Information Technology Engineers Skill Standards

System Analysts

Contents

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1. Overview

1.1 Background of developing the "Information Technology Engineers Skill Standards"

At present, great hopes are placed on information technology as the sources of industry regeneration and new economic growth. This is because the roles of IT have been expanded from the tools for manufacturing cost reduction and service speedup to those for effective collaboration among enterprises and the creation of new industries. From now on, the rise or fall of an enterprise will be determined by quality of computerization investment. It is therefore an urgent matter to bring up engineers who construct advanced information systems and those who utilize them.

In view of this, the Central Academy of Information Technology has repeated a study on how to bring up, evaluate, and select good engineers who can show their practical ability on actual jobs. As a conclusion, the academy decided to establish the "information technology engineers skill standards" centering on the criteria to determine whether the required jobs can be performed adequately or not.

1.2 Significance and objective of developing the "Information Technology Engineers Skill Standards"

The results of surveys that the Central Academy of Information Technology has conducted on information processing engineers have suggested an important issue to be solved in the industrial world and by educational institutions such as schools. The issue is the establishment of the guidelines that clearly define what the industrial and educational worlds are expecting to get. While these guidelines need to define the level of knowledge, skills and capability to be equipped with by IT personnel (engineers) who do the actual jobs in the industrial world, they need to define the models of IT engineers who can be accepted internationally, and the ways how schools and other educational institutions should conduct education training on the basis of these models. One example of the guidelines is the "Skill Standard for IT Engineers" developed by the Northwest Center for Emerging Technologies (NWCET) as part of the establishment of "Skill Standards" by the US Department of Labor.

The "Information Technology Engineers Skill Standards" have been developed as a tool that solves the issue mentioned above, and apply to all the sections of the information technology engineers examinations as criteria to evaluate the skills of engineers who have been brought up. The application of this skill standard is significant for the industrial world in "recruiting human resources with the guaranteed ability to do actual jobs." For educational institutions such as schools, this is significant for "understanding and confirming the knowledge, ability, and the achievement levels of the engineers required by enterprises." For government agencies, this is significant for "grasping the technical level of the entire industrial world."

1.3 Configuration of the "Information Technology Engineers Skill Standards"

The "Information Technology Engineers Skill Standards" is a tool that provides information about knowledge and skill needed to do jobs such as building, operational control, usage and evaluation of IT system in organizations such as corporations. It also provides indicators to determine the outcome of jobs. "Information Technology Engineers Examinations: Overview of the New System" and "Information Technology Engineers Examinations: Scope of Examinations" describe knowledge, technology (technical knowledge), and ability that information processing engineers need to have, and performance indicators (listed in ①, ②, and ③ below). The established skill standards describe these points more specifically by consulting actual jobs.

1) Roles and jobs
2) Expected technical levels
3) Scopes of examinations: examination in the morning and that in the afternoon
   (The above information can be downloaded to access http://www.jitec.jipdec.or.jp/.)

The "Information Technology Engineers Skill Standards" consists of three kinds of technical information described below. In this standard, individual skill standards are established for each examinees classified according to examination categories.

(1) Key activities

This chapter describes jobs that are keys unique to each examination categories. It describes the "roles and jobs" in 1) above more specifically.

(2) Skill criteria

This chapter describes what knowledge and skill should be used to do the key activities in (1) above, and also describe performance indicators to determine what outcome should be obtained. It describes "expected technical levels" in 2) above more specifically.

(3) Body of knowledge

This chapter systematically describes common knowledge independent of examination categories and knowledge needed to do the key activities in (1) above. This chapter also covers the "scopes of examinations" in 3) above.

1.4 Image of a "System Analyst" and Skill Standards

These skill standards are provided to apply the framework of the aforementioned information technology engineers' skill standards to "system analysts."

(1) Image of applicable persons

Based on business strategies, system analysts create information strategies, information systems concepts and systems plans. They also are involved in supporting information system development projects and business process innovation promoted together, and in evaluating the results. Thus system analysts are required to have consulting abilities on the selection and installation of the information technology optimum for the information strategies of the enterprise and the ability to achieve the maximum effect from the investment in the information system.

In planning information system development projects and analyzing system requirements, system analysts play important roles to complement the works conducted by project managers and application systems engineers.

(2) Skill Standards

The skill standards below apply to system analysts:

1) IT common body of knowledge
2) System analyst
   - Key activities, skill standards, practical body of knowledge, and core body of knowledge

2. Key Activities

Key activities of system analysts are those important tasks to be performed in order to strategically create system plans required by the enterprise management and to realize the most cost-effective information systems. In the skill standard, this set of works is referred to as an "information system planning process."

The information system planning process consists of seven basic activities shown in Fig. 2-1.

Advice on creating the enterprise business strategies
Creation of information strategies
Creation of information systems conception
Creation of system plans
Support to information system development project planning
Evaluation of systems
Consultation on informationalization

Fig. 2-1 Information System Planning Process

Each activity is decomposed into more detailed works called "tasks." In the skill standard, the information system planning process is presented as follows:

Activity	Task	Job outline
1. Act 1	1-1 Task 1	x x x x x x x x x x x x x x
	1-2 Task 2	x x x x x x x x x x x x
	1-3 Task 3	x x x x x x x x x x
2. Act 2	2-1 Task 1	x x x x x x x x x x x
	2-2 Task 2	x x x x x x x x x x x x x
	2-3 Task 3	x x x x x x x x x x x x x x x
	2-4 Task 4	x x x x x x x x x x x x

The major activities of system analysts are "Advice on creating the enterprise's business strategies." "Creation of information strategies," "Creation of information systems conception," "Creation of system plans," "Support to information system development project planning," "Evaluation of systems," and "Consultation on informationalization" as shown in Fig. 2-1.

[Information System Planning Process]

Activity	Task	Job outline
1. Advice on creating the enterprise business strategies	1-1 Confirmation of enterprise business requirements	Reviewing and understanding the following regarding enterprise business requirements: (1) Business policy (2) Enterprise goal (3) Intermediate and long-range conceptions (4) Enterprise business strategies
	1-2 Advice on creating business models	Advice on the following works by the CIO, staff members, etc: (1) Investigating and evaluating the business value of IT (2) Developing business models and establishing business processes
	1-3 Understanding of business models at the business process level	Organizing and understanding a business model as follows: (1) Diagramming at a business process level

Activity	Task	Job outline
2. Creation of information strategies	2-1 Investigation and analysis of the operational environment (business environment)	Performing the following concerning the business environment: (1) Analyzing the business environment, including markets, competitors, clients, regulations, and the economic situation (2) Identifying the relationship between the results of business environment analysis and the enterprise goals
	2-2 Investigation and analysis of current business processes	Performing the following concerning the current business operations: (1) Gathering information on organizations and technology related to the current business processes (2) Analyzing and extracting business process problems (3) Evaluating administration and operations in the industry (evaluating users' information utilization and IT use capability)
	2-3 Investigation and analysis of current information systems	Performing the following concerning the information systems: (1) Analyzing objectives, functions, architectures, sizes, capabilities, maintenance, operation, failures, etc. of the current and future information systems. (2) Extracting information system problems (3) Evaluation of the technical level in industry (ensuring the industry's average technical level)
	2-4 Investigation and analysis of the information technology trend	Performing the following concerning IT: (1) Investigating and understanding a technical trend which helps create enterprise information strategies (2) Analyzing IT use which makes it possible to attain business goals, to maintain competitive edge, and to create a business opportunities
	2-5 Creation of basic strategies	Performing the following concerning basic strategies: (1) Identifying and prioritizing business processes to be developed, improved or innovated (business development/improvement/innovation areas) (2) Making sure that what should be developed, improved, and innovated comply with business objectives (3) Creating intermediate and long-range plans (including confirmation that resources will be available to carry out the plans) (4) Preparing evaluation criteria for information strategies

	2-6 Selecting the overall image of the new business processes and the things in which investment is to be made	Performing the following based on basic strategies: (1) Examining the modeling of the highest-level business functions and business organizations which will be required in the enterprise in the future modeling (2) Creating an image of the new overall view of targeted business processes (including study of restructuring business processes) (3) Estimating cost for attaining the new business goal and analyzing its effect and potential risk (4) Selecting the information system in which an investment is to be made, and establishing its goal
	2-7 Creation and approval of information strategies and proposal of the implementation organizations for them	Performing the following according to the new overall view and investment goal which are determined according to the business requirements and basic strategies: (1) Documenting information strategies (information strategy guidelines) (2) Approving information strategy guidelines at the enterprise management level (3) Proposing an information strategy implementation organization

Activity	Task	Job outline
3. Creation of information system conception	3-1 Definition of problems in target business systems	Performing the following concerning the target business systems: (1) Identification of targeted business process flow and information handled (2) Sorting out the confirmed items from the information system's view (3) Analyzing problems and finding their solutions in the targeted business processes (4) Defining the solutions which can be realized by developing an information system
	3-2 Analysis of targeted business system	Performing the following concerning the targeted business system: (1) Checking the current information system related to development, improvement, and innovation of the business processes ① Functions, data, and system architecture ② Methods of maintenance and operation, and organization and management of maintenance and operation ③ Quality (2) Analyzing and classifying functions and data for restructuring business functions
	3-3 Study of applicable IT	Performing the following to materialize new business processes: (1) Determining research goals, scope, and items, and conducting the research (2) Considering applicability of the research results to the new business processes (3) Considering the IT utilization enhancement program (an IT use scenario)
	3-4 Creation of business process model	Performing the following concerning all the related business processes and the targeted processes: (1) Restructuring and modeling of business functions (2) Considering the target business processes based on applicable information technologies (3) Considering consistency between the targeted processes as a whole and business functions (4) Sorting out major changes to the business process and system as well as concrete problems in implementing business processes
	3-5 Determination of the system architecture	Performing the following concerning the system architecture: (1) Making clear system functions which support the business functions (2) Making clear process flows and data which are related to the system functions (3) Determining system architecture which is needed to realize the system functions (4) Making clear major data bases and network configurations

	3-6 Prediction of the cost and effect of a system investment	Performing the following concerning the system investment: (1) Predicting a quantitative effect (sales increase, cost reduction, etc.) when the system is provided (2) Predicting a qualitative effect (organizational vitalization, improved personnel abilities to use IT, etc.) when the system is provided (3) Estimating roughly the period, organization and workload of system development, operation, and maintenance, and estimating the system implementation cost (4) Clarifying the effect of an investment in a system and the timing of realizing the effect on the basis of cost vs effect
	3-7 Verification of the information strategy	Performing the following to ensure that a enterprise goal and business and information strategies are carried out: (1) Verification consistency of business process models (2) Verification system architecture feasibility (3) Verification the rational of the effect of a system investment
	3-8 Creating of conception and obtaining approval for it information system	Performing the following, taking into account the result of information strategy verification: (1) Documenting an information system conception (2) Obtaining approval from the responsible person in charge of the information system department or CIO (3) Preparing evaluation criteria for an information system conception

Activity	Task	Job outline
4. Preparation of system plan	4-1 Study of feasibility of implementing basic requirements	Performing the following to confirm and realize basic requirements: (1) Confirming basic requirements for development, operation, maintenance, transition, environment build up, and quality (2) Making clear basic guidelines for system construction (objectives, means, personnel, period, deadline, equipment, cost, operational and responsibility assignments, etc.) (3) Examining the satisfactoriness, technical and economical feasibility of prerequisites (personnel, deadline, cost, etc.)
	4-2 Preparation of a rough development schedule	Preparing a development schedule, using the following procedures: (1) Decomposing the entire system into subsystems (2) Prioritizing the subsystems for development (taking into account effects on related departments and business processes) (3) Preparing a rough development schedule for each subsystem (taking into account personnel, the deadline, cost, consistency, etc.)
	4-3 Establishing system selection principles	Performing the following to provide a system of the selected type: (1) Making clear basic functional requirements, configuration requirements, and acquisition requirements (vendor requirements, product requirements, etc.) for the system (hardware and software) and budgetary limitations (2) Making clear the scope of system selection attempts
	4-4 Establishing an information system development project implementation organization	Performing the following, based on estimated cost and effect of investment in the system: (1) Making sure that prerequisites such as workload, personnel, and cost are satisfied (2) Establishing an information system development project implementation organization
	4-5 Setting clear basic guidelines for system transition	Performing the following concerning system transition: (1) Making clear system transition principles (2) Making clear basic transition requirements (for data base transition, network transition, changes to business processes) (3) Making clear a rough transition plan

	4-6 Making clear basic guidelines for system operation and maintenance	Performing the following concerning system operation and maintenance: (1) Making clear basic guidelines for system operation and business operation (2) Making clear basic requirements (organizations, procedures, etc.) for system operation and business operation (3) Making clear basic requirements (organizations, procedures, etc.) for maintenance (taking into account actions against system failures) (4) Making clear system change guidelines
	4-7 Making clear basic guidelines for setting up the environment	Performing the following concerning the environments (development, operation, and maintenance environments): (1) Making clear environment setup guidelines (2) Estimating rough system needs for each period (estimating information system resources for each period) (3) Computing the amount of system resources used
	4-8 Making clear basic guidelines for training	Performing the following concerning training of users and developers: (1) Making clear basic training requirements (business, objectives of training, the scope of training, training organization, training facilities, and the training environment) (2) Roughly organizing a training schedule
	4-9 Making clear basic quality guidelines	Performing the following concerning the system quality criteria and quality assurance system (including security measures and a contingency plan): (1) Specifying guidelines for establishing system quality criteria (2) Proposing a quality assurance system
	4-10 Preparing a system plan and obtaining approval	Documenting the following and obtaining approval of a system plan from the manager of the information system department or CIO: (1) Workloads cost, and schedule of development, operation, and maintenance of a constructed system (2) Prerequisites concerning basic requirements, etc. for environment setup, training, and quality

Activity	Task	Job outline
5. Support to information system development project planning	5-1 Support to information system development project plan preparation	Giving support and advice when the project manager prepares a project plan document from the viewpoints of the information system conception and the general system plan: (1) Making clear organizations, resources, work items, and the schedule which are needed to develop, operate, and maintain the information system. (2) Making clear work items, work scopes, and schedules, etc. in case of outsourcing. (3) Making clear system products and vendor procurement specifications and conditions
	5-2 Advice for obtaining approval for an information system development project plan	Performing the following in the process of obtaining an approval to the information system development project: (1) Answering questions from manager of the information system department (2) Answering questions from CIO

Activity	Task	Job outline
6. Evaluation of systems	6-1 Evaluating system operation	Receiving a system operation evaluation report from the system administrator and reviewing request for improvement regarding the following on the system aspects, especially related to information strategies: (1) Degree of providing requested functions (2) Response time, processing time, and resource utilization (3) System failure frequency, the number of failures, recovery time, and availability (4) Security (5) Effects of operation
	6-2 Evaluating business processes	Receiving a business process evaluation report from the system administrator, evaluating the following from business process aspects, and reviewing requests for improvement: (1) Degree of providing requested functions (2) Request for improvement of business processes which fit current business processes (increasing business efficiency and ease of use, etc.) (3) Evaluating the effects of the investment and business processes in cooperation with user representatives

Activity	Task	Job outline
7. Consultation on informationali-zation	7-1 Comprehensive consultation on an information system	Giving advice on the following concerning an information system: (1) Creation of information strategies (2) Creation of a system plan (3) Support to business process innovation in the user department (4) Evaluation of the System evaluation (5) System solution proposals
	7-2 Advice on IT use	Giving advice on the following concerning IT use in the user department: (1) Selection and installation of software packages (2) Promotion of e-business (3) Installation of knowledge management (4) Use of an application service provider (ASP), etc.

3. Skill Criteria

Skill criteria are a tool (a list) with which to measure whether a series of activities in a system planning process by a system analyst have been successfully performed using proper procedures, methods, knowledge, and skills.

The skill criteria provide indicators (achievement indicators) which show what outcome needs to be obtained by performing each task in each of the seven activities. The standards also specify the knowledge (Required Knowledge) and skills (Required Skills) which are needed to perform each task.

[System Analysts Skill Criteria]

1. Advice on creating enterprise business strategies				
No.	**Task**	**Performance indicators**	**Required knowledge**	**Required skill**
1-1	Confirmation of business requirements	• Business policies must be correctly understood. • Business goals must be correctly understood. • Intermediate and long-range plans must be correctly understood. • The target domain (business domain) must be correctly identified.	• Common knowledge of business in general • Knowledge of key items of business requirements	• Ability to gather information required to understand business requirements • Ability to identify matters related to informationalization related to business requirements • Ability to understand key business matters
1-2	Advice on making a business model	• Using a new business model, innovative business domain must be clearly identified. • Proper advice on business model planning must be given in terms of information strategy and information resource allocation. • Effects must be clearly described which bring changes to the business environment and IT revolution have on business.	• Knowledge of business models • Knowledge of framework review for business model planning • Knowledge of planning business models • Knowledge of the business value of IT • Knowledge of competitiveness analysis • Knowledge of the enterprise business domains and to recommend countermeasures • Knowledge of enterprise competence • Knowledge of alliance	• Ability to analyze business methods in the enterprise domain from various angles • Ability to understand the significance of a new business model and study its feasibility • Ability to analyze and predict the effect of the IT revolution on a business model
1-3	Understanding at a business process level	• A business model must be correctly understood at a business process level.	• Knowledge of business processes • Knowledge of business process analysis and representation	• Ability to gather information on processes covered by a business model • Ability to understand a business model at a business process level • Ability to explain business processes to persons concerned with business model planning

2. Creation of Information Strategies

No.	Task	Performance indicators	Required knowledge	Required skill
2-1	Investigation and analysis of the business environment	• The external environment must be correctly understood. • The relationship between the results of external environment analysis and the business targets must be documented. • Information must be continuously gathered.	• Knowledge of methods of investigating and analyzing the external environment • Knowledge of macro-economics • Knowledge of the industry trend and competitors • Knowledge of related law, rules, and regulations • Knowledge of documentation	• Ability to investigate the trends of the market and competitors • Ability to make clear most important matters from the results of investigation • Ability to identify the gap between the results of external environment analysis and the business goals
2-2	Investigation and analysis of current business processes	• The internal environment must be correctly understood. • Business problems must be analyzed and extracted, and the results documented. • The management and process aspects in the industry must be evaluated, and the results documented.	• Knowledge of methods of investigating and analyzing the internal environment • Knowledge of general basic business processes • Knowledge of business administration and its methods • Knowledge of documentation	• Ability to investigate an enterprise's organization, technical capabilities, etc. • Ability to make clear most important matters from the results of investigation • Ability to identify operational needs and defects
2-3	Investigation and analysis of the current information system	• The goal, functions, system architecture, size, capabilities, cost, operation, maintenance, and failure situation of the current information system must be correctly understood. • Problems with the information system which occur or are likely to occur in the near future must be properly identified and documented. • The average technical level in the industry must be understood.	• Knowledge of information system investigation, analysis, and evaluation • Knowledge of documentation	• Ability to investigate information systems • Ability to establish evaluation criteria for information systems
2-4	Investigation and analysis of an information technology trend	• The information technology trend must be entirely and comprehensively understood. • Methods of using IT which are applicable to business and information strategies are appropriately identified, analyzed, extracted and documented. • Information must be continuously gathered.	• Knowledge of the IT trend • Knowledge of methods of IT trend investigation • Knowledge of documentation	• Ability to sort out IT information so that it can be used to promote business and information strategies • Ability to find and keep IT information sources • Ability to evaluate the value of IT utilization

2-5	Establishing a basic strategy	• What should be developed, improved, and innovated must be properly identified and given relative priorities • Contribution of development, improvement, and innovation to business goal attainment must be properly evaluated. • Intermediate and long-range plans must be established to attain enterprise goals. • Proper means to obtain resources must be available to realize development, improvement, and innovation. • Criteria for prioritizing development, improvement, and innovation items must be established, taking business requirements and resource availability into account. • What to be developed, improved, and innovated must be documented.	• Knowledge of business process analysis methods • Knowledge of enterprise business strategies • Knowledge of enterprise business resources • Knowledge of documentation	• Ability to explain a basic strategy to persons concerned • Ability to create intermediate and long-range plans according to the enterprise business strategy • Ability to conduct negotiations to obtain business resources • Ability to coordinate opposing opinions
2-6	Determining overall image of business processes and investment targets	• Business process functions and organizations must be modeled at the highest level to draw up a new overall image. • The gap between the new overall image and the current information system must be known, and information system requirements must be clear. • The target of an information system must be selected according to the new overall image, and the goals established. • A proper target for information system investment must be selected according to the scale of a project, its priority, and necessary resources, and the goals established and documented.	• Knowledge of business process analysis methods • Knowledge of modeling • Knowledge of BPR • Knowledge of documentation	• Ability to extract operational functions and information from what should be developed, improved, and innovated • Ability to check whether the functions complies with the information • Ability to refine and evaluate a model • Ability to determine the targets of an investment • Ability to explain the reason to determine on investment to the parties concerned • Ability to consider BPR
2-7	Establishing an information strategy, obtaining its approval, and proposing an implementation organization	• Information strategy guidelines must be documented in the standard format used by the enterprise. • Information strategy guidelines must be distributed to the persons concerned and approved by them. • A information strategy implementation organization in the information department must be properly proposed.	• Knowledge of the standard of description formats for information strategy guideline • Knowledge of documentation	• Ability to explain information strategy guidelines to a person responsible for promoting an information strategy and obtain his or her approval • Ability to coordinate opposing opinions • Ability to evaluate the efficiency of the implementation organization in the information system department

3. Creation of an Information System Conception

No.	Task	Performance indicators	Required knowledge	Required skill
3-1	Defining the problems in the business processes	• Information strategy guidelines must be correctly understood. • The flow of the business processes and the information must be sorted out from the standpoint of the information system. • Problems in the business processes must be properly analyzed. • Problems which are to be solved by installing the an information system must be documented (as an information system conceptual plan).	• Knowledge of information strategy guidelines • Knowledge of how to find and solve a problem • Knowledge of documentation	• Ability to gather information to understand information strategy guidelines • Ability to analyze processing performed by the information system and processed information, from the functions, information, and organization of the business processes. • Ability to correlate information system to business process problems
3-2	Analyzing the business system	• The current information system which requires new development/improvement/innovation functions, data, system architecture, maintenance and operation methods, maintenance and operation organizations, administration organization and quality must be correctly grasped. • Functions and data must be sorted out and documented so that the functions and data can be used for the reconstruction by development/improvement/innovation • The effect of system failure must be analyzed to set a failure management level.	• Knowledge of the current information system • Knowledge of risk identification and the effect of risk • Knowledge of system failure • Knowledge of documentation	• Ability to obtain materials related to the current information system • Ability to understand the functions of the current information system and characteristics of the data
3-3	Investigating applicable information technology	• Principles of information technology trend investigation (objectives, the scope of investigation, items to be investigated) must be clear. • Based on the results of investigation, the applicability of IT to new business processes must be studied. • The results of study must be documented.	• Knowledge of IT trend research methods • Knowledge of IT trend evaluation methods • Knowledge of documentation	• Ability to research and evaluate an IT trend based on study principles

3-4	Making an business process model	• The targeted business processes and all the related business processes must be sorted out, and the reconfiguration and modeling of business functions should be properly done. • Applicable IT must be matched with the business functions, and the consistency of the entire information system is ensured. • Major changes to the business processes and information system and specific problems in the conduct of business processes must be correctly sorted out. • Major changes to the business process model and information system and specific problems in the execution of the business processes must be documented.	• Knowledge of sorting out major changes to the business processes and information system and specific problems in executing the processes the operation • Knowledge of business processes models • Knowledge of operational processes • Knowledge of data classes (entities) • Knowledge of documentation	• Ability to analyze and define an business process model by correlating a business process with a data class • Ability to evaluate and determine the business process model • Ability to explain the business process model to persons concerned • Ability to coordinate opposing opinions
3-5	Determining the system architecture	• The major functions of the information system must be clear. • Information and processing which are needed to provide the major functions must be clear. • System architecture which provides the major functions must be clear. • Data bases and networks which are essential to the major functions must be clearly listed and configured. • Software package installation and use of outside resources must be considered. • The major functions, architecture, etc. of the information system must be documented.	• Knowledge of system architecture • Knowledge of networks and data bases • Knowledge of software packages • Knowledge of documentation	• Ability to decompose functions • Ability to evaluate and analyze system architecture

3-6	Predicting the cost and the effect of a system investment	• The quantitative and qualitative effects of an information system must be properly predicted. • The prediction of the approximate time length, organization and workload for the development, operation, and maintenance of an information system must be adequate. • Information system cost must be properly estimated. • The cost and the effect of the information system must be property considered. • The cost and the effect of an investment in the information system must be documented.	• Knowledge of quantitative and qualitative effects of the systematization • Knowledge of cost estimation methods for system development, operation, and maintenance • Knowledge of documentation	• Ability to use prior data to estimate cost • Ability to consider cost risk • Ability to predict the time when an investment effect appears • Ability to consider a cost cut • Ability to explain the effect of an investment in a system
3-7	Verifying the information strategy	• Items described in information strategy guidelines must be correctly understood. • The feasibility of the enterprise goal, business strategy as well as information strategy has been examined with the business process model and system architecture. • The results of the examination must be put in order.	• Knowledge of information strategy guidelines • Knowledge of business process models • Knowledge of system architecture • Knowledge of the effect of an investment in a system	• Ability to discern adaptability to an information strategy
3-8	Creating an information system conception and obtaining approval	• Information strategy guidelines must be documented in the standard description format used by the enterprise. • Information system conceptual plan must be distributed to persons concerned and approved by them	• Knowledge of the standard description formats for information system conceptual plan • Knowledge of documentation	• Ability to explain information system conceptual plan to a person responsible for promoting an information strategy and obtain his or her approval • Ability to coordinate opposing opinions

4. Creation of a System Plans

No.	Task	Performance indicators	Required knowledge	Required skill
4-1	Examining the feasibility of basic requirements	• Basic requirements for development, operation, maintenance, transition, environmental setup and quality of an information system must be correctly understood. • The basic guidelines of objectives, period, cost as well as work and responsibility allocation of an information system must be clear. • The prerequisites for basic requirements must be satisfied, and technical and economic feasibility must be examined.	• Knowledge of an information system conceptual plan	• Ability to discern the degree of difficulty of realization • Ability to discern the allowance range of the prerequisites • Ability to find problems and countermeasures • Ability to explain feasibility to persons concerned
4-2	Preparing a rough development schedule	• The information system must be divided into subsystems which meet the basic requirements. • Proper development priorities must be given to the subsystems. • The schedule for each subsystem must meet the basic principles.	• Knowledge of subdividing a system • Knowledge of scheduling techniques	• Ability to determine the priorities of subsystem development • Ability to explain the subsystem decomposition, prioritization and the schedule to persons concerned
4-3	Establishing system selection principles	• System architecture must be clear in terms of basic functions, configuration requirements, and cost limits. • The scope of system selection research must be clear.	• Knowledge of system architecture	• Ability to identify key points of system selection • Ability to identify the scope of system selection research
4-4	Establishing an information system development project promotion set-up	• Personnel, delivery deadline, and cost restrictions must be taken into account. • The configuration of the development project, the number of necessary personnel, their role assignments, cooperation of the user department must be made clear.	• Knowledge of organization building	• Ability to establish an efficient implementation organization within the constraints • Ability to explain project implementation organization to persons concerned and perform coordination when it is established
4-5	Making clear basic system transition principles	• Principles and basic requirements for system transition must be clear. • A rough system transition plan must be made clear.	• Knowledge of system transition • Knowledge of a system to be in transition	• Ability to anticipate failures which are likely to occur during the system transition and countermeasures • Ability to explain transition principles and basic requirements to persons concerned and perform coordination

4-6	Making clear basic principles for system operation and maintenance	• Basic requirements for the operation and maintenance principle, schedule, etc. of the system/business processes must be clear. • Basic requirements for maintenance organization and works for failures during system operation must be clear. • The principles system operation tasks must be clear.	• Knowledge of system operation and maintenance • Knowledge of system reliability • Knowledge of business process operation and maintenance	• Ability to determine a system reliability indicator • Ability to identify failures which are likely to occur during system operation • Ability to take into account cost constraints on system operation and maintenance • Ability to explain system operation and maintenance principles to persons concerned
4-7	Making clear basic principles for environment setup	• The periods and quantities of usage of information system resources in a general framework required for setting up the environment must be properly estimated.	• Knowledge of estimating the time lengths and quantities of the usage by periods of information system resources in a general framework required for building the environment • Knowledge of environments	• Ability to gather data needed to estimate the cost to set up environment • Ability to explain an estimated time length and amount of usage to persons concerned and perform coordination when the estimation is done
4-8	Making clear basic principles for training and education	• The objectives and scope of training and education on business processes and the system must be clear. • The training organization, facilities, environment, and schedule for education and training must be clear. • A schedule of training and education for business process and system must be clear.	• Knowledge of user's needs for training • Knowledge of developer' needs for training	• Ability to know needs for training • Ability to make clear when training is needed
4-9	Making clear basic principles for quality assurance	• Basic system quality requirements must be clear. • Basic requirements for a system quality assurance organization must be clear. • Continuous quality improvement action must be taken into account.	• Knowledge of quality criteria used by the enterprise • Knowledge of security countermeasures and contingency	• Ability to discern user's quality needs • Ability to evaluate quality criteria • Ability to evaluate and select quality assurance processes
4-10	Designing and approving a system plan	• A system plan must be documented in the standard format used by the company • A system plan must be properly evaluated in terms of technology, operation, and economics. • A system plan must be distributed to persons concerned and approved by them.	• Knowledge of standard formats for describing the system plan • Knowledge of documentation	• Ability to explain a system plan to a person responsible for information strategy implementation and obtain his or her approval • Ability to explain a system plan to persons concerned with information strategy implementation and secure their cooperation • Ability to coordinate opposing opinions

5. Support to Information System Development Project Planning				
No.	**Task**	**Performance indicators**	**Required knowledge**	**Required skill**
5-1	Supporting an information system development project planning	• The project plan must comply with the information system conception and the system plan.	• Knowledge of the project plan	• Ability to sufficiently communicate with the project manager • Ability to evaluate a project from an information strategy standpoint
5-2	Advice on obtaining approval for an information system development project plan	• Questions from a person who is in a position to approve a project must be properly answered.	• Knowledge of a project plan approval process	• Ability to understand questions from a person who is in a position to approve a project

6. Evaluation a Systems

No.	Task	Performance indicators	Required knowledge	Required skill
6-1	Evaluating system operation	• A system operation evaluation report submitted by a system administrator must be correctly understood. • System operation problems and needs must be analyzed so that the problems and needs can be reflected in the next system plan.	• Knowledge of a system operation evaluation report	• Ability to know the extent to which a user's needs are met • Ability to gather key system improvement needs
6-2	Evaluating business processes	• An operation evaluation report submitted by a system administrator must be correctly understood. • Proposals for problem solutions on business process aspects are properly selected so that such improvements can be reflected in the next project.	• Knowledge of business process evaluation report	• Ability to know the extent to which a user's needs are met • Ability to know key improvement needs on business process aspect • Ability to understand at a system level the evaluation of the effects of the business processes performed by a user-department representative

7. Consultation on informationalization				
No.	**Task**	**Performance indicators**	**Required knowledge**	**Required skill**
7-1	Comprehensive consultation about an information system	• Operational innovations must be made by the user department initiative • Business process problems in the user department must be solved by a system solution.	• Knowledge of SI • Knowledge of BPR	• Ability to understand problems in business processes • Ability to make proposals to the user department
7-2	Consultation about IT use	• The user department staff members must be properly directed regarding IT installation. • Proper advice on e-business must be given to executives, CIO, and user department staff members. • Proper IT must be selected as a problem solving means in the user department and be in place.	• Knowledge of software package • Knowledge of knowledge management • Knowledge of application service providers • Knowledge of e-business	• Ability to understand a problem with the user department • Ability to make a proposal

4. Body of Knowledge

A system analyst knowledge system is a body of knowledge which is hierarchically organized on technical and problem-solving themes. Such knowledge is essential for successfully performing the business processes mentioned in "Section 2 Key Activities" and meeting needs for a more profound effect on business, a more effective investment in informationalization, and a more reliability.

A knowledge system necessary for system analysts consists of the following:

1) IT common body of knowledge
2) System analyst practical body of knowledge and core body of knowledge

Because the "IT common body of knowledge" of 1) is essential for not only for system analysts but applicants for all the test categories, it is described in an independent volume. For further information on the IT common knowledge system, refer to Information Processing Engineer Skill Standard "IT Common Knowledge System".

According to the scope of the information processing engineer proficiency test, system analysts are tested on knowledge of the following five fields:

"II. Computer system (Level II)"
"III. System development and operation (Level III)"
"VI. Security (Level II)"
"VII. Standardization (Level II)"
"VIII. Information System Introduction and Business (Level III)"

2) "System analyst practical body of knowledge and core body of knowledge" are organized knowledge and skills which are essential for producing an information strategy and planning an information system (in which system analysts demonstrate their ability most highly). Such knowledge and skills are also absolutely needed to support an information system development project for realization of the conception and innovations performed by the user department.

The practical body of knowledge consists of the following:

- A. Business General: Necessary for smooth communications between business strategy creation and information strategy creation.
- B. Information Systems: Closely related to information systems.
- C. Advice on Business Planning Strategy: Needed to give advice to a business strategy planners from a standpoint of informationalization.
- D. Creation of Information Strategy: Needed to prepare an information strategy and draw a new overall image of business processes.
- E. Creation of Information System Conception: Needed to select the business processes in which an informationalization investment is made to, determine the outline of system architecture, and to predict the investment effect.
- F. Creation of System Plan: Needed to create the entire system overall plan for systematization.
- G. Support to Project Planning: Needed to support the project plan which conforms to the systematization conception.
- H. System Evaluation: Needed to improve a system in operation and business processes.
- I. Consultation on Informationalization: Necessary for consultation on building an information system and selecting and installing IT.

The knowledge which belongs to the core body of knowledge has not been classified yet. This body of knowledge will be established in the future.

[System analyst practical body of knowledge and core body of knowledge]

Knowledge field	Major classification	Intermediate classification	Minor classification
A. Business general			
	1 Business strategy basics		
		1.1 Outline of business strategy	
			1.1.1 Significance of business strategy
			1.1.2 Development of concept of business strategy
			1.1.3 Business strategy system
			1.1.4 Business strategy and environment adaptation patterns
	2 Understanding business strategies and business problems		
		2.1 Understanding business strategy	
			2.1.1 Business principles
			2.1.2 Business domains
			2.1.3 Business resources
			2.1.4 Organizations and their roles
			2.1.5 Business planning
		2.2 Understanding the business environment	
			2.2.1 Outside environment
			2.2.2 Internal environment
		2.3 Understanding business problems	
			2.3.1 Business problems functions
			2.3.2 Business problems classified by hierarchies

	3 Knowledge of business strategy planning		
		3.1 Procedures for establishing business strategy	
			3.1.1 Establishing business principles
			3.1.2 Understanding the external and internal environments
			3.1.3 Analyzing fighting power in the business domain
			3.1.4 Making clear business domain and predicting market environment change
			3.1.5 Understanding business strategy problems
			3.1.6 Examining solutions to business strategy problems
			3.1.7 Creating business strategy conception
		3.2 Business strategy planning techniques	
			3.2.1 Analyzing the business environment
			3.2.2 SWOT analysis
			3.2.3 Marketing analysis
			3.2.4 Competitive analysis
	4 Business administration and decision making		
		4.1 Functions of business administration	
			4.1.1 Process of business administration
			4.1.2 Organization hierarchy and business administration
			4.1.3 Problems in administration principles
		4.2 Examining decision making	
			4.2.1 Common characteristics of decision making
			4.2.2 Structure of decision making
			4.2.3 Hierarchy of decision making and information characteristics

	5 Business organizations		
		5.1 Business strategy and enterprise organizational structure	
			5.1.1 Relationship between business strategy and organizations
			5.1.2 Types of strategies and organizational structures
		5.2 Strategic organization structure	
			5.2.1 In-house venture business
			5.2.2 Strategic business unit (SBU)
		5.3 Business strategy and enterprise organizational culture	
			5.3.1 Common characteristics of organizational culture
			5.3.2 Merger between business culture and organizational culture
			5.3.3 Fostering organizational culture
	6 Business models		
		6.1 Overview of business models	
			6.1.1 Significance of business models
			6.1.2 Business models and business processes
		6.2 Business models and business activities	
			6.2.1 Positioning the business model in the business strategy
			6.2.2 Framework of business model making
			6.2.3 Business models and e-business
		6.3 Patents for business models	
			6.3.1 Overview of patents for business models and criteria for granting patents

	7 IT and business innovation		
		7.1 Business innovation	
			7.1.1 Reducing hierarchical levels in organizations and increasing management, administration, and operation efficiency 7.1.2 Outsourcing of routine business processes 7.1.3 Business process innovation and BPR 7.1.4 Benchmarking 7.1.5 Core competence business 7.1.6 Sharing routine/non-routine knowledge (groupware, knowledge management) 7.1.7 Decision making and information processing 7.1.8 Business administration intended to increase employee satisfaction (ES) 7.1.9 Strategic M&A 7.1.10 Accounting globalization 7.1.11 High-level information literacy
		7.2 Market innovation	
			7.2.1 Increasing the number of consumer classes (expanded advertisement, reduced distance, disregarded time difference) 7.2.2 Market strategy (CRM) intended to increase customer satisfaction 7.2.3 Promoting e-business
		7.3 Production and distribution innovation (procurement/production/sales)	
			7.3.1 Supply chain (integration of material procurement, production, and sales; distribution model) 7.3.2 3PL (third party logistics)
		7.4 IT-related law, regulations, and organizations	
			7.4.1 IT basic law (tentative) 7.4.2 Organizations involved in information processing training and researches 7.4.3 EC-related organizations 7.4.4 Guidelines for personal information protection (privacy mark) 7.4.5 Online mark

Knowledge field	Major classification	Intermediate classification	Minor classification
B. Information systems			
	1 Information systems		
		1.1 Business and information strategies	
			1.1.1 Information strategy (significance, overview, basic functions) 1.1.2 Structure of information systems in enterprises and other organizations (hierarchical/functional structures, consistency with business/information strategies)
		1.2 Examples of applications of information systems	
			1.2.1 Data support systems (transaction processing systems, information report systems) 1.2.2 Decision-making support systems (DSS) 1.2.3 Executive support information systems (ESS) 1.2.4 Strategic information systems (SIS) 1.2.5 Deployment of pursuing information network strategies (diversification telecommunications media, organization theories of networking, strategy effect) 1.2.6 Package software (ERP)
		1.3 Information strategy problems and informationalization conception	
			1.3.1 Establishing systematization conception 1.3.2 Approach to systematization conception 1.3.3 Evaluating current information strategy 1.3.4 Finding information strategy problems 1.3.5 Determining effects of solutions to business problems and solution goals by information systematization
		1.4 Information system organizations	
			1.4.1 An information coordination executive and system operation committee (CIO, information system operation committee) 1.4.2 Organizations of information system planning, development, and operation control 1.4.3 Managing information-related affiliated companies 1.4.4 Use of IT outsourcing vendors

	2 Information system evaluation and security		
		2.1 Evaluating information system	
			2.1.1 Overview of information system evaluation 2.1.2 Evaluating in system planning processes 2.1.3 Evaluating in system development processes 2.1.4 Evaluating in operation and maintenance works
		2.2 Risk analysis	
			2.2.1 Concept of risk analysis 2.2.2 Risk management methods
		2.3 Information security	
			2.3.1 Concept of information security 2.3.2 Security management methods
	3 Framework of information system development		
		3.1 Common Framework 98: SLPC-JCF98	
			3.1.1 Planning process 3.1.2 Development process 3.1.3 Operation process 3.1.4 Maintenance process
	4 Information system-related criteria and guidelines		
		4.1 Criteria	
			4.1.1 System audit criteria 4.1.2 Information system safety countermeasure criteria 4.1.3 Computer virus prevention criteria 4.1.4 Unauthorized-access prevention criteria 4.1.5 ISO 15504 (Software Process Assessment) 4.1.6 CMM
		4.2 Guidelines	
			4.2.1 Software management guidelines

Knowledge field	Major classification	Intermediate classification	Minor classification
C. Advice on planning enterprise business strategy			
	1 Ascertaining enterprise business requirements		
		1.1 Confirming key points of enterprise business strategies	
			1.1.1 Business principles 1.1.2 Enterprise goals 1.1.3 Intermediate and long-range plans 1.1.4 Targeted domain (business domain)
	2 Advice on making business model		
		2.1 Advice on creating business models	
			2.1.1 Creating new business value 2.1.2 Establishing strategy for transition to a new business model 2.1.3 Reviewing new business architecture
		2.2 Advice on reviewing framework for business model creation	
			2.2.1 Investigating and reviewing the external and internal environments 2.2.2 Business strategy and fighting power adjustment 2.2.3 Making clear business innovation processes 2.2.4 Improving ability to deal with business environment change
		2.3 Knowledge of business models	
			2.3.1 Business transaction models using IT 2.3.2 Types of business models (mall, shop, community, e-market place, etc.) 2.3.3 Examples of typical business models 2.3.4 Dealing with business model patents 2.3.5 Anticipating risk after business model building
	3 Understanding at business process level		
		3.1 Knowledge of business processes	
			3.1.1 Business model hierarchy and business processes
		3.2 Business process analysis	
			3.2.1 Guidelines for reviewing business processes

Knowledge field	Major classification	Intermediate classification	Minor classification
D. Creating information strategy			
	1 Investigating and analyzing operational environment (business environment)		
		1.1 Analyzing operational environment	
			1.1.1 External environment (markets, competitors, clients, regulations, economic environment) 1.1.2 Analysis methods
		1.2 Making clear relationship with enterprise goals	
			1.2.1 Business success factors
	2 Investigating and analyzing the current operations		
		2.1 Gathering information and finding/analyzing problems related to the current operations	
			2.1.1 Organizations 2.1.2 Technical capability (productivity, degree of operation, ability to procure material, brand reputation, the number of patens) 2.1.3 Finding and analyzing operational problems (characteristic factor analysis)
		2.2 Evaluating management and business process aspects in the industry	
			2.2.1 Qualitative evaluation 2.2.2 Quantitative evaluation
	3 Investigating and analyzing information systems		
		3.1 Investigation and analysis of information systems and evaluation in the industry	
			3.1.1 Adaptability to business information strategy (objectives, functions, and information) 3.1.2 System architecture, scale, capability, and cost 3.1.3 Maintenance and operation methods, failure status, durability
		3.2 Finding information system problems	
			3.2.1 Problems in the current situation
		3.3 Evaluation in the industry	
			3.3.1 Technical level

	4 Investigating and analyzing information technology trend		
		4.1 Understanding information technology trend	
			4.1.1 Network 4.1.2 Data base 4.1.3 Security 4.1.4 e-business 4.1.5 Law, regulations, and organizations 4.1.6 Software packages 4.1.7 Information sources (vendor information, examples) 4.1.8 System architecture changes (Web 3-layer CSS, etc.) 4.1.9 System development technology (object-oriented technology, etc.) 4.1.10 System operation technology (general operation, etc.) 4.1.11 Data center (center outsourcing, IDC)
	5 Establishing basic strategy		
		5.1 Extracting functions and information from the current operations	
			5.1.1 Function extraction 5.1.2 Information extraction
		5.2 Analyzing the operations and creating intermediate and long-range plans	
			5.2.1 Preparing the rough flow of the current operations 5.2.2 Determining what to be developed, improved, and innovated for the current operations 5.2.3 Preparing the rough flows of what should be developed, improved, and innovated 5.2.4 Analyzing the rough flows by comparison 5.2.5 Designing intermediate and long-range plans
		5.3 Prioritizing what should be developed, improved, and innovated; and verifying their feasibility	
			5.3.1 Determining relative priorities 5.3.2 Verifying consistency to attain business strategy targets 5.3.3 Verifying obtainability of business resources

	6 Selecting new overall image of business processes and the target of investment		
		6.1 Making overall business process model	
			6.1.1 Reviewing the highest-level operational function (preparing high-level function hierarchy charts and high-level DFD) 6.1.2 Reviewing highest-level operational data (extracting data classes, preparing high-level ER diagrams) 6.1.3 Analyzing interaction between operational functions and operational data (matrix related to operational functions and operational data) 6.1.4 Determining business domains (all the domains necessary for the business strategy)
		6.2 Filling gap between the current information system and new overall image	
			6.2.1 Putting together system improvement plant to solve business information problems
		6.3 Determining the target for information system investment	
			6.3.1 Considerations to be made in selection of the target for information system investment 6.3.2 The method for grasping the effect of information system investment 6.3.3 Method of analyzing the risk of information systematization investment
		6.4 Considering whether BPR is carried out or not	
			6.4.1 Considering business process restructuring

	7 Establishing information strategy, obtaining its approval, and proposing an implementation organization		
		7.1 Preparing information strategy guidelines	
			7.1.1 Criteria for preparing information strategy guidelines (the new business process image extracted from results of external environment analysis, results of internal environment investigation and analysis, evaluating administration and operations, system problems, IT use, operational function/information/organization relationship analysis)
			7.1.2 Proposal of information system development principle (outsourcing, ERP, in-house development)
		7.2 Approval for information strategy	
			7.2.1 Approval for information strategy (at the executive level)
		7.3 Implementing the information strategy	
			7.3.1 Planning organization, taking system life cycle into account
			7.3.2 Cooperation with persons concerned with information strategy promotion (CIO, the manager of the information system department, application engineers, senior system administrators, technical engineers, project managers)
			7.3.3 Clarifying responsibilities of departments using the system (responsibilities for preparing budget, making effect measurements, and reporting)
			7.3.4 Mechanism for reviewing information system development project (pre-evaluation, in-process evaluation, post-evaluation)
			7.3.5 Charging to the users for using the system (accounting system)

Knowledge field	Major classification	Intermediate classification	Minor classification
E. Creating information system conception			
	1 Defining problems in the business processes		
		1.1 Sorting out the flow of the business processes and data to which the new information system is to be applied	
			1.1.1 Sorting out from the standpoint of information system the flow of the business processes and data to into which information system is to be applied
		1.2 Analyzing problems in business processes to which the information system is to be applied and finding approach to solutions to them (defining the business processes which the new information system is to be applied and requirements for systematization of business processes)	
			1.2.1 Extracting problems in business processes 1.2.2 Classifying an approach to the solutions to operational problems (determining problems which are to be solved using the information system)
	2 Analyzing the business process system		
		2.1 Confirming the current information system to which developments, improvements, and innovation are to be applied	
			2.1.1 Implemented functions, data, and system architecture 2.1.2 Maintenance and operation methods and organizations 2.1.3 Management and quality
		2.2 Classifying functions and data to restructure business process functions	
			2.2.1 Classifying functions and data for restructuring
		2.3 Analyzing information system failure risk and determining failure management levels	
			2.3.1 Analyzing risk due to system shutdown, malfunction, damage to data, etc. 2.3.2 Determining failure management levels
	3 Investigating applicable information technologies		
		3.1 Investigating applicable IT	
			3.1.1 Determining goals 3.1.2 Determining the scope of applying the IT 3.1.3 Determining items to be investigated
		3.2 Reviewing applicable IT	
			3.2.1 Reviewing use of investigation results

	4 Making business process model		
		4.1 Modeling business process (functions, information)	
			4.1.1 Defining business processes 4.1.2 Defining data classes 4.1.3 Analyzing the relationship between business process and data classes (defining business process model)
		4.2 Examining overall consistency with business process functions based on applicable IT	
			4.2.1 Analyzing the relationship among applicable IT, the current information system, and business process functions 4.2.2 Refining business process model (review and decision making)
		4.3 Sorting out major changes to the business process and the information system and, concrete problems in performing business processes	
			4.3.1 Sorting out major changes to the business process and information system 4.3.2 Sorting out concrete problems in performing business processes
	5 Determining the system architecture		
		5.1 Making clear system functions which support business process function and describing the flow	
			5.1.1 Defining major information system functions 5.1.2 Describing the processing of major information system functions
		5.2 Determining system architecture needed to implement system functions	
			5.2.1 Preliminary (external) design of the information system 5.2.2 Configuration of data bases and networks and their lists
		5.3 Considering package software installation	
			5.3.1 Considering package software installation (points to be considered for installation, need for testing)

	6 Estimating the cost and effect of system investment		
		6.1 Estimating the quantitative and qualitative effect of the information system installation	
			6.1.1 Quantitative effect of information system installation (sales increase, cost reduction, etc.) 6.1.2 Qualitative effect of information system installation (organizational vitalization, improved personnel abilities to use IT, etc.)
		6.2 Estimating information system development, operation, and maintenance cost	
			6.2.1 Cost of building the information system 6.2.2 Cost of operating and maintaining the information system
		6.3 Estimating cost-effectiveness of the information system	
			6.3.1 Computing effects 6.3.2 Computing a break-even point
	7 Verifying information strategy		
		7.1 Verifying business process and system functions, and information strategy	
			7.1.1 Verifying enterprise goal 7.1.2 Verifying business strategy 7.1.3 Verifying information strategy
	8 Creating information system conception and obtaining an approval for it		
		8.1 Creating information conception	
			8.1.1 Preparing information system conceptual plan (soluble business process problems, functions and data for restructuring, necessary IT, outcome of business process model)
		8.2 Evaluating and approving information system conception	
			8.2.1 Approval of the conceptual plan (CIO, manager of information system department) 8.2.2 Establishing criteria for evaluating the overall information system introduction plan

Knowledge field	Major classification	Intermediate classification	Minor classification
F. Creation of a system plan			
	1 Examining the feasibility of basic requirements		
		1.1 Confirming basic requirements	
			1.1.1 Requirements for development and quality 1.1.2 Requirements for operation and maintenance 1.1.3 Requirements for transition and environment setup
		1.2 Making clear basic principles for system plan	
			1.2.1 Objectives and means 1.2.2 Personnel, and work and responsibility assignments 1.2.3 Period and deadline 1.2.4 Facilities and cost
		1.3 Examining the feasibility of basic requirements based on basic principles	
			1.3.1 Feasibility of requirements for development and quality 1.3.2 Feasibility of requirements for operation and maintenance 1.3.3 Feasibility of requirements for transition and environment setup
	2 Drawing up rough development schedule		
		2.1 Decomposing the system (to be developed) into subsystems	
			2.1.1 Consideration to be made on subdividing system
		2.2 Giving development priorities to subsystems	
			2.2.1 Consideration to be made on development priorities
		2.3 Drawing up rough development schedule for each subsystem	
			2.3.1 Consideration to be made on a rough development schedule
	3 Establishing system selection principles		
		3.1 Clarifying system's basic function requirement configuration requirement, and budgetary limits	
			3.1.1 Hardware's basic function requirements and configuration requirements, cost limitation, and procurement requirements (vendors, products) 3.1.2 Software's basic requirements function requirements and configuration requirements, cost limitation, and procurement requirements (vendors, products)
		3.2 Clarifying the scope of system selection research	
			3.2.1 Scope of hardware selection research 3.2.2 Scope of software selection research

	4 Establishing an information system development project organization		
		4.1 Establishing project organization	
			4.1.1 Making clear the relationship between the project organization and persons concerned (positioning the project organization in the company, structure of the project organization, the number of members and role assignments, cooperation with the user department) 4.1.2 Establishing a project organization, taking the workload, personnel, delivery date, and cost into account
	5 Making clear basic principles for system transition		
		5.1 Making clear basic principles for system transition	
			5.1.1 Transition principles 5.1.2 Basic requirements (data base and network transition, changing business process procedures) 5.1.3 Rough transition plan
	6 Making clear basic principles for system operation and maintenance		
		6.1 Making clear basic requirements for operation (system operations and business processes)	
			6.1.1 Operation organization 6.1.2 Operation works
		6.2 Making clear basic requirements for maintenance (during normal and erratic operation)	
			6.2.1 Maintenance organization 6.2.2 Maintenance works
		6.3 Making clear principles for system change works	
			6.3.1 Principles for system change works
		6.4 Making clear SLA (service level agreement)	
			6.4.1 SLA evaluation criteria 6.4.2 SLA evaluation method
	7 Making clear basic principles for environment setup		
		7.1 Estimating information system resources by periods and computing the amount of resources used	
			7.1.1 Development environment 7.1.2 Operational environment 7.1.3 Maintenance environment

	8 Making clear basic principles for training and education		
		8.1 Making clear basic principles for operations and system training	
			8.1.1 Business processes, objectives, and scope 8.1.2 Training and education organization and facilities, and environment 8.1.3 Training schedule, etc.
	9 Making clear basic principles for quality assurance		
		9.1 Making clear basic requirements for system quality criteria and quality assurance organization	
			9.1.1 System quality criteria 9.1.2 System quality control organization (including measures for ensuring safety and security and contingency plans)
	10 Creating the system plan and obtaining the approval		
		10.1 Sorting out prerequisites for basic requirements for system development, operation, and maintenance	
			10.1.1 Workload and cost 10.1.2 Schedule and environment set 10.1.3 Training and education 10.1.4 Quality
		10.2 Creating the system plan and obtaining the approval	
			10.2.1 Preparing a system plan (workload and cost for development, operation, and maintenance, schedule, training and education, basic quality requirements, etc.) 10.2.2 Review (technology, operation, economics) 10.2.3 Approving a system plan (CIO, manager of the information system department)

Knowledge field	Major classification	Intermediate classification	Minor classification
G. Supporting an information system development project plan			
	1 Supporting information system development project planning		
		1.1 Determining a scope	
			1.1.1 Scope plan 1.1.2 Scope definition 1.1.3 Clarifying work items (determining whether outsourcing is chosen or not)
		1.2 Preparing work schedules	
			1.2.1 Determining periods and work schedules (work items, workload, schedule) 1.2.2 Resources (personnel, facilities, organization) 1.2.3 Cost
		1.3 Setting up organization and securing personnel	
			1.3.1 Determining organization structure 1.3.2 Assigning personnel to organizations
		1.4 Reviewing action against risk	
			1.4.1 Risk analysis and effect investigation 1.4.2 Determining action against risk
		1.5 Reviewing quality plan	
			1.5.1 Quality principles and goal 1.5.2 Quality organization and methods
	2 Advice on approving the information system development project plan		
		2.1 Confirming Persons concerned with project approval	
			2.1.1 CIO 2.1.2 Manager of the information system department
		2.2 Confirming persons concerned with project implementation	
			2.2.1 Project manager 2.2.2 Application engineers 2.2.3 Senior system administrators 2.2.4 Technical engineers

Knowledge field	Major classification	Intermediate classification	Minor classification
H. System evaluation			
	1 Evaluating system operation		
		1.1 Degree of realization of functions	
			1.1.1 Degree of realization of necessary functions
		1.2 Status of attained performance	
			1.2.1 Response time 1.2.2 Processing time 1.2.3 Resource use status
		1.3 Reliability of system	
			1.3.1 Frequency of troubles 1.3.2 Number of failures 1.3.3 Recovery time 1.3.4 Availability
		1.4 Security	
			1.4.1 Security (unauthorized-access prevention) 1.4.2 Security training and education
		1.5 Usability	
			1.5.1 Workload on the user 1.5.2 Ease of operation by the user 1.5.3 Effect of operation 1.5.4 Control of system operating time
	2 Evaluating business processes		
		2.1 Degree of realization of operational functions	
			2.1.1 Degree of realization of required functions
		2.2 Effect of system/operation transition	
			2.2.1 Effect on current business processes 2.2.2 Consistency data transition
		2.3 Ease of use of the system business processes are performed	
			2.3.1 Operability during with the use for normal objectives 2.3.2 Operability during the use for management objectives

		2.4 Use and control of user-side resources	
			2.4.1 The degree of use of the information system in each user department 2.4.2 The control status of system resources owned by the user department 2.4.3 The control status of personal information on individual persons
		2.5 Ease of receiving support and training from users' viewpoint	
			2.5.1 Degree of use of the help desk 2.5.2 Status of user training
		2.6 Business process improvement requirements	
			2.6.1 Number of improvement requests 2.6.2 Status of reflecting improvement requests

Knowledge field	Major classification	Intermediate classification	Minor classification
I. Consultation about informationalization			
	1 Comprehensive consultation about information system		
		1.1 Guiding information strategy promotion	
			1.1.1 Creating information strategy
			1.1.2 Information system conception
			1.1.3 Creating system plan
			1.1.4 Creating the project plan
		1.2 Guiding system evaluation principles	
			1.2.1 Evaluating system operation
			1.2.2 Evaluating business process operations
		1.3 Supporting business process innovations in the user department	
			1.3.1 Advice on BPR implementation
			1.3.2 Advice on desktop tool selection
		1.4 Proposing system solutions	
			1.4.1 Involvement of the user department in SI
			1.4.2 Selecting SI vendors
	2 Consultation about IT use		
		2.1 Understanding IT use problems in the user department	
			2.1.1 Evaluating degree of the use of IT in the user department
		2.2 Selecting IT for the user department	
			2.2.1 Software package
			2.2.2 Application service provider (ASP)
			2.2.3 e-business
			2.2.4 Knowledge management

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