HRD. This was because, with some exceptions abroad, there was no practical index available for clarifying necessary skills and procurement policy despite many companies (especially in the IT service industry) needed definite indices.

Meanwhile, environment for individuals related to providing IT services also has changed significantly. Individuals not only need to have values within their companies but also need to have strength in the IT market or industry. With that, it is necessary for individuals to design their career paths at their early career stages and to develop their expertise through work experience. However, in the past, it was impracticable to identify careers and skills that individuals should have pursued and had to acquire. This problem was also caused by a lack of clear and objective skill indices.

We develop ITSS in order to solve these problems related to skill indices. Of course, issues of HR are varied and wide, and it is not enough to overcome HR problems from only perspectives of companies and individuals. It is essential to clarify work value and ethics of a high level IT professional occupation and to promote its social recognition and status. It is also vital to establish supporting structures to transfer IT related expertise and knowledge to successors in order to bring up future experts. To achieve these, it is indispensable to implement well-organized and closely linked measures and policies among industry, academia, and government all together. We strongly hope that this provides further close cooperation among industry, government, and academia.

(2) Overall ITSS Structure

ITSS consists of three parts as shown in Figure 2. The structure of ITSS is designed based on ISO and JIS (Japanese Industrial Standard) form and their description methods.

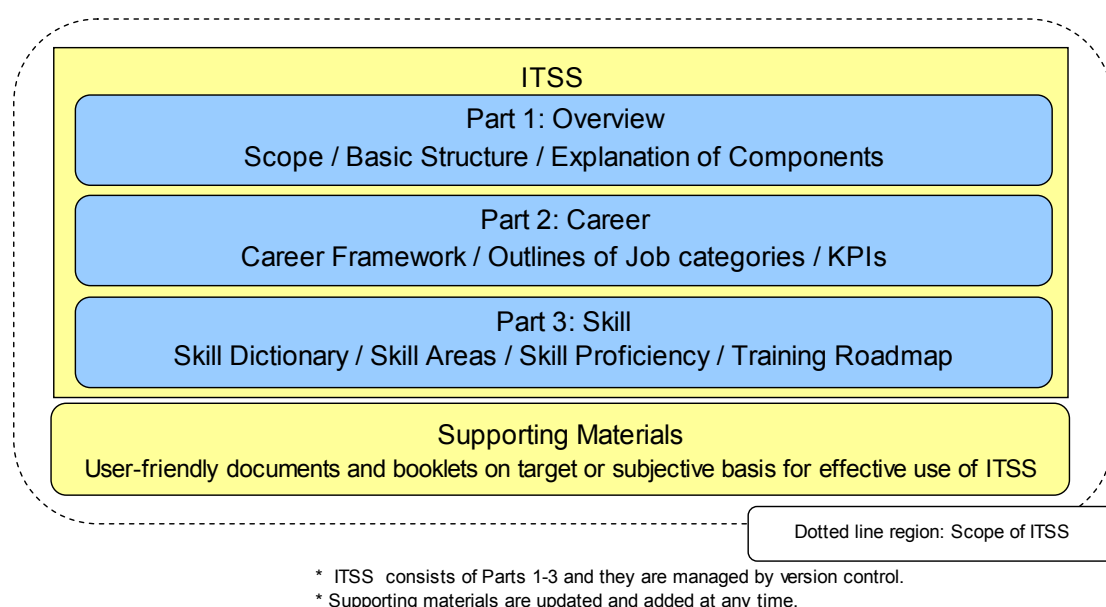


Figure 2. Whole Structure of ITSS

Contents of Part 1: Overview are enriched compared to the previous version of ITSS, and it explains a structure and how to interpret contents of ITSS. Part 1: Overview regards “business performance” and “proficiency” as two perspectives to see human abilities in a business context.

Part 2: Career addresses “business performance” and Part 3: Skill delivers “proficiency.” Parts 1-3 are the basic components of ITSS, and their major or minor revisions are managed by version control.

In addition to above, the ITSS Center prepares supporting materials. The supporting materials are user-friendly documents and booklets including released documents (e.g., ITSS Pocket Handbook), output of the Professional

Community, introduction of practical cases in companies, etc.. The ITSS Center continues to organize and enhance the supporting materials systematically from viewpoints of ITSS users: top management, people engaged in human resource development, individuals, etc..

(3) Position of Part 1: Overview

Part 1: Overview describes structures, term definitions, and meaning of ITSS in order to grow a correct comprehension and promote appropriate and adaptive use within companies.

Various misunderstandings occurred about its practical applications in a real business world. The misunderstanding came from the facts that ITSS has generality for widespread use and that it uses abstract concepts and expressions in order to ensure generality.

For example, to link (or replace) ITSS's terminology to names of specific products is necessary when ITSS is put in practice, but such company-specific terminology is excluded from ITSS. One substantial role of this overview part is to clarify an actual ITSS application scope and position.

In another case, purposes of ITSS were not properly apprehended. One of its purposes is to be used with a business strategy, but there were many cases that ITSS was used only for a personnel or skill assessment without a business strategy.

Part 1: Overview provides complementary explanations to avoid these confusions, and its contents are shown in Figure 3.

| |
|----------------------------------|
| 1. Scope |
| 2. Utilization of ITSS |
| 3. Terminology and Definitions |
| 4. Fundamental Structure of ITSS |

Figure 3. Contents of Part 1: Overview

1. Scope

ITSS is indices that identify and systematize business capabilities required for providing IT services. To identify and systematize business capabilities, ITSS sets up extent of job categories and specialty fields and their levels, and determines indices as entry criteria of each level as well.

1.1 Purposes

- Capital investment is a key issue of business management. When considering capital investment for HRD, it is insufficient to focus only on individuals or specific skills. It is significant to clarify roles, value, and skills exercised by IT professionals from a viewpoint of “business success.” ITSS systematically organizes these items to provide fair guidelines. A purpose of ITSS is to promote efficient capital investment for HRD in the IT service industry by utilizing ITSS indices.

- ITSS promotes to develop high level IT professionals with social and market value, and low level IT professionals to be able to establish themselves in the IT markets.

1.2 Application Fields

ITSS aims at assessment of business capabilities of HR who are working as professionals engaged in the IT service industry. It mainly focuses on the IT service industry providing customers with IT services, but it is also applicable to IT departments in user companies in general.

ITSS targets at usage in companies, individuals, and educational organizations.

- IT service companies (including IT departments in user companies):
ITSS serves as guidelines for HRD and procurement along with company strategies, and as a common language to indicate HR portfolio necessary to companies. Companies, which have their own original systems and criteria for skills and careers in place, are able to locate and recognize their positions outside world objectively by defining relationships of their systems and criteria to ITSS.
- Individuals (IT professionals):
ITSS serves as guidelines for individuals to design their career paths and to determine methods for their skill development. Moreover, individuals, who might consider changing their careers, are able to comprehend experience and results in detail necessary to pursue their target careers. Using indices of ITSS supports individuals to develop their skills step by step and enable them to acquire practical engineering skills.
- Various educational organizations providing training, skill development courses and services (including higher educational organizations):

ITSS serves as guidelines to explain objectively what types of skills are to be improved through curricula provided by educational organizations. We expect ITSS to be common guidelines to HRD of industry and academia.

ITSS intends to form a common framework (value criteria) for effectual cooperation among various companies, educational organizations, etc. and to assess IT HR across their boundaries.

1.3 General Versatility⁵ of ITSS

Knowledge and skills used in ITSS have certain versatility. Versatility is generality in order to have a certain level of versatility. The knowledge and skill concepts are divided into several layers from the perspectives of both versatility and specificity (see Figure 4.) Characteristics of knowledge and skills in Figure 4 are more general and transferable in lower layers but more definite and specific in upper layers.

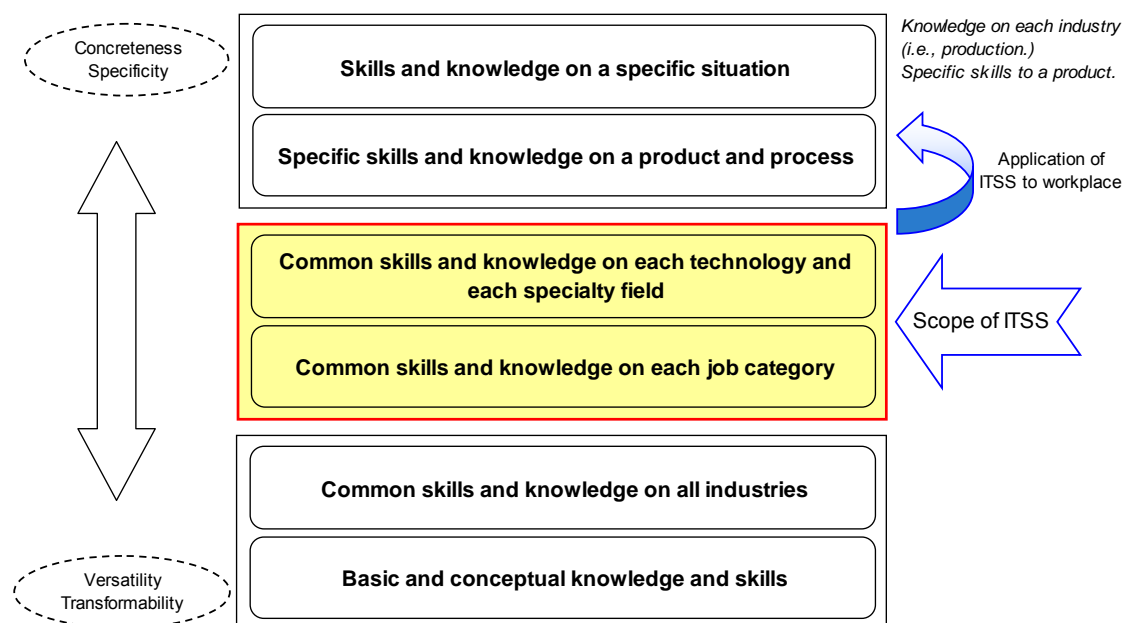


Figure 4. Versatility Level of ITSS

ITSS is versatile indices as shown in the middle layers in Figure 4. This means skills in ITSS are common levels to various technology areas and business operations.

When introducing ITSS to real business fields, contents of ITSS have to be linked (or replaced) to specific contexts. For example, contexts specific to each company or product are linked to characteristics of business capabilities, their definitions, and skills written in job descriptions.

⁵ The contents in this paragraph refer to METI Research Report: Knowledge engineering approach for the skill standards. Editor, Hirata, K., Authors, Hirata, K., Seta, K., & Ikeda, M. The Ministry of Economy, Trade, and Industry, 2004.

Increasing versatility yields transformability, transferability, reduction of cognitive workload, and building of common perception, etc.. ITSS is developed to provide common indices in the IT service industry.

1.4 ITSS Application to Companies

Just as companies employ a variety of business strategies, companies invest their capital in different careers and vocations. At an ITSS application to a company, it first should use definitions of ITSS as common indices and then set its own indices that reflect career and skill requirements specific to a company along with its business strategy (see Figure 5.)

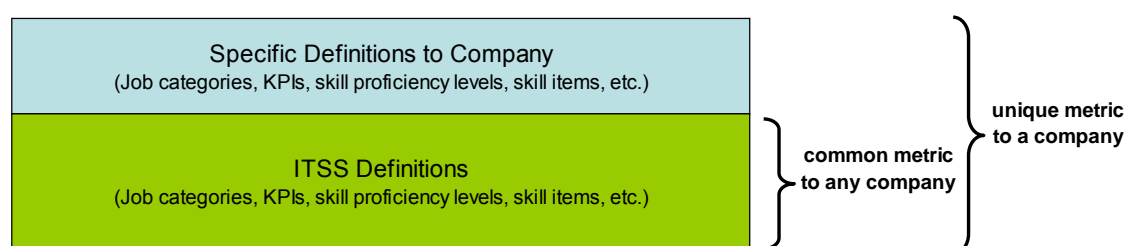


Figure 5. Notion of Utilization

Each company interprets or redefines ITSS into its common and specific internal guidelines that are comprehended and applicable to a workplace. This reduces differences of interpretation among companies.

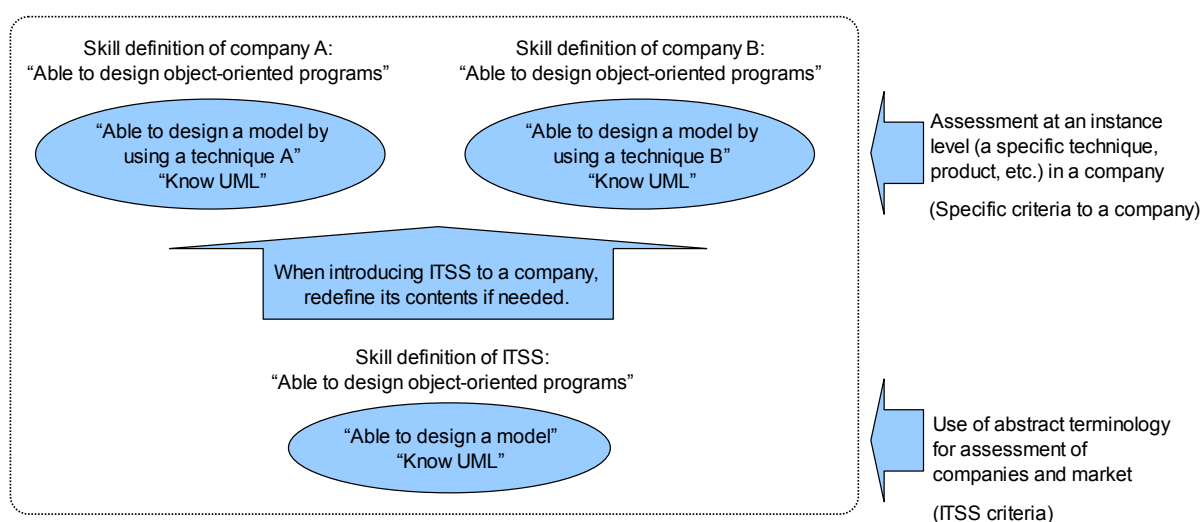


Figure 6. ITSS Application Image

1.5 Points on ITSS Application

ITSS ought to be used to measure individuals' contributions to business activities adequately. If a company introduces ITSS when capital investment for

HR is not along with management judgment or a business strategy, it will not be able to develop IT HR who can lead business and technology and give the company competitiveness advantage. Introduction of ITSS only for convenience of personnel management or for revision of reward system without a specific business strategy may result in decreasing an individual's motivation.

ITSS is a reference model, not rules or specifications, and this can be stated another way: ITSS is indices to share common understanding among various people engaged in development and training of HR. Although ITSS is an acronym of "Skill Standards for IT Professionals," it is no need to deploy all contents of ITSS or as it is. It is recommended to use part of ITSS where needed for implementing a business strategy.

Some terms in ITSS may have different meanings depending on contexts. For example, the term "communication skills" varies from to job category to job category (its implications and performance levels.) Connotations and criteria of other terms, such as "complex", "sophisticated", "advanced", and "successful" differ among job categories and specialty fields as well.

1.6 Reference

- METI Research Report: The skills trend survey for IT service industry in Japan. Editor, Hirata, K.; Authors, Hirata, K., Ohta, M., Matsuo, M., & Suehiro, J. The Ministry of Economy, Trade, and Industry, 2003.
- METI Research Report: Knowledge engineering approach for the skill standards. Editor, Hirata, K., Authors, Hirata, K., Seta, K., & Ikeda, M. The Ministry of Economy, Trade, and Industry, 2004.
- METI Report: Introduction of skills standard for IT professionals. Editor, The council of skills standard for IT professionals. The Ministry of Economy, Trade, and Industry, 2002.

2. Utilization of ITSS

2.1 ITSS Utilization

(1) Response to Skill Requirement Diversification

With expansion of an IT application area and rapid progress and diversification of technology, specialization and segmentation in the IT industry have steadily increased. In this circumstance, it is no longer adequate to expect someone to deal with both wide range of business operations and technologies all together and cope with them properly.

In order to take a variety of IT investment opportunities, there is a need to promote training and HRD of IT professionals for each diversified technology field.

In the previous IT HR market in Japan, there was a typical linear career path (a programmer → a systems engineer → a project leader.) Most IT professionals in Japan are concentrated in the intermediate-level population. With a view to meet diversified and deepening customer requirements, and to ensure their satisfaction, the IT industry needs to develop expert engineers as IT professionals in both new solutions and latest technology areas.

ITSS provides common guidelines for the IT markets, which describe direction and contents of a variety of skills.

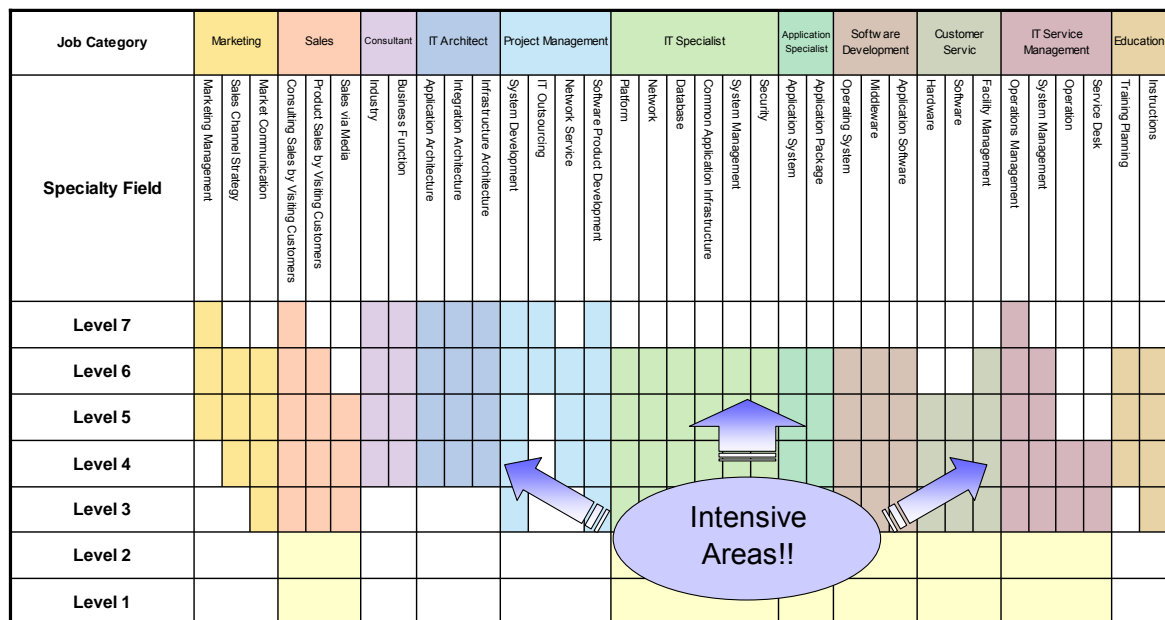


Figure 7. Image of IT HR Uneven Distribution

(2) Skill Proficiency Promotion

ITSS has important functions that indicate not only diversification of required skills on the horizontal axis but also skill proficiency on the vertical axis.

To show levels of skill proficiency as metrics is to indicate goals, objectives, and options to IT HR at their early career stages who have intentions to become IT professionals. Many jobs require a high skill proficiency level, such as management of a large project, complex system design, a security system with superior safety, etc.. IT professionals who possess high-level skills, such as shown above, will be able to create new information technologies, methodologies, and solutions. Then, utilizing newly created solutions and technologies yields development of new IT HR. Moreover, it enhances HR skill proficiency.

(3) Common Framework for Skill Strategy Planning and Realization

IT service companies ought to have business strategies first in order to develop med- and long- term strategies for skill development. In addition, it is crucial to make decision on their business strategies, for instance, whether or not to strengthen upper stream business such as consulting, to focus on a specific area like databases or network technology, to shift to financial sector business or public sector business, etc.. By having clear business strategies, companies become to be able to formulate their own skill development strategies (e.g., focusing on skills needed to develop, rearranging infrastructure for developing necessary skills, and setting motivation for training and development) to take competitive advantage in the IT market. In this way, ITSS is of assistance to guidelines for designing and planning skill development strategies.

Likewise, individuals should design and pursue their own career paths as independent IT professionals. To improve skill proficiency, it is essential for individuals to find possible career paths in their companies or circumstances. ITSS is, as a common framework, a valuable tool for individuals to compare their own career paths with ITSS as well.

As shown earlier, ITSS provides the common framework for individuals and companies to design career and skill strategies. The clear entirety of the common framework builds explicit and mutual recognition between individuals and companies on which skills and levels to focus on.

(4) Indices Provision for IT HRD

Another significant purpose of ITSS is to provide indices used when contents of information services and training courses are exchanged in the IT market.

ITSS does not determine unit price of a service nor does certify quality of the service, and this is simply because ITSS is a reference model. ITSS is indices used by individuals and companies for considering skill strategies, and is to define common indices for drawing a skill building road map. This opens a way to indicate relative positions among certification system, public qualifications, and licenses, in in-house training and outside training.

For example, it is possible to determine relative levels among companies, which have introduced their own IT professional qualification processes for consultants, by comparing their levels with ITSS.

Common indices offer an enormous advantage of being able to apprehend skill levels of other companies. This also improves procurement convenience: when a company is not able to fulfill its HR requirement inside a company, it can appropriately procure HR from the IT market.

ITSS is effective common indices to figure out skill levels for optimum resource assignment for improving entire service quality. It is also valuable as a complementary tool for customers to evaluate affordability of their vendors' service.

ITSS is put to be used as common indices for HRD as well. By using these common indices among variety types of parties related to HRD, such as IT service companies, individuals, educational organizations including universities, etc., they are able to collaborate closely with one another. Consequently, development of IT HR forms a close relationship among them and becomes more efficient and effective.

2.2 ITSS and Development of IT Professionals

HRD without business strategies will not lead to an HRD policy, which develops IT professionals playing vital roles in technology and business for their companies and supporting company competitiveness. ITSS is efficacious and meaningful when utilized in an HRD process based on a business strategy as shown in Figure 8.

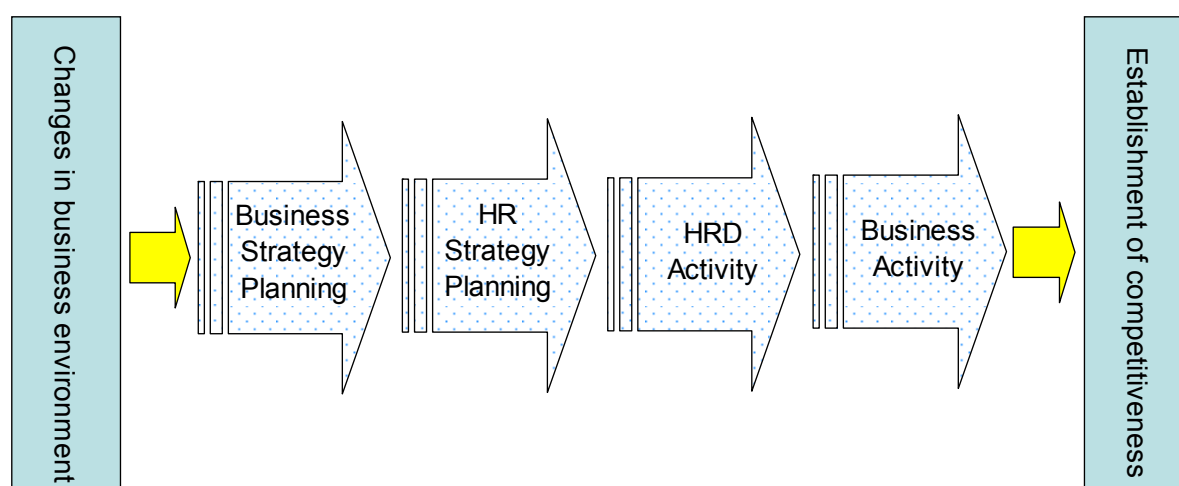


Figure 8. Human Resource Investment Process

Companies ought to define direction and policy by considering their business issues. This is called “business strategy planning” that is the first step to identify

in which to invest company resources. The second step is “HR strategy planning.” This step identifies skills necessary to implement business strategies, and determines how to resource companies with skills required for business strategies. In other words, to make clear what types of HR are necessitated for business, to analyze skill levels of HR of the moment, and then to determine how to fill gaps between them, are in the second step. The third step is “HRD activity,” implementation of an HRD strategy and management of a HRD progress. Finally, the last step is “business activity” to utilize developed HR in actual business to give companies competitiveness advantages.

The next section describes an HR investment process from a perspective of ITSS utilization.

2.3 Business Strategy Planning

In the “business strategy planning” step, a business domain is discussed (e.g., shifting a primary business weight from system development to system consulting). Successful utilization of ITSS is dependent on whether or not a business strategy is clear. Identification of HR and skills needed to implement a business strategy requires a clear business strategy. ITSS is effective only when it is comprehended and applied as guidelines for pursuing and achieving business strategies and objectives.

2.4 HR Strategy Planning

The “HR strategy planning” step has the following process sequence, identification of IT HR required for a business strategy, gap analysis between existing status and desired status, development of a skill acquisition policy, and HRD planning.

(1) Identification of IT HR Required for Business Strategy

Companies ought to analyze skills and identify HR required for following business strategies. Each company, comparing with ITSS, should identify necessary job categories and levels based on its business strategy to show individuals career paths.

1. Identification of required skills based on business strategy

Companies need to develop and procure HR for business activities. Identification of “required skills for attainment of business objectives” is derived from business strategies. They select and focus on skills in accordance with their own requirements for business strategies to make effective HR investment.

2. Indication of careers and career paths

Once required skills are clarified, companies provide individuals with career paths for systematic skill acquisition. ITSS is of serve to indicating the career paths specifically. Additionally, it makes possible to match company

strategies with individuals' development by utilizing indices based on the levels and job categories of ITSS. Thus, ITSS advances effective HRD alongside common objectives shared with companies and individuals.

Figure 9 points to a career path of project management as an example of a typical model of a job category.

In this illustration, as you can see, career levels among the job categories are same in horizontal axis. This is to avoid complex or unclear explanation. However, in actuality, when an individual changes her/his job category to a new one, levels of required skill and experience differ before and after switching a job category. An individual needs to take training or get education to gain experience with a view to keep a same level after a shift of a job category.

Example: Project Management

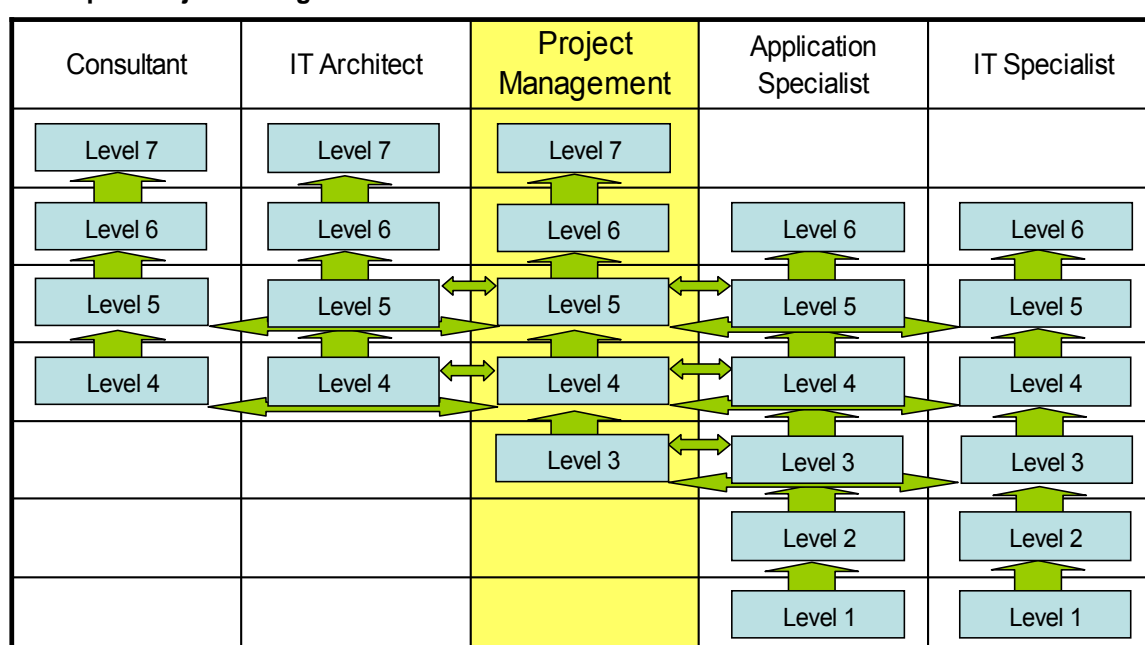


Figure 9. Image of Typical Career Paths

(2) Gap Analysis Between Existing Status and Desired Status

When required and desired skills are defined as targets, companies ought to ascertain existing status of skills demonstrated by their HR. This helps individuals clearly visualize their career paths along with ITSS as guidelines. Therefore, individuals take notice of their existent status (job categories, skill levels, etc.) and comprehend processes to reach their goals (required skills and career objectives.) Ascertaining existing status of skills is also important for companies. Specifically ascertaining skills, based on ITSS, that HR of companies possess is valuable to collecting information for planning careers and skill development for the future.

(3) Development of Skill Acquisition Policy

When existing status of skills is ascertained, companies need create policy to bridge gaps. To be more precise, for instance, employee development, mid-career staff recruitment, and outsourcing of operations, can be possible measures as policy. In any case, ITSS provides indices of decision making on policy.

(4) HRD Planning

It is crucial to make directions of both an HRD strategy and each individual development consistent for effective HRD promotion. Based on policies of skill acquisition, companies ought to determine job categories, a number of a workforce in each job category, and time schedule that are required to carry out the policies, and then map each individual to close gaps between skills an individual has and skills a company desires. It is significant for companies to reference ITSS in order to ascertain gaps between existing status and desired status of skills and identify HRD problems.

2.5 HRD Activity

The next step, after mapping corporate HRD plans into individuals, is skill training and development for individuals. Companies determine HRD plans such as target careers (job categories, specialty fields, and levels), measures of HRD, and time schedule.

HRD planning includes med- and long- term plans and short-term plans. For example, career paths are taken into consideration in med- and long- term plans, and training plans to develop unsatisfied skills intensively in short-term plans. At implementation of HRD plans, it is expected that companies ascertain progress of med- and long- term plans and short-term plans organizationally, and give individuals feedback at times.

(1) HRD Planning

Next two perspectives should be considered together at development of HRD plans.

1. Career Development

When developing med- and long- term HRD plans, it is essential to acknowledge both individuals' existent careers (job categories, specialty fields, and levels) as IT professionals and target careers that they are aiming at. HRD plans have to be developed with consideration of systematic skill acquisition based on their career paths.

2. Skill Development

When developing short-term plans, it is also essential that individuals are able develop their skills necessary for existent and future careers. HRD plans should take account that individuals are able to improve skills in

planned and intensive manner.

Considering moving up to higher level of IT professionals, to design career paths based on ITSS helps individuals shift their mind-set from skill development to career development. They should first acquire basic skills through their daily assigned duties, with an aim for future careers and specialized skills. Individuals need to be aware of that acquiring specialized skills of specialty fields increases their market value as well.

(2) HRD Implementation and Promotion

When implementing HRD, it is critical for companies to design HRD plans based on actual business practice, which are combined with off-the-job training (training course participation, conference attendance, and community activities) and on-the-job training (mentoring, coaching, and job assignments to actual projects.) It is also imperative to lay foundation of companies that promote HRD activities as HR investments.

In order to advance furthermore HRD effectively, each company should provide individuals with support to encourage them to improve their skills (e.g., providing incentives to motivate them to aim for skill development.)

Referring to KPIs (Key Performance Indicators) of each level of ITSS enables individuals to learn and acquire knowledge, skills, and professional mind-set required of IT professionals.

Low levels of ITSS define typical and basic skills, and take fundamental roles in IT HRD. Low-level IT professionals are encouraged to acquire a wide range of knowledge that is not restricted to their assigned duties.

To bring this to fruition, while they are occupied with daily duties, companies are also strongly encouraged to motivate individuals to go up to higher levels by showing specific goals, such as passing ITEE.

(3) HRD and Assessment

ITSS has two aspects of assessment; one is experience and results, and the other is technologies specific to a variety of products, methodologies, and others that individuals possess. Both aspects are significant for HRD and assessment. Companies should manage skills to be developed, but this is not enough for entire assessment.

What is significant is not only to have an individual skill but also to have business capabilities to select skills and necessary technology and to combine them for optimum ways to resolve business problems. ITSS is designed based on idea of assessing these business capabilities as IT professional skills.

HR skill assessment is an issue that both top management and IT professionals across IT companies must address. In particular, it is requisite for IT service companies to comprehend importance of that skill assessment is

connected with quality of their own techniques and services.

Individuals can mainly acquire skills through work experience. Therefore, assessment of skills of lower-level IT professionals in a job category should be performed by high-level IT professionals with high-level skills in the same job category.

In reality, however, high-level IT professionals in a business field are heavily involved in a wide range of duties, and they often cannot secure their time for skill assessment. Development of subordinates and assessment are decisive acts in a business aspect, and ITSS builds in conditions of high-level IT professionals, like HRD of lower level IT professionals, community activities, etc.. The aim of this is to contribute to HRD and assessment by passing on high-level skills that high-level IT professionals have.

High-level IT professionals are assessed strictly by how they exercise their skills and how they contribute to projects. A method assumed for assessment of higher level IT professionals is to review documents describing project experience and results in detail, and to conduct interviews if a rigorous review is necessary.

In the low levels, ITSS emphasizes effort for skill acquisition. This is because acquiring skills when individuals are at low-level stages is vital to grow toward higher level in the future. Methods assumed for assessment of low level IT professionals are to review what types of training they completed, to judge skills they possess, etc..

A certification system in the IT service industry should not be restricted to a company or educational organization. It should be based on ITSS and applicable to any IT service company or educational organization. This encourages individuals to raise their skill levels with a broader perspective regardless of companies or educational organizations.

In addition to certifications, it is very efficacious for certified IT professionals to receive rewards (e.g., premium bonuses), to be given consideration of their promotion, or to be offered opportunity of salary rise, etc..

HRD and assessment are inseparable from each other, and it is consequential to lead individuals to next steps for career improvement through assessment of HRD results. In order to put this into place, after assessment of skills individuals possess, they ought to be provided with opportunities to utilize skills they have for work assigned. This idea is also applicable to recruitment and utilization of new graduate HR. Opening up opportunities to those who received effective and specialized vocational training to use their skills in work given will become a major incentive for quality improvement of higher education.

2.6 Business Activity

ITSS as common guidelines can be applied to the following business

activities.

(1) Procurement of Project Staff

Based on “scope of responsibility,” “complexity,” and “size” described in ITSS, companies develop personnel plans responding to necessary HR. However, in truth, it is not easy to procure HR to fulfill all requirements in many instances. In such occasions, one potential manner is to reference ITSS in order to determine required HR, then to assign a project to a person with skills close to its required skills from a point of career development.

(2) Common HR Perception among Companies

The crucial is to minimize gaps between HR provided by an IT service company and HR sought by its customer. ITSS enables them to share a same image of HR together. Instead of a conventional request (e.g., a specific number of low, middle, and high level SEs), ITSS serves as a reference model of IT professional requirements to describe clear and specific job categories and their levels.

2.7 Promotion of Human Resource Investment

(1) Necessity of Commitment of Top Management

Investment in HRD is an essential part in corporate management over a boundary of traditional human resource issues, and top management should be conscious of its significance. Commitment and participation of top management is of importance to promotion of HR investment within a company.

(2) Necessity of Cross Functional Activities

In addition to commitment by top management, organizational effort beyond borders of divisions within the company is necessary. Traditionally, HRD tends to be left entirely up to a personnel (or training) division. However, collaboration of a personnel division and business operations division is critical for HRD investment. In other words, “cross divisional” effort is a weighty matter: involving all related divisions besides top management and a personnel division. Top management, a personnel party, and business operations parties should be cooperative organically all together across an existing framework.

When attempting at formulation of structures that differ from traditional ones, such as establishment of a new career certification system, a company may have to carry out reformation by involving a whole organization. If a cross-functional division designs HRD investment plans and has roles of activity management and promotion, it intensifies an investment activity of HRD. What is vital is that top management takes into account various opinions of different operational divisions.

3. Terminology and Definitions

Terms and definitions of ITSS are basically compliant with existing Japanese standards and bodies of knowledge (e.g., JIS, ISO including JIS X 0001, and JIS X 0020), but the following terms and definitions are unique to ITSS. They have special meanings and it is significant for ITSS users to translate terms and definitions in ITSS for proper comprehension and utilization of ITSS.

3.1 Skills (Business Capabilities)

Skills in ITSS are defined as business capabilities⁶. Skills do not mean a set of individual technology elements. Skills are business capabilities to be able to select and apply technology elements appropriately in solving problems.

3.2 Professional

An IT professional is a person who actually and successfully achieves business results and contributes to the IT industry growth. Necessary criteria of an IT professional are to be able to,

- Achieve commitments to a customer and company.
- Train and develop subordinates for passing on her/his skills and knowledge acquired through experience.
- Perform activities continuously to improve her/his business capabilities.
- Take social responsibility and have ethics of an IT professional.

An IT professional fulfills customer's requirements to achieve business outcomes by combining and utilizing appropriate skills. Possessing high skills means providing a customer, project members, partners, and an own company with great value that an IT professional produces. To achieve a commitment to a customer and a company, an IT professional should have not only high technological skills, but also high-level personal skills such as communication, negotiation, leadership, and overall business related skills. Moreover, to pass down skills, an IT professional ought to contribute to training and development of subordinates by mentoring, coaching, etc..

3.3 Job Category (Career)

The job categories (careers) in ITSS are specialized domains where each professional stands, but they do not precisely indicate roles within a company or project.

The correspondence of the Common Career/Skill Framework to job categories in ITSS is shown in Figure 10 (adapted from The Common Career/Skill Framework, INFORMATION-TECHNOLOGY PROMOTION AGENCY, Ministry of Economy,

⁶ In general, "skills" are often referred to as knowledge and expertise on element technology: know-how on adoption of a specific product or service, specific programming language, etc. However, it is difficult to regard having single knowledge or expertise as an ability to make customer's business successful.

Trade and Industry, JAPAN.)


| Common Career/Skill Framework | | | ITSS |
|-------------------------------|----------------------|---|---|
| Human Resource Type | Human Resource Image | | |
| Basic Strategy | Strategist | | Marketing Sales Consultant |
| Solution | System Architect | | IT Architect |
| | Project Manager | | Project Management |
| | Technical Specialist |  | IT Specialist Application Specialist Software Development |
| | Service Manager | | Customer Service IT Service Management |
| Creation | Creator | | (N/A) |
| Others | | | Education |

Figure 10. Correspondence of the Common Career/Skill Framework to Job Categories in ITSS

3.4 Responsible Person

A responsible person is one who has responsibilities in a service provider side and in charge of entire pertinent activity processes and phases. The responsible person delivers value directly to a person in charge in a customer side.

3.5 Leader

A leader is one who has responsibilities for promoting execution of particular pertinent activity processes and phases she/he is assigned. The leader delivers value directly to the responsible person.

3.6 Member

A member is one who creates deliverables and business outcomes. The member delivers value directly to the leader.

4. Fundamental Structure of ITSS⁷

To get an idea of ITSS structure, this chapter explains a basic concept of ITSS, outline of each constituent part, and its linkage to other constituent parts in ITSS.

4.1 Structural View of Human Capabilities and Competency

There are two perspectives of human capabilities. One is actual results and the other is capabilities that an individual possesses (see Figure 11.)

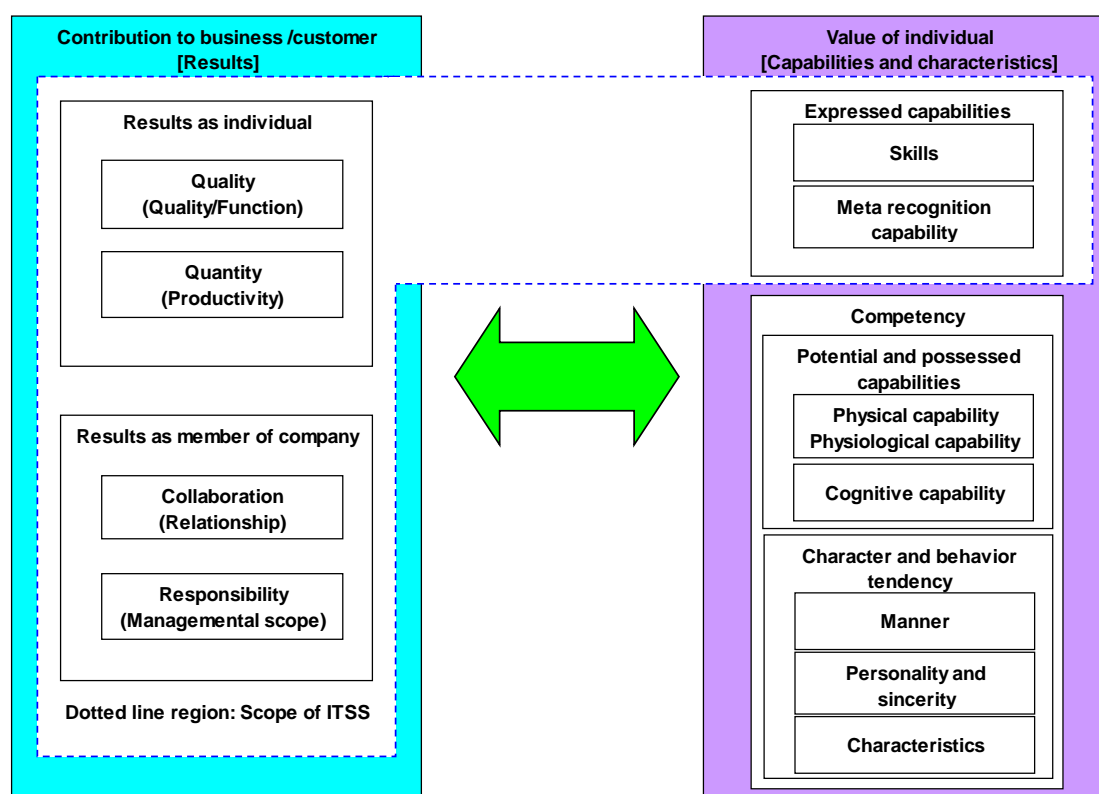


Figure 11. Human Resource Investment Process

The left figure illustrates viewpoints of how many results an individual achieves, how high quality of the results an individual produces is, and how much an individual contributes to business. This figure also explains that an individual's capabilities are assessed by considering a problem solving capability and a performance level at which an individual exercises in assigned duties. The right figure illustrates value of an individual, and it shows viewpoints of how much an individual possesses capabilities.

From the viewpoint on the left side, there are four essential features of

⁷ The contents in this paragraph refer to METI Research Report: The skills trend survey for IT service industry in Japan. Editor, Hirata, K.; Authors, Hirata, K., Ohta, M., Matsuo, M., & Suehiro, J. The Ministry of Economy, Trade, and Industry, 2003. and METI Research Report: Knowledge engineering approach for the skill standards. Editor, Hirata, K., Authors, Hirata, K., Seta, K., & Ikeda, M. The Ministry of Economy, Trade, and Industry, 2004.

assessment: quality, quantity, collaboration, and responsibility. These four elements are assessed with regard to business performance and outcomes; whether or not quality level is fulfilled, productivity is sufficient, an individual works with others in cooperative and collaborative manner in her/his assigned duties, and an individual achieves business outcomes in a responsible position.

A difference between viewpoints of left side and right side is explained by a fact that each side is used for assessment of different types of HR elements. The scope on the left side is a “performance assessment,” which depends on a difficulty level of a problem to be solved and magnitude of an outcome. The “performance assessment” allows to judge whether or not an end outcome satisfies a customer and is fruitful for both the customer and an individual’s company.

The scope on the right side is a “capability assessment,” which gauges “expressed” capabilities an individual demonstrates. The “capability assessment” aims to develop desired HR and to ensure steady work performance, and this is also useful information at job assignment and personnel allocation in the future.

4.2 ITSS Structure and Its Concept

Based on the idea above, ITSS structuralizes its concept as shown in Figure 12.

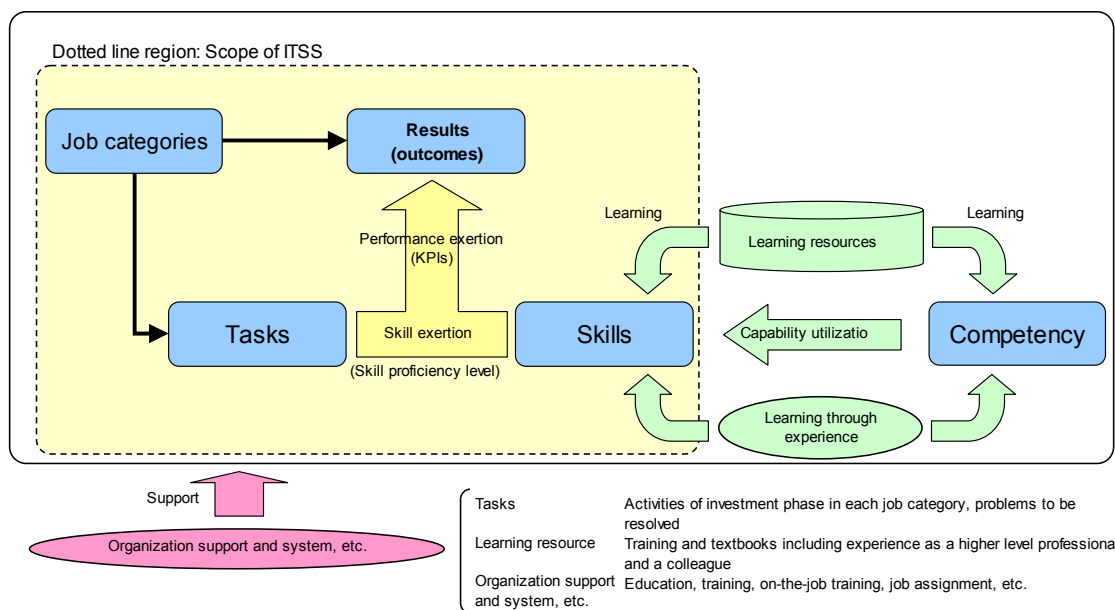


Figure 12. ITSS Concept and Its Relation To Others

In this figure, problems to be solved are indicated as “Tasks.” Contents of tasks vary among jobs, and we define task contents of each job as job categories in ITSS. When an individual performs tasks by utilizing her/his skills, it yields business outcomes.

Utilizing proficient skills, which are necessary to take on tasks, in order to put

in optimal performance enables her/him to achieve business outcomes that satisfy customer's demands. A skill demonstration level of an individual has influence on whether or not she/he can achieve a satisfactory result.

ITSS outlines assessment of measurable human capabilities in two forms. One is skill proficiency levels that indicate capability levels of being able to demonstrate skills. The other is the KPIs that indicate magnitude of outcomes or results.

ITSS assesses measurable and observable capabilities and skills that are acquirable posteriori. Obtaining necessary knowledge through education or training and using the knowledge in real experience will develop these posteriori skills.

This skill learning-demonstration cycle is regarded as experience and results. Repetition of this cycle accumulates experience and results, and it directs individuals to a next step.

4.3 ITSS Basic Structure

ITSS has two major parts: careers and skills. A career framework⁸ is an at-a-glance chart that represents indices of outcomes required for business. A skill dictionary is another at-a-glance chart that lists skills necessary to achieve outcomes.

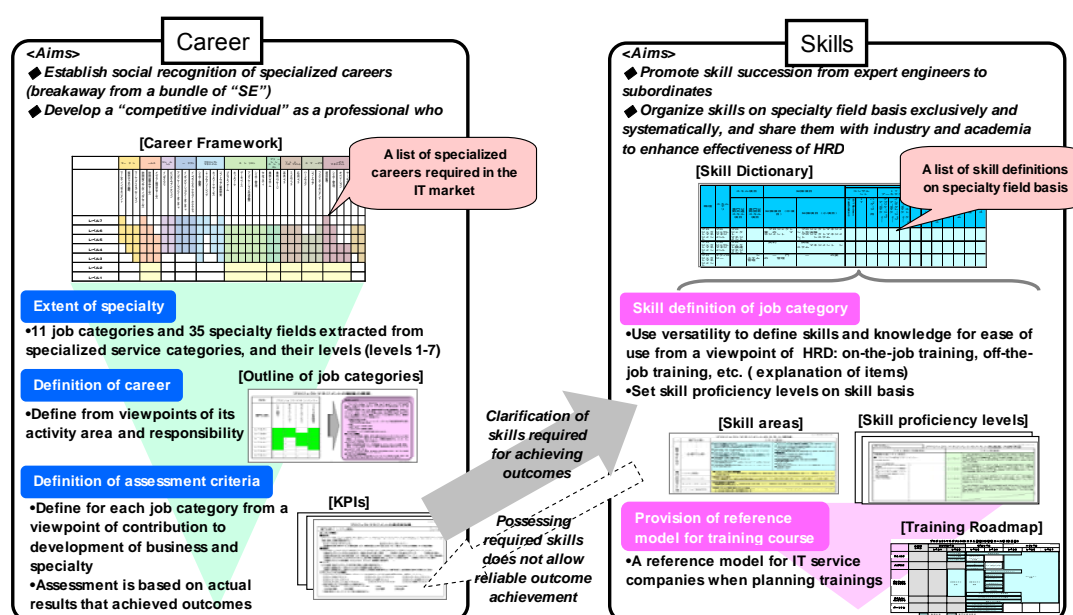


Figure 13. ITSS Basic Structure

(1) Documents on Careers

An activity area of each job category is determined, and this activity area is

⁸ The contents in this paragraph refer to METI Research Report: The skills trend survey for IT service industry in Japan. Editor, Hirata, K.; Authors, Hirata, K., Ohta, M., Matsuo, M., & Suehiro, J. The Ministry of Economy, Trade, and Industry, 2003. and METI Research Report: Knowledge engineering approach for the skill standards. Editor, Hirata, K., Authors, Hirata, K., Seta, K., & Ikeda, M. The Ministry of Economy, Trade, and Industry, 2004.

called a job category. A job category is broken down into a several specialty fields. ITSS sets KPIs of each specialty field in a job category, and the KPIs are objective indices to describe experience and results.

(2) Documents on Skills

Skills required of each job category or specialty field are broken down to elements called skill items. A skill proficiency level is defined to state a maturity degree of each skill item. Furthermore, each skill item has a set of knowledge items needed for demonstrating the skill item.

Skills are organized from viewpoints of both objective observation, and possible use for educational training.

4.4 Components of ITSS

Components of ITSS are shown below Figure 14.

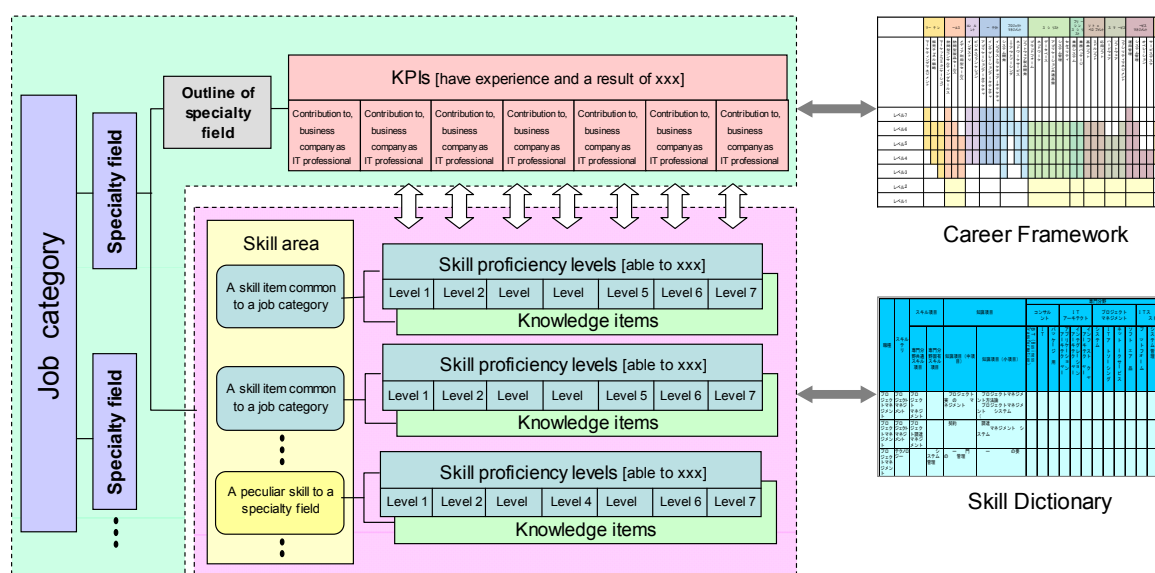


Figure 14. ITSS Components

(1) Career Framework

The career framework shows an overall view of ITSS, and it has two axes: the vertical axis exhibits job categories, and the horizontal axis represents the depth of capability levels of the job categories. It provides individuals and companies with a common framework to design and plan skill strategies and career paths. In consideration of business needs, technological specialty and originality, liability to customers, and global recognition, ITSS defines 35 specialty fields in 11 job categories, and categorizes them into levels 1-7.

(2) Job Category Outlines

The outlines of the job categories describe activities required of each job

category. It is explained that in which occasion and what type of value an individual in a particular job category should produce at an event of IT investment.

(3) KPIs (Key Performance Indicators)

The KPIs are defined as metrics of each job category and specialty field, and they are used to identify levels of business capabilities objectively. A distinctive feature of ITSS is assessment of capabilities by the KPIs that are based on actual experience and results.

The KPIs consist of two types of contribution. One is business contribution: an individual's direct contribution to an outcome of a project. The other is professional contribution: contribution to a company and the IT service industry as an IT professional. At assessing HR levels, both of these contributions are assessed in a comprehensive manner.

(4) Skill Dictionary

The skill dictionary is a chart that covers all skill items and knowledge items used in ITSS. The skill items and knowledge items are hierarchically listed in the skill dictionary, and it clearly describes the relation of the skill items and knowledge items to the job categories and specialty fields.

(5) Skill Items and Knowledge Items

The skill items are definitions of capability elements necessary to achieve business outcomes. The knowledge items are knowledge required for acquiring the skill items. The skill items and knowledge items show their mutual relationship to help ITSS users identify which corresponding knowledge items an individual should acquire to attain a skill item.

(6) Skill Areas

The skill areas specify skill items and knowledge items necessary for each job category and specialty field. A description of a skill area consists of common skills to a job category and specific skills to a specialty field in a job category.

(7) Skill Proficiency Levels

The skill proficiency levels are set on each skill item to indicate skill maturity degrees required for performing business activities. The skill proficiency levels give an explanation of criteria in the term "being able to do" duties, and they are supportive evidence of whether or not an individual possesses skills of a certain level. In other words, an individual with a certain degree of mastery should be able to exercise skill items of a corresponding level of skill proficiency.

(8) Training Road Map

The Training Road Map illustrates training subjects that individuals ought to

complete to aim at acquiring knowledge of a job category. The Training Road Map is in accordance with ITSS. It consists of "training course groups" and "training course lists" that offer a group of training courses of each job category, "training course details" that describes contents and details of each training course, and "skill items" and "knowledge items" that explain relationship of skill and knowledge items with each training course.

4.5 Relationship Among ITSS Components

Here is shown a relationship among components of ITSS from perspectives of business outcomes and human capabilities.

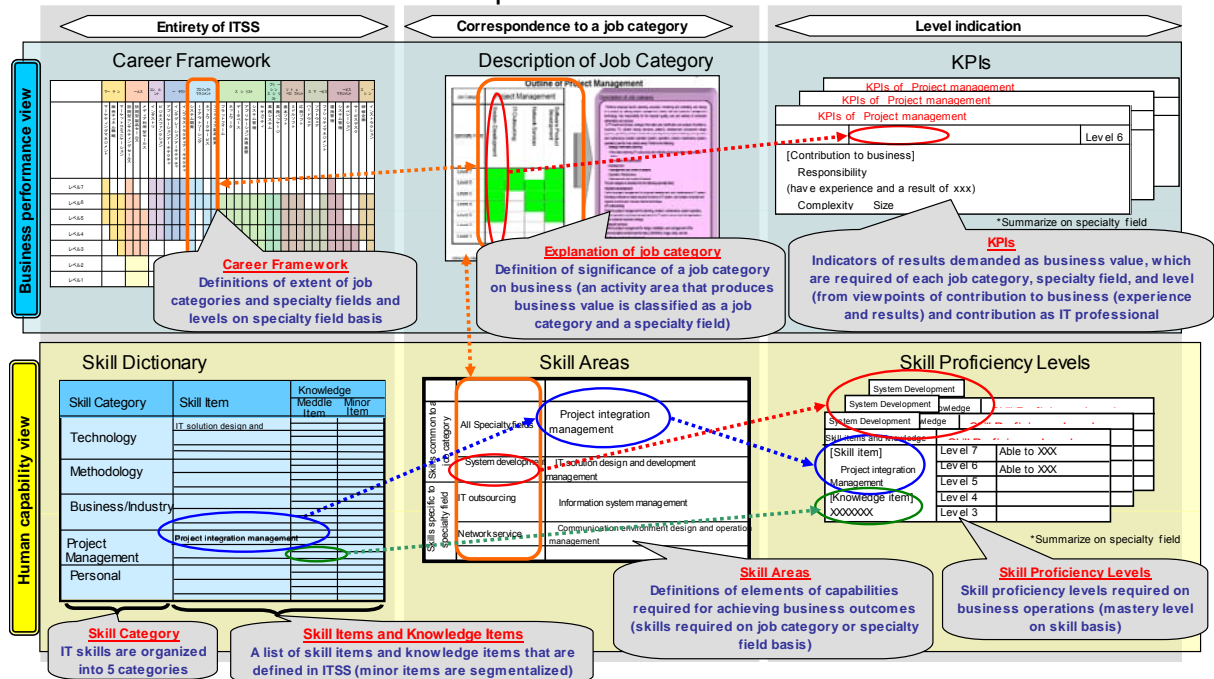


Figure 15. Relationship Among ITSS Components

(1) Documents from Business Performance View

As we mentioned earlier, the job categories are shown in the career framework, and there is an overview of each job category in Part2: Career. The overview consists of specialty fields' levels and outlines. In addition, the KPIs are defined for each level of the specialty field.

(2) Documents from Human Capability View

All skill items defined in ITSS are organized in the skill dictionary. The skill area is a set of skills required of IT professionals to perform business activities, and it is extracted from all skill items. The skill area is defined on a job category basis.

All skill items necessary to each specialty field are defined with the skill proficiency levels. The skill proficiency levels indicate skill maturity degrees required to achieve levels defined in the KPIs.

4.6 Level Assessment

(1) Level Assessment by KPIs

The KPIs are assessment indices of individuals as IT professionals while the skill proficiency levels are assessment indices of single skills. Although both have level concepts, remember do not to confuse the KPIs with the skill proficiency levels.

The KPIs are based on the proficient skills of the specialty fields, and are an assembly of each skill and knowledge. They define levels of experience and results required to create outcomes that external or internal customers demand.

From a viewpoint of business success, ITSS takes a particular note on actual value that IT professionals produce through interactions with customers. Elements of practical business capabilities required to produce actual value are broken down and organized systematically in ITSS. Thus, IT professionals are assessed by the KPIs, which are metrics of experience and results.

The skill proficiency levels are for assessment of capabilities in a limited range, and they are necessary yet insufficient for assessment of whole business capabilities. This is because improving a proficiency level of individual skill itself is not a final goal of HRD. What ITSS emphasizes is development of IT professionals that can fulfill customers' requests based on their proficient skills.

Levels used in the KPIs have seven stages that represent degrees of problem solving experience and results required of IT professionals in a specialty field in a job category. Figure 16 provides a general perspective of 7 levels without considering a particular job category or specialty field.

| Levels | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 | Level 7 |
|-----------------------------------|---|--|----------------|--|---|--|---------------------------------|
| Contribution to value creation | Able to find and resolve problem at work (Utilization) | | | | Lead business, technology, methodology (Creation) | | |
| | Carry out duty under supervision | | Carry out duty | Lead in scope of work/project | Contribute to a company | Contribute to the IT industry | Lead the IT industry |
| | | | | | | | Have influence on the IT market |
| | | | | | | Achieve recognition within the IT market | |
| | | | | | Achieve recognition inside an IT company/organization | | |
| | Achievement of required work | | | | Able to develop subordinates | | |
| | | Able to perform all duty independently | | | | | |
| | | Able to perform part of duty independently | | | | | |
| Able to perform under supervision | | | | | | | |
| Assessment scope | | | | | | Results as a member of IT industry | |
| Assessment object | | | | Results as a member of IT company/organization | | | |
| | Results as an individual | | | | | | |

Figure 16. Concept of Levels and Assessment

◆ Level 7

Individuals at this level have established their specialty fields as IT professionals, and create and lead technologies, methodologies, and business opportunities inside and outside their companies, organizations, etc.. They have experience and results of leading advanced service development and commercialization for the whole IT market, and are recognized as **world-class IT professionals**.

◆ Level 6

Individuals at this level have established their specialty fields as IT professionals, and create and lead technologies, methodologies, and business opportunities inside and outside their companies, organizations, etc.. They have experience and results in the IT market besides in their companies, organizations, etc., and are recognized as **high-end IT professionals in their countries**.

◆ Level 5

Individuals at this level have established their specialty fields as IT professionals, and create and lead technologies, methodologies, and business opportunities inside their companies, organizations, etc.. They have experience and results, and are recognized as **high-end IT professionals within their companies, organizations, etc..**

◆ Level 4

Individuals at this level have established their specialty fields as IT professionals, and independently clarify problems and lead problem solving with their own skills. In their companies, organizations, etc. they contribute, based on their experience, to organization of knowledge required of IT professionals and

to **development of lower level IT professionals**, and are recognized as high level IT professionals. They are also requested to improve their skills continuously for their career development.

◆ Level 3

Individuals at this level **perform** all assigned duties **independently**, and aim to establish their specialty fields. They have application knowledge and skills necessary to become IT professionals, and are requested to improve their skills continuously for career development.

◆ Level 2

Individuals at this level **perform assigned duties under the supervision of higher-level IT professionals**. They have basic knowledge and skills necessary to become IT professionals, and are requested to improve their skills actively in order to pursue their career paths for career development.

◆ Level 1

Individuals at this level **have the basic knowledge minimum required** of those who are relating to IT. They are requested to improve their skills actively in order to pursue their career paths for career development.

There is a wide gap of required capabilities in the KPIs between levels 1-3 and levels 4-7. The main point of the KPIs of levels 1-3 is that “individuals have experience of taking part in projects as team members.” This means that an emphasis is on responsibility and performance for their assigned duties; however, it does not contain responsibility or capabilities required of high level IT professionals (e.g., development of lower level IT professionals and successful project conclusion.) Meanwhile, the main point of the KPIs of levels 4-7 is that “individuals have experience of concluding projects successfully as team leaders.”

The individuals at level 3 are requested to “independently perform” duties that “fulfill business requirements.” Because they are accountable for outcomes of duties as team members, they are expected to possess “practical business capabilities”; however, they need not have comprehensive business capabilities such as personal skills including leadership.

Levels 1 and 2 of ITSS describe that individuals at these levels are “able to perform” assigned duties “under the supervision of higher level IT professionals.” What meant here is to have “knowledge” and “skills” necessary to carry out duties assigned by team leaders with the direction of higher level IT professionals is requested rather than to have “practical business capabilities” to solve problems. Those who at level 1 are expected “to do part of duties under the supervision of higher level IT professionals,” and a major focus requested at level 1 is on possessing “knowledge.”

(2) Meaning of ITEE in level assessment

ITEE tests both knowledge and capabilities: basic knowledge important for IT HR and practical business capabilities based on project experience and results that individuals produce as IT HR. For this reason, ITEE has been highly valued in Japan, and many information service companies encourage their employees to take ITEE.

According to the proposal in the HRD WG Report, ITEE has been drastically revised in order to develop the objective HR assessment mechanism based on the Common Career/Skill Framework. The consistency of ITEE and 3 standards (ITSS, ETSS, and UISS) are ensured by using the Common Career/Skill Framework as a reference model.

All requirements in both the KPIs and the skill proficiency levels in ITSS are hereby consistent with quality and quantity of project experience and results, and business capabilities of ITEE successful applicants.

In other words, those who possess practical business capabilities required of a certain level of ITSS should be able to pass a corresponding level of ITEE. Therefore, the ITSS Center regards passing a certain level of ITEE as entering a corresponding level of ITSS⁹. ITEE successful applicants should apprehend contents of the higher level KPIs of ITSS to broaden their experience in order to attain “business capabilities” of higher levels.

From a conception that ITSS assesses contributions of individuals in diversified business activities, it is tough to set up uniform criteria across companies, organizations, etc.. Hence, ITSS uses terms to indicate degrees of skills such as “complex,” “sophisticated,” “advanced,” and “successful” but specific contexts or standards.

On assessment, companies, organizations, etc. are requested to create environment to give a transparent and objective HR assessment. It is also necessary to “visualize” reasons of an HR assessment by measurable numbers for fair evaluation, not by sense.

Assessment guidelines for each level in ITSS are as follows.

1. ITSS level 1

ITSS level 1 expects individuals to perform assigned duties under the supervision of higher level IT professionals regardless of specialty fields or job categories. The individuals at this stage are anticipated to learn and acquire basic “knowledge” widely.

Information Technology Passport Examination is to test individuals for the minimum “basic knowledge” necessary for IT professionals. When an individual

⁹ When individuals are assessed without ITEE, needless to say, the “KPIs” and “skill proficiency levels” remain available as level assessment guidelines. The “KPIs” and “skill proficiency levels” are useful for organizations that are not able to give priority to ITEE for certain reasons. This is also recommended for assessment of human resources who have actual business outcomes and results yet have no successful achievement of ITEE.

passes this exam, he/she is regarded as having already attained the minimum capabilities in ITSS level 1.

2. ITSS level 2

ITSS level 2 expects individuals to comprehend skills required to fulfill assigned duties as team members under the supervision of higher level IT professionals, and to perform part of duties independently. The individuals at this stage are anticipated to acquire “knowledge” and to learn how to apply “skills” by using the “knowledge.”

Fundamental Information Technology Engineer Examination consists of two kinds of tests: a “knowledge” test and a “skills” test (multiple-choice questions are designed for individuals with relevant experience to be able to select right answers.) Fundamental Information Technology Engineer Examination is to test individuals for “knowledge” and “skills” necessary to perform duties “under the supervision of higher level IT professionals.” When an individual passes this exam, she/he is regarded as having already attained the minimum capabilities (possession of the basic “knowledge” and “skills”) in ITSS level 2.

3. ITSS level 3

ITSS level 3 expects individuals to possess “business capabilities” for performing assigned duties as team members independently (since capability of being able to execute duties as team members is required in level 3, a substance of the “business capabilities” here means application “skills.”) From this level, individuals’ specialties in job categories are gradually formed.

Applied Information Technology Engineer Examination also consists of two kinds of tests: a “knowledge” test and a “skills” test. Applied Information Technology Engineer Examination is to test individuals for the “knowledge” and “skills” defined in ITSS level 3 (individuals’ application skills are measured in short answer questions.) When an individual passes this exam, she/he is regarded as having already attained the minimum capabilities (possession of the application “knowledge” and “skills”) in level 3.

About level 3 and higher levels of ITSS, individuals should become aware of their career formation based on their expertise. When making a decision on which job category in which specialty field in ITSS she/he is going to aim at, an individual should make consideration of her/his current duties and past experience.

4. ITSS level 4

ITSS level 4 expects individuals to have established their specialty fields, to be able to instruct team members as team leaders, and to have enough skills and knowledge to produce outcomes that meet required degrees. Those who at this level are also requested to make contributions as IT professionals, such as development of lower level IT professionals.

Advanced-level Examination, which is consisted of Information Technology

Strategist Examination, System Architect Examination, Project Manager Examination, Network Specialist Examination, Database Specialist Examination, Information Security Specialist Examination, and Information Technology Service Manager Examination etc., is to test individuals for “knowledge” and high level “skills”¹⁰ defined in each specialty field of ITSS level 4. When an individual passes the exam(s), she/he is regarded as having almost met the minimum level of the skill proficiency required of the job category(s) or specialty field(s) in ITSS.

There are two types of results to determine level 4. One is results produced by exercising business capabilities and fulfilling obligation that are demanded in the real business field. The other is results of what high level IT professionals are expected to do (e.g., technological innovation and development of lower level IT professionals.) Therefore, the determination of level 4 requires assessment by both a result of the Advanced-level Examination and the KPIs.

¹⁰ Japan Information-Technology Engineers Examination Center (JITEC) defines the “practical capability” in Advanced Examination (for level 4) as high level “skills.” There are two types of tests in Advanced Examination to appraise the high level “skills.” In short-answer questions, applicants are given virtual cases and are asked to write suitable actions to solve problems as high level IT professionals by using their knowledge and experience. In long-essay questions, which maintains the same perspective as the short-answer questions put, they are asked to write based on their experience how to organize problems and countermeasures, necessary steps toward ideal situation, etc..

Here is shown the correspondence of the job categories and specialty fields to the Information Technology Engineers Examinations.

Table1: Correspondence to the Information Technology Engineers Examination (ITEE)

| Level | Job Category | Specialty Field | Examination | Note |
|---------|--|-----------------------------------|---|------|
| Level 4 | Marketing | | Information Technology Strategist Examination (ST) | |
| | Sales | | Information Technology Strategist Examination (ST) | |
| | Consultant | | Information Technology Strategist Examination (ST) | |
| | IT Architect | | System Architect Examination (SA) and another | *1 |
| | Project Management | | Project Manager Examination (PM) | |
| | IT Specialist | Platform | | |
| | | Network | Network Specialist Examination (NW) | |
| | | Database | Database Specialist Examination (DB) | |
| | | Common application Infrastructure | | |
| | | System management | | |
| | | Security | Information Security Specialist Examination (SC) | |
| | Application Specialist | | System Architect Examination (SA) | |
| | Software Development | Operating system | | |
| | | Middleware | | |
| | | Application software | System Architect Examination (SA) | |
| | Customer Service | | Information Technology Service Manager Examination (SM) | |
| | IT Service Management | | Information Technology Service Manager Examination (SM) | |
| | Education | | | |
| Level 3 | Applied Information Technology Engineer Examination (AP) | | | |
| Level 2 | Fundamental Information Technology Engineer Examination (FE) | | | |
| Level 1 | Information Technology Passport Examination (IP) | | | |

*1: For assessment of IT Architect level 4, Information Technology Strategist Examination (ST) can be also used instead of System Architecture Examination (SA).

The names of specialty fields are described when they have correspondence to the different examination.

The blank boxes in 'Examination' indicate that the job category or specialty fields do not have corresponding examinations.

Appendix (Glossary)

| | |
|---------|---|
| ETSS: | Embedded Technology Skill Standards Embedded Technology Skill Standards is the clarification and systematization of skills necessary to develop embedded software, and provide “measures”(common standards) useful for developing and utilizing engineers with embedded software skills. |
| HR: | Human resources |
| HRD: | Human resource Development |
| HRD WG | Human Resource Development Working Group |
| IPA: | Information-Technology Promotion Agency, Japan |
| IT: | Information Technology |
| ITEE: | Information Technology Engineer Examination |
| ITSS: | Skill Standards for IT Professionals |
| KPI: | Key Performance Indicator |
| METI: | the Ministry of Economy, Trade and Industry |
| Off-JT: | off-the-job training |
| OJT: | on-the-job training |
| UISS: | Users’ Information System Skill Standards Users’ Information Systems Skill Standards is for the optimum deployment of information system function in business organizations, and for understanding and developing specifically human resources necessary for that. |

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