Information Technology Strategist Examination

(Level 4)

Syllabus

— Details of Knowledge and Skills Required for

the Information Technology Engineers Examination —

Version 3.0

IPA

INFORMATION-TECHNOLOGY PROMOTION AGENCY, JAPAN

Major category	Minor category	Outline	Required knowledge	Required skills
I Development or Support of Enterprise Strategy Reflecting Characteristics of Each Industry and Leveraging Information Technologies				
1 Development of Enterprise Strategy Utilizing Information Technologies Based on Business Strategy	1-1 Confirmation of management requests	Confirm and understand the following matters concerning company's management requests. • Management policy • Company goals • Medium- and long-term initiative • Business strategy	• Management in general • Priority matters in management requests • Understanding the business environment • Corporate management and organization • Basic principles of the business strategy • Competition strategy	• Obtaining information to understand the management requests • Regarding the management requests, identifying matters related to computerization • Understanding the priority matters in management
	1-2 Investigation and analysis of the business environment	Perform the following tasks concerning the domestic and overseas business environments: • Analysis of the business environment including the market, competitors, partners, legal regulations, and economic situation • Clarification of the relationship between the business environment analysis result and company goals	• Investigation and analysis techniques for the external environment • Macroeconomics • Industry trends and competitors • Related laws • Global environment (green IT, etc.)	• Investigating the market and competitors' trends • Clarifying which matters are of the greatest importance based on the investigation results • Identifying gaps between the external environment analysis results and company goals
	1-3 Extraction of issues	From the collected information, analyze and extract issues about information resources.	• Business management • Effects of IT on corporate management • Corporate manager role and management • Performance indicator to evaluate the strategic goals	• From the collected information, analyzing and extracting issues about information resources • Evaluating issues from the viewpoints of structure, maintenance, and operations
	1-4 Investigation and analysis of IT trends	Perform the following tasks concerning information technology: • Investigation and understanding of the technology trends that are useful in planning the information strategy of a company • Analysis of IT usage to achieve company objectives, maintain competitive advantages, and create business opportunities	• IT trends (including IoT, big data, AI, etc.) • Investigation techniques for IT trends	• Organizing IT information so that it can be utilized to promote management and information strategy • Developing and securing IT information sources • Evaluating the value of IT
	1-5 Development of enterprise strategy	Based on the business strategy and corporate environment, develop an enterprise strategy that utilizes IT.	• Understanding the business environment • Corporate management and organization • Basic principles of business strategy • Competition strategy • Business management • Effects of IT on corporate management • Corporate manager role and management • Performance indicator to evaluate the strategic goals • Effects of information security on corporate management (Cybersecurity Management	• Developing an enterprise strategy based on the management policy, environment analysis results, and extracted issues • Developing enterprise strategy evaluation indexes

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		Guidelines, etc.)		
2 Development of a Business Model Using Information Technologies	2-1 Proposal for a business model development using information technologies	Provide advice on the following tasks performed by the CIO and staff: • Investigation and evaluation of business values created by IT • Development of a business model and development of business processes	• Business models • Examination of a framework to develop a business model • Business model planning • Business values created by IT • Analysis techniques of business competitiveness • Business fields • Competencies of companies • Alliance	• Analyzing business implementation methods in a business field from various aspects • Understanding the meaning of the new business model, and examining its feasibility • Analyzing and estimating the impacts of IT innovation on business models, and advising measures to cope with the impacts
	2-2 Business innovation planning	With best practices (good implementation cases) as a guide, clarify major management requirements. Plan a business model with which a company can realize its business strategy and continuously grow	• Business models • Business model cases • Latest business management techniques • Business models across organizations and companies • Risks and obstacles to the realization of a business model • BPR and related cases • CSF (Critical Success Factor) • Major performance indicator for each activity • Investigation and analysis of business details • Management of marketing and sales operations • Manufacturing and value-adding operations • Distribution operations and supply chain management • Financial business • Procurement and purchasing operations • Customer management	• Understanding the latest trends of business management techniques, and understanding the business trends correctly • Presenting the optimum solution as a whole when planning a business model change • Setting a goal and evaluation criteria for the effects of resolutions, and evaluating the achievement level • Understanding and analyzing the current business correctly • Clarifying CSFs to implement the improvement theme, as well as activities to realize the theme • Graphically representing major activities as a specific business model • Defining major performance indicators to manage each activity to implement the business model • Presenting the business model to the internal and external persons concerned, and making them understand it
	2-3 Proposal to increase the added value of new products and services	Increase added value by applying IT technologies, and plan innovative products or services.	• IT trends (including IoT, big data, AI, etc.) • IT application cases • Risks and obstacles to the realization of new products and services • Management of marketing and sales operations • Manufacturing and value-adding operations	• Understanding the latest IT trends (including IoT, big data, AI, etc.)and correctly grasping the trends in customer needs • Setting a goal and evaluation criteria for the effects of resolutions, and evaluating the achievement level

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			• Distribution operations and supply chain management • Financial business • Procurement and purchasing operations • Customer management	• Understanding and analyzing the current solution correctly • Presenting the new product or service to the internal and external persons concerned and making them understand it
3 Feasibility Study on an Enterprise Strategy	3-1 Selection of a system solution	Examine system solutions to realize the business model, and develop basic policies.	• Selection of system solutions • IT trends (including IoT, big data, AI, etc.) • Information computerization trends	• Investigating and analyzing technology trends concerning system solutions • Evaluating the application of the system solution to the company
	3-2 Development of an outsourcing strategy	Examine utilization of external resources, and develop basic policies.	• Outsourcing trends • Utilization of outsourcing (utilization of cloud computing, etc.)	• Investigating and analyzing trends of outsourcing utilization • Evaluating the utilization of outsourcing for the company
	3-3 Feasibility study on an enterprise strategy	Evaluate the feasibility mainly from the following viewpoints: • Total optimization of the business model and information resources • Total optimization of the IT infrastructure • How popular the information resources to be used are • How advanced the information resources to be used are	• EA (enterprise architecture) • Business models • Information systems models • BPR	• Evaluating feasibility of the enterprise strategy utilizing information technologies
	3-4 Defining activities and performance indicators for implementing the enterprise strategy	Define performance indicators, target values, and their measurement methods to check the progress of the enterprise strategy.	• Evaluation indexes of corporate management • Evaluation indexes of strategies • Balanced score card • CSF (Critical Success Factor) • KPI (Key Performance Indicator) • KGI (Key Goal Indicator)	• Defining performance indicators, target values, and their measurement methods to check the progress of the enterprise strategy • Defining activity indexes, target values, and their measurement methods to know whether or not the activities for the enterprise strategy realization are being properly performed.
	3-5 Extraction of issues and risks	Based on the current situation and trends inside and outside the company, systematically organize various issues and risks concerning the information system. Then, identify issues and risks according to the new business model.	• Scenario planning • Risk management • Risk analysis techniques	• Based on the current situation and trends inside and outside the company, systematically organizing various issues and risks concerning the information system. Then, identifying issues and risks according to the new business model.
	3-6 Rough estimate of budget	Estimate the work and necessary resources needed to achieve the result, and roughly estimate the cost for execution.	• Scheduling • Cost estimation techniques	• Considering restrictions on project execution, identifying the work needed to achieve results • Considering the work identified,

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				• identifying necessary resources • Accumulating procurement costs for the identified resources, calculating a rough estimate of cost for execution, and budgeting the project
II Development of Information Systems Strategy Reflecting Business Characteristics for Each Industry, and Development of Total Computerization Plan				
4 Development of Information Systems Strategy	4-1 Clarification of the target businesses	Identify new business operations, as well as operations that need be improved or reorganized, and determine priorities for their examination. Confirm whether the business operations support the company objectives, whether resources to execute the plan are definitely available, and business operations are technologically feasible.	• Business processes • Business process analysis and notational techniques	• Collecting information related to the business operations targeted by the business model
	4-2 Development of a new overall picture of business operations (definition of the business operations model)	Examine the top-most business function and the business organization model that will be necessary for the company in the future. As a result of this examination, draw a new overall picture of the target business operations. In addition, create an overall image of the new system, and confirm whether or not the business function and the organization model are consistent with the new system.	• Business processes • Business process analysis and notational techniques	• Understanding the business model at the business process level • Explaining the business process to the persons concerned in business model planning
	4-3 Investigation and analysis of current (as-is) business operations	Perform the following tasks concerning the current business operations: • Collection of information concerning organizations and technologies in the current business • Analysis and extraction of business issues • Evaluation of management and business within the industry (evaluation of information utilization by the users and IT utilization capabilities)	• Investigation and analysis techniques for the internal environment • Mission-critical tasks in general • Business management work and techniques	• Investigating the organizations and technical capabilities of a company • Clarifying most important matters based on the investigation results • Identifying business needs and faults
	4-4 Investigation and analysis of the information system (as-is)	Perform the following tasks concerning the information system: • Analysis of the purpose, functionality, architecture, scale, capability, maintenance and operation method, and failure status of the current and future information systems • Extraction of issues of the information system • Evaluation of the technology level within	• Investigation, analysis, and evaluation of the information system	• Investigating the information system • Setting the evaluation criteria for the information system

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		the industry (to ensure average technology level within the industry)		
	4-5 Development of the basic strategy (definition of the entire information system)	Perform the following tasks concerning the basic strategy: • Identifying and prioritizing business operations to be developed, improved, and reorganized • Confirmation of the conformity of each target business operations to the company objectives • Development of a medium- and long-term plan (including confirmation of availability of the resources to execute the plan) • Creation of the information strategy evaluation criteria	• Business analysis techniques • Companies' business strategies • Companies' management resources	• Explaining the basic strategy to the persons concerned • Developing the medium- and long-term plan in accordance with a company's business strategy • Negotiating for acquisition of necessary management resources • Finding consensus among conflicting opinions
	4-6 Analysis and prioritization the issues related to information system development	Perform the following tasks according to the basic strategy: • Modeling of the top-most business function and the business organization that will be necessary for the company in the future. • Illustration of the new overall picture of the target business operations (including examination of business restructuring) • Analysis of the rough estimate of costs, effects, and potential risks of the new business operations • Selection of targets and setting goals for information system investment	• Business analysis techniques • Modeling • BPR	• Extracting business functions and business information from the targets of development, improvement, and restructuring • Verifying that the functions are consistent with the information • Refining and evaluating the model • Selecting the targets of investment • Explaining the reason for selecting the investment target to the persons concerned • Considering BPR
	4-7 Defining activities and performance indicators for implementing the information strategy	Define performance indicators to check the progress of the information strategy, as well as activity indexes to know whether or not the activities for realization are being properly performed.	• Balanced score card • CSF • KPI • KGI	• Defining performance indicators to check the progress of the information strategy • Defining activity indexes to know whether or not the activities for the realization of the information strategy are being properly performed
	4-8 Development and approval of the information strategy	Perform the following tasks according to the new overall picture of the business operations and the investment targets selected from the management requests and the basic strategy: • Documentation of information strategy (information strategy guidelines)	• Standards for information strategy guideline description formats	• Explaining the information strategy guidelines to the person in charge of information strategy promotion, and obtaining approval • Finding consensus among conflicting opinions

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		• Approval of the information strategy guidelines at managerial level • Proposal for the information strategy promotion scheme		• Evaluating efficiency of the promotion scheme for the information systems department
5 Total Computerization Planning	5-1 Development of Information System Infrastructure Construction Policy (Planning of IT Architecture)	Expand the business processes based on the business model. Plan an IT architecture while selecting the optimum IT for the company.	• IT trends (including IoT, big data, AI, etc.) • Impact of IT on business (management, organizations, people, etc.) • Basic principles of strategic computerization planning and its work steps • Interaction between IT and people • Investment effect of the information system in terms of business management • Maturity level of the information system • Information models such as the target information model • Methodologies and techniques for computerization planning • Resources and project teams for computerization planning • Investigation and documentation of the actual situation of the current information system	• Explaining to corporate managers and executives the effectiveness of utilizing the IT strategy • Abstracting the business, business operations, and information system, and creating an appropriate functional model • Applying the basic principles when finalizing the strategic computerization plans • Investigating and documenting the actual situation of the current information system • Gauging the maturity level of the information system, and finalizing the strategic computerization plans • Organizing the project team in charge of planning, and managing the team as the leader • Analyzing and modeling the processes and data
	5-2 Defining standards	Define the standards necessary for the company's IT environment in accordance with information technology trends.	• International standards and national standards • Development methodologies in general • Software quality measurement techniques • Estimation techniques • Productivity evaluation techniques • Systems architectures (functional decomposition of hardware, software, and manual work, adoption of hardware architecture, software architecture, database architecture, and SOA (Service-Oriented Architecture), etc.) • Information systems models • EA	• Keeping track of standardization trends in the industry • Comprehensively and generally keeping track of information technology trends • Extracting potential standards necessary for the company's IT environment • Evaluating the necessity of potential standards, and screening them
	5-3 Development of quality control	Extract the points to be checked for conformity to each standard, and consider the evaluation system and evaluation items for each point.	• Internal control • IT governance • Development methodologies in general	• Extracting the points to be checked for conformity to each standard • Proposing the evaluation system for each

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	framework	Plan a mechanism to monitor the evaluation items, and develop (or define) a process to control the quality.	• Process maturity level • SLCP (software lifecycle process) • Quality planning • Quality assurance • Quality management	point to be checked • Deriving evaluation items for each point to be checked • Defining measurement items to monitor continuous conformity status and values provided by the quality control process • Planning and introducing the mechanism to monitor defined measurement items • Developing (or defining) a process to control quality • Preparing the organizational structure • Documenting the evaluation criteria
	5-4 Development of the system solution application policy	Develop an application policy for a system solution.	• Application trends of system solutions • Investigation and analysis of applicability • Application evaluation • Application of ERP packages and BI (Business Intelligence) tools	• Investigating and analyzing the application trends of system solutions • Understanding business characteristics in the applicable fields • Executing application evaluations • Selecting an optimum ERP package
	5-5 Defining activities and performance indicators for implementing the information system infrastructure construction policy	Define performance indicators to check the extent of realization of the information system infrastructure construction policy, as well as activity indexes to know whether or not the activities for the realization are being properly performed.	• Balanced score card • CSF • KPI • KGI	• Defining performance indicators to check the extent of realization of the information system infrastructure construction policy • Defining activity indexes to know whether or not the activities for the realization of the information system infrastructure construction policy are being properly performed
	5-6 Approval for the information system infrastructure construction policy, and proposal for the promotion scheme	Distribute the information system infrastructure construction policy to the persons concerned. After obtaining approval, propose a promotion scheme for the information systems department.		• Documenting the information system infrastructure construction policy in accordance with the standard description format • Distributing the information system infrastructure construction policy to the persons concerned, and obtaining approval • Proposing the promotion scheme of the information systems department
	5-7 Medium- and long-term information	Develop a medium- and long-term information computerization plan.	• IT portfolio (IT project classification) models • EA	• Developing the medium- and long-term information computerization plan. • Dividing the plan into individual projects

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	computerization planning		• Program management • Total development scheduling • System lifecycle • Risk analysis techniques	
	5-8 Development of the operational policy of the information systems department	In order to perform the information systems strategy execution processes, incorporate the information systems department in the company-wide organization structure, and clarify its position and missions. Define the roles and responsibilities, and establish the organization.	• Project planning techniques • Organization theories in general • Management by objectives • Quality assurance • Information security • Compliance • IT evaluation indexes • Internal control	• Understanding the structure of computerization processes and the persons concerned, and defining the information strategy execution processes as described below. • Incorporating the information systems department in the company-wide organization structure, and clarifying its position and missions • Based on the business needs, establishing the appropriate organization structures, not only within the company but also outside the company • Defining the roles and responsibilities, and documenting them as the job role definition • Assigning responsibilities and authorities concerning quality assurance, risks, information security, and compliance, and establishing organizations as required • Establishing the optimum collaborations, information-sharing, and cooperative framework among various persons concerned inside and outside the information systems department
	5-9 Development of the general IT control preparation policy (establishment of the control framework)	In order to achieve the expected business goal and deal with changes in situation, prepare a periodical review process of the organization structure, and define and document the components of the information system control environment (expectation and requirements for value creation by information system investment, risk tolerance, integrity, ethical sense of value, capability of staff, accountability, execution responsibility, etc.)	• Management analysis techniques • Information investment evaluation techniques • Risk analysis techniques • Organization capability evaluation techniques • Internal control • General IT control • Total optimization • Computerization promotion scheme • Computerization investment planning	• Reviewing the organization structure periodically, and preparing the processes so that the company can achieve the expected business goal and deal with changes in situation • Defining and documenting the information system control environment components which conform to the management principles and operation policies based on the corporate culture • Creating and maintaining the frameworks for risks and internal control that cover

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				the entire company, in order to protect information resources and systems as well as maximize the value to be provided for business requirements
	5-10 Development and implementation of the business continuity plan	Clarify the target scope and risks of business continuity, and develop, and implement the business continuity plan (purpose, scope, implementation scheme, etc.) related to the information system.	• Business continuity planning • Risk analysis techniques	• Developing and documenting business continuity policies related to the information system • Developing business continuity plans (purpose, scope, implementation scheme, etc.) in the organizations including the persons concerned
	5-11 Analysis of system risks	Perform the following tasks concerning risk analysis: • Clarification of risks and the extent of the impact • Analysis of loss due to information system failure • Determination of the allowable recovery time for business operations and recovery priority	• Risk management • Risk analysis techniques • Scale and extent of the impact of anticipated disasters (earthquakes, terrorism, etc)	• Identifying possible disasters, and estimating the scale, cause(s), and impact • Analyzing damage to the organization due to information system failure or functional deterioration • Clarifying the importance and urgency of business recovery • Determining the allowable recovery time for business operations and recovery priority • Obtaining the consensus of the persons concerned on determined matters
	5-12 Development of a disaster recovery plan	Develop a disaster recovery plan, considering consistency with the business continuity plan and.	• Development of the disaster recovery plan	• Developing a disaster recovery plan • Thoroughly notifying the persons concerned of the disaster recovery plan
	5-13 Annual computerization planning	Calculate all the costs related to the information system. Propose an annual computerization plan as well as a promotion scheme for the information systems department. Obtain approvals of the persons concerned for the established annual computerization plan.	• Project planning • Estimation techniques • Risk analysis techniques • Development of a computerization promotion scheme	• Expanding the individual project plans to annual plans • Calculating all the costs related to the information system • Developing the annual organizational structure plans • Developing the monitoring and control plan • Developing the resource procurement and installation plan • Proposing the promotion scheme of the information systems department • Distributing the annual information computerization plan to the necessary persons concerned, and obtaining their

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				approval
III Development of Individual Computerization Initiative and Plan Reflecting Business Characteristics for Each Industry				
6 Development of Individual Computerization Initiative and Plan	6-1 Identification of basic requirements for the computerization planning	Based on a computerization initiative, identify basic policies (regarding such matters as goals, means, staff, period, delivery date, equipment, costs, work assignments, and responsibility assignments), and identify basic requirements of development, operations, maintenance, testing, migration, environment preparation, and quality.	• Business operations • Notations related to business and information • System analysis techniques • Systems architecture, hardware, and software • Database and network • Information security • Notations related to system components	• Collecting necessary information from the persons concerned • Analyzing businesses and understanding their process flows • Understanding the types of information that are entered and issued for specific business operations • Analyzing systems
	6-2 Understanding of the target business operations	Organize business operations and information in terms of an information system.	• Information strategy guidelines	• Obtaining information to understand the information strategy guidelines • In terms of the functions of target business operations, information, and organizations, analyzing the process of an information system and the information to be handled
	6-3 Definition of system-related issues in the target business operations	Analyze specific problems of the target business operations, clarify the course of resolving the problems, and define issues that must be resolved using an information system.	• Techniques for finding and resolving problems	• Associating business issues with an information system
	6-4 Analysis of the business system	Understand the functions, data, systems architecture, maintenance, operational methods, operational framework, management framework, and quality of the current system for the target business operations. Organize the functions and data so that they can be easily utilized for planning the restructuring of the business functions. In addition, identify relations with other systems associated with the target business, and understand the functions, data, operational methods, operational framework, management framework, and operational risks.	• The current information system • Risk identification and impact of the risks • System failures • IT evaluation techniques	• Obtaining materials relating to the current information system • Understanding the characteristics of functions and data concerning the current information system
	6-5 Study of applicable information technologies	Study technology trends to establish a concrete overall picture of the business. When studying the trends, determine objectives, scope, and specific items to study. Consider how to apply the results of such study.	• Techniques for studying IT trends • IT evaluation techniques	• Studying and evaluating IT trends according to a study policy

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	6-6 Creation of a business operations model	Concerning the target business operations and all related business operations, perform restructuring of the business functions and model them. Based on the study of applicable information technologies, consider business functions to be targeted, and ensure consistency among the targeted functions. In addition, organize the key changes of the business and system, as well as the specific issues of implementing the business.	• Organizing the key changes of a business and information system, as well as the specific issues of implementing the business • Business operations models • Business processes • Data classes (entities)	• Analyzing and defining a business operations model through associating business processes with data classes • Evaluating and deciding on a business operations model • Explaining a business operations model to the persons concerned • Finding consensus among conflicting opinions
	6-7 Design of business process	In order to implement the business operations model, organize the target business operations and all the related business operations, and properly design the business function restructuring and business processes. In addition, clarify the process owner, system owner, and data owner to appropriately utilize the system.	• Business environment analysis techniques • BPM (business process management) • BPR • Business analysis techniques • Business process notation techniques	• In order to implement the business model, organizing the target businesses and all the related business operations, and properly planning the business function restructuring and business processes • Comparing the applicable information technologies and target business functions based on the knowledge of the business operations, and ensuring the consistency of the entire plan for installing the information system • Based on industry-specific knowledge, organizing major changes to the target business operations and defined business processes, as well as specific issues in the business operations • Documenting the business process changes and specific issues in the business operations • Defining the policies for approval method, information integrity, access control, backup, and audit trail record, considering the accuracy, completeness, and auditability of the business process • Clarifying the process owner, system owner, and data owner to appropriately utilize the system

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	6-8 Organizing computerization functions and developing the systems architectures	Based on the business operations model, organize the information and process flow regarding the computerization functions supporting the business functions targeted. Develop a systems architecture necessary for realizing the functions. In addition, clarify the configuration of main components (databases, servers, and networks) necessary for the functions.	• Systems architectures • Networks and databases • Software packages • SOA (Service-Oriented Architecture) • Information security	• Organizing the computerization functions that support the business functions • Developing feasible systems architectures • Evaluating and selecting a systems architecture
	6-9 Clarification of a basic policy regarding service level and quality	Clarify the service level of the system in terms of such matters as reliability, performance, and security. Based on that, clarify basic requirements concerning the system quality and the quality management framework (including safety and information security measures).	• Quality standards adopted by companies • Information security measures and contingencies • Quality assurance	• Determining the company's quality requirements • Evaluating quality standards • Evaluating and selecting the quality assurance process
	6-10 Consideration of feasibility	Concerning the requirements of the development, operations, maintenance, migration, environment preparation, and quality, consider whether the system can be technically and economically realized based on staff, delivery date, costs, and other prerequisites.	• Computerization initiative	• Determining the difficulty level of realization • Determining acceptable ranges for the prerequisites • Considering the problems and their countermeasures • Explaining the feasibility to the persons concerned
	6-11 Creation of the overall development schedule	Partition the entire prospective system into subsystems if necessary. Prioritize the subsystems upon studying the impact of each of them on related departments and business operations. Considering the staff, delivery date, costs, consistency, and other factors, create general development schedules for each of the subsystems, which constitute the entire development schedule.	• Partitioning into subsystems • Techniques for scheduling	• Prioritizing subsystems to be developed • Explaining partitioning into subsystems, their prioritization, and their development schedules to the persons concerned, as well as making adjustments among them
	6-12 Determination of system selection policy (application of a system solution, etc.)	Clarify the basic functional requirements, configuration requirements, and budget of the prospective system (hardware and software) to establish concrete organized computerization functions and the determined systems architecture. Determine the scope of the study regarding the system selection should be studied.	• Systems architectures • Application of system solutions (application of ERP packages and BI (Business Intelligence) tools, etc.)	• Recognizing the important matter regarding the system selection • Determining the scope of the study regarding the system selection

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	6-13 Projection of the costs and system investment effect	Provide a projection of the quantitative and qualitative effect of the system to be realized. By establishing an assumption of the general timeframe, organization, and person-months of the development, operations, and maintenance, estimate the costs of realizing the system. By associating the effect with the costs, clarify the investment effect and timing of the system.	• Quantitative and qualitative effect of computerization • Techniques for estimating the costs of developing, operating, and maintaining a system	• Applying past data to cost estimation • Considering cost risks • Projecting when the investment effect of a system will occur • Considering how to suppress costs • Explaining the investment effect of a system
	6-14 Support for the development of a project-promoting scheme	Based on the projection of the costs and investment effect of the system, support the development of a project-promoting scheme, for example, by checking the relevant prerequisites (person-months, staff, delivery date, costs, etc.).	• Organization structure	• Planning an efficient promotion scheme within restrictions • Explaining the development of the project-promoting scheme to the persons concerned, as well as making adjustments among them
	6-15 Verification of consistency between business strategy, information strategy, and computerization initiative	Determine the feasibility of the business goal, business strategy, information strategy, and computerization initiative by verifying the consistency of the business operations model, the feasibility of the systems architecture, and the correctness of the investment effect of the system.	• Information strategy guidelines • Business operations models • Systems architectures • System investment effect	• Determining conformity to the information strategy
	6-16 Creation and approval of computerization plan	Document the following items concerning computerization planning. Then, obtain the approval from the person in charge of the department of information systems or from the CIO for the documents: • Specific person-months, costs, and schedule for developing, operating, and maintaining the system • What is needed for outsourcing (when applicable), such as relevant work items and schedule • Prerequisites of the basic requirements of the preparation of environments, education and training, and quality	• Description format standards for computerization plans	• Explaining a computerization plan to the person in charge of the promotion of an information strategy, and obtaining his/her approval • Explaining a computerization plan to those concerned with the promotion of the information strategy and asking for cooperation from them • Finding consensus among conflicting opinions
7 Procurement of Appropriate Individual Systems	7-1 Preparation of RFP (Request For Proposal) for system procurement	Clarify the basic policy of computerization resource procurement, and create an RFP, which are the initial requirements for the information system. Select the supplier,	• Business systems (processes, organizations, people, etc.) • Problem analysis and modeling • Sensitivity analysis • Basic principles for computerization	• Analyzing the current situation, and organizing issues • Leading the project towards the goal • Selecting proper candidate of procurement sources

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		evaluate the proposal, and create the system construction and installation plan.	resource procurement • IT products and their procurement sources (including third parties) • Maturity level of IT products • Computerization resources • RFI (Request for information) • Maturity level of IT vendors • Obsolete IT and its impact on procurement • Risk investigation • Computerization models • Basic principles for information system development, test, and installation • Information system construction planning • Information system operations planning • Information system construction control and its management • Information system requirements definition • Budget and cost for computerization • RFP • IT vendors • Creation of business processes	• Properly explaining the goal, scope, and procurement requirements to the vendors according to RFP • Organizing the project to execute procurement, and appropriately managing it • Proceeding with the computerization resource procurement process according to the basic principles • Selecting appropriate solutions to implement the business model • Appropriately creating the proposal evaluation criteria and vendor contract conditions • Appropriately selecting vendors • Creating the computerization execution plan • Managing communications with both of the internal and external projects concerning information system construction • Managing information system construction according to the information system construction plan • Clarifying the organization's needs through data model and business process analysis at an overview level, organizing the corresponding application area and necessary service level requirements, and then creating an appropriate RFP
	7-2 Proposal evaluation and selection of supplier	Select suppliers according to the proposal evaluation results.	• Items in a proposal • Procurement selection • Items in a quotation	• Receiving proposals and cost estimations from vendors, and organizing them in a format which allows for comparison • Evaluating the received proposals for consistency with the RFP according to the proposal evaluation criteria • Selecting suppliers according to the proposal evaluation results.

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IV Execution Management and Evaluation of the Information Systems Strategy Based on Assumptions and Constraints for Each Business				
8 Progress Management of the Entire Reform Program for Products, Services, Business, Organizations, and Information System	8-1 Monitoring (understanding of the situation)	Periodically and continuously monitor the entire reform program to see if it is producing values in accordance with the information systems strategy.	• Business environment analysis techniques • Competition analysis techniques • CSF • KPI • KGI • Hearing techniques	• Evaluating and analyzing individual projects to see if they fit the information systems strategy and are creating values • Evaluating the entire reform program to see if it is creating values in accordance with the information systems strategy • Designing the monitoring framework, reporting to the persons concerned, and proposing improvement • Determining specific indicators for evaluation of values • Collecting and accumulating actual data from the monitoring target • Performing monitoring regularly and continuously • Evaluating the project plan to see if it conforms to the information systems strategy or entire computerization plan
	8-2 Control	Assign the highest priority to implementation of the information systems strategy in every process of the reform program, and control it regularly and continuously. In addition, execute corrective or preventive measures against the risks in the program after consulting with the persons concerned.	• Risk management • Total optimization • Computerization promotion scheme • Computerization investment planning • EA • Program management	• Considering implementation of the information systems strategy in every process of the reform program • Controlling the process periodically and continuously • Reporting on program risks to the manager, having understood the facts • Sufficiently communicating with the project manager • Properly answering questions from the project plan approver • Determining defects which should be known to the manager of the corresponding department or which should be escalated to the upper level • Notifying the parties affected • Planning and executing corrective or preventive measures based on an analysis of the root cause of an exception or defects • Measuring the effect of taking corrective or preventive measures

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				• Managing portfolios, programs, and projects in a controlled manner. • Constructing mechanisms to allow the business department to lead all the IT-related investments and the IT departments to assure the IT capability and optimization of the service supply cost
	8-3 Promotion of standardization of information system infrastructure and quality management for the system	In order to protect information system resources and the system itself and maximize the value provided in response to business requirements, promote creation and introduction of various standards concerning the system for the entire company.	• Project evaluation techniques • Total optimization • Computerization promotion scheme • Business models • Business operations models • Information systems models • EA • Program management • Internal control • General IT control	• Investigating and analyzing the conformity review results • Accurately understanding the differences between the situation upon creation and the current situation
	8-4 Review of the standards	Evaluate the investigation results, and revise the standards as necessary.	• Architecture models • Development methodologies in general • Software quality measurement techniques • Estimation techniques • Productivity evaluation techniques • Test techniques • International standards and national standards • Communication scenarios • Communication planning	• Deriving points for which revision should be considered • Clarifying the revision target scope • Examining the revision, rearranging relationships with other standards, and checking for inconsistencies and impacts • Obtaining approval from an appropriate level (CIO, department manager, etc.) • For continuous improvement, developing comprehensive quality plans, and regularly notifying staff of them
	8-5 Risk management and measures for reform execution	Notify the entire company of the policy for handling IT risks, and obtain agreement on the IT risk management plan. Adjusting the priority and assignment of various resources (people, time, budget, etc.) among multiple computerization projects, and implement countermeasures and preventive measures against risks for the entire program.	• Risk management • Risk analysis techniques • Program management • IT portfolio (IT project classification) models	• Notifying the entire company of the policy for handling IT risks, and obtaining agreement on the IT risk management plan • Evaluating the impact of changes (achievement level of information system functions), and maintaining the value • Identifying and recognizing factors that require program modifications • Adjusting the priority and assignment of various resources (people, time, budget, etc.) among multiple projects

Major category	Minor category	Outline	Required knowledge	Required skills
				• Developing countermeasures and preventive measures against risks for programs in general • Preparing corrective or preventive measures against problems concerning deviation from the plan and actual results, and executing the improvement plan
9 Promotion of System Utilization	9-1 Promoting application of system solutions	Investigate and analyze business operations to which system solutions can be applied, and evaluate applicability and effectiveness. Then, create the application plan, and promote application.	• System solution technology trends • Business operations to which system solutions can be applied • Evaluation • ERP packages	• Investigating and analyzing application trends of system solutions • Understanding business characteristics in the applicable field • Executing application evaluation • Promoting application of the selected ERP package
	9-2 Data utilization	Promote installation and use of the optimum software package, in order to promote data utilization required for realizing the business strategy.	• Strategic utilization of data • Basics of statistics such as data analysis, processing, and evaluation • Data, information, and knowledge • Knowledge management • Data utilization software packages • Data utilization software package vendors • Installation procedure of data utilization software packages • Knowledge data sharing	• Explaining to corporate managers and executives the effectiveness of the mechanism to strategically utilize data • Summarizing strategically important data requirements in accordance with the purpose of use • Creating a plan to introduce optimum IT for data utilization, and managing its introduction to the internal project • Planning the framework and environment that support the promotion of installation and use of the data utilization software package, and leading the preparation of them • Leading data utilization (analysis and accompanying actions) in the user department in accordance with the purpose • Increasing added value by organizing data into information, and then into knowledge, and sharing and utilizing it • Collecting achievements made by data utilization, and promoting the preparation of the information system environment for data sharing

Major category	Minor category	Outline	Required knowledge	Required skills
	9-3 Promotion and education of IT utilization	Promote to and educate users inside the company including executives about IT utilization. For example, establish the new business model, and construct organization, frameworks, and systems that contribute to getting the most out of the IT architecture.	• Education and promotion regarding IT utilization • Content of education on IT utilization • Abilities, skills, and achievement levels related to human resources development • Human resources development techniques • Employee education and human resources development • Human resource systems (performance-based evaluation, compensation, etc.) • Motivation and human relationship management • Entrepreneur spirit, venture spirit, and spirit of challenge	• Planning measures for education and promotion regarding IT utilization that improves investment effect on the IT architecture. • Planning the framework and system to continuously implement educational activities regarding IT utilization for the users, and leading the promotion of this • For employee education and human resources development, proposing details necessary for education and promotion regarding IT utilization • Planning the annual budget, including education of staff necessary for IT utilization promotion and education, and commission fees to partners, etc. • Regularly measuring and improving effects of the measures related to IT utilization promotion and education • Planning and leading execution of an education and promotion plan from the aspect of IT utilization to realize the business strategy • Coordinating internal and external people concerned in human resources development and personnel affairs, and preparing an optimum education and promotion plan
	9-4 Improvement of information literacy	Plan appropriate measures to improve users' and organization's abilities to realize the business model and IT architecture in an integrated manner.	• Human resources development and education • Information literacy • Information literacy education • Skills and achievement levels • Educational achievement indexes • Evaluation of users' skills • Concrete and practical techniques to improve skills, such as role playing • IT service vendors • IT-related education companies	• Keeping track of human resources development status and problems • Creating an information literacy improvement plan to realize the business model • Accurately understanding the skills necessary to achieve management goals and carry out business operations, and planning procurement of these skills • From the aspect of human resources development, planning an evaluation system for the effects of information literacy education

Major category	Minor category	Outline	Required knowledge	Required skills
				• Appropriately and regularly evaluating the skills and achievement levels of the users, and creating skill development plans • Persuading executives to understand the budget for improvement of information literacy • Appropriately conducting management to implement the information literacy improvement plan
	9-5 Analysis, evaluation, and improvement of effects, costs, and risks of the reform program	Evaluate the IT investment effect using means such as balanced score cards, and also evaluate the system operation and usage status toward the realization of the business strategy.	• Change management (reform execution management) and monitoring • Achievement levels of business improvement • Control requirements at the operational (business implementation) level • IT investment effect analysis • Evaluation table for IT investment effect • Investigation on usage of the information system by the users • PDCA cycle • Balanced score card • Asset values (NPV calculation, depreciation, etc.)	• Appropriately understanding implementation status of business improvement establishment and change management (reform execution management) • Creating an appropriate measurement plan for actual improvement data, and managing the implementation of the measurement plan • Clarifying operational (business implementation) level control requirements and evaluating the actual situation • Analyzing the effects of IT investment using appropriate indexes • Investigating and evaluating usage status of the information system • Evaluating the goal achievement level of specific business improvement activities to realize the business model
	9-6 Improvement requests and feedback	Collect improvement requests from system effect and usage evaluation, and incorporate them into the next business model and IT architecture plan.	• Business improvement execution • Improvement data collection and cause analysis • Problem-solving techniques • Business improvement settlement and change management	• Setting improvement goal and performance indicators • Correctly assessing the maturity level of the information system, and directing improvement activities • Setting improvement goals suitable for the business maturity level • Correctly understanding the business achievement, and appropriately summarizing improvement requirements • Collecting improvement data, leading internal projects towards a better business

Major category	Minor category	Outline	Required knowledge	Required skills
				model using cause analysis and problem-solving techniques, and then continuously establishing business improvement • Appropriately incorporating evaluation results into the next business model and IT architecture plan
10 Strategy Achievement Level Evaluation	10-1 Enterprise strategy evaluation	Compare the measured values and the target values of the enterprise strategy evaluation indexes, and analyze the variances. Extract enterprise strategy issues from the analysis results, and incorporate them into the next plan.	• Enterprise strategy evaluation indexes • Variance analysis techniques • Business analysis techniques	• Comparing the measured values and the target values of the evaluation indexes, and analyzing the variances • Evaluating the evaluation indexes according to the results of the variance analysis • Extracting issues from the evaluation results
	10-2 Information systems strategy evaluation	Compare the measured values and the target values of the information systems strategy evaluation indexes, and analyze the variances. Extract information systems strategy issues from the analysis results, and incorporate them into the next plan.	• Information systems strategy evaluation indexes • Variance analysis techniques • Business analysis techniques	• Comparing the measured values and the target values of the evaluation indexes, and analyzing the variances • Evaluating the evaluation indexes according to the results of the difference analysis • Extracting issues from the evaluation results
	10-3 Total computerization plan evaluation	Compare the measured values and the target values of the total computerization plan for the information system (IT strategy, infrastructure construction policies, etc.) and analyze the variances. Extract total computerization plan issues from the analysis results, and incorporate them into the next plan.	• Total computerization plan evaluation indexes • Variance analysis techniques • Business analysis techniques	• Comparing the measured values and the target values of the evaluation indexes, and analyzing the variances • Evaluating the evaluation indexes according to the results of the variance analysis • Extracting issues from the evaluation results
	10-4 Individual computerization plan evaluation	Compare the measured values and the target values of the individual computerization plan (system operations and business operations) and analyze the variances. Extract the issues of the individual computerization plan based on the analysis result, and incorporate them into the next plan.	• Individual computerization plan evaluation indexes • Variance analysis techniques • Business analysis techniques	• Comparing the measured values and the target values of the evaluation indexes, and analyzing the variances • Evaluating the evaluation indexes according to the results of the variance analysis • Extracting issues from the evaluation results

Major category	Minor category	Outline	Required knowledge	Required skills
V Creation and Promotion of Planning & Development of Embedded System				
11 Creation and Promotion of Planning, Development, Support and Maintenance of Embedded System	11-1 Technology trends analysis	Keep track of trends in basic technologies such as communication, information, architecture, human interfaces, storage, semiconductors, measurement, control, and platforms, and also in IoT, big data, and AI, and perform analysis for commercial deployment of embedded systems.	• A broad range of knowledge that support the planning strategy for embedded systems including communication, information, architecture, human interfaces, storage, semiconductors, measurement, control, platforms, IoT, big data, and AI etc.	• Having insight into the future deployment of technologies leading to the planning strategy of the embedded system • Collecting information of related technology trends
	11-2 Product strategy planning	Make a product strategy in consideration of trends in the market and in-house technical assessment.	• Reverse engineering • Clean room design for separating technical analysis from intellectual property handling	• Making a business strategy for product development from market trends and in-house technologies • Creating a new product on the basis of the result of reverse engineering and reviewing relationships with the intellectual property right
	11-3 Organizing considerations with regard to intellectual properties, standards, laws, product safety, and environmental preservation	Based on the technology requirements for the planned embedded system, analyze their relationships with intellectual properties, standards, and laws, summarize the points to consider on product safety and environmental preservation, and give appropriate instructions to subordinates.	• Status of intellectual properties related to the target technology areas. • Own company's competence (proprietary technologies) • Overview of the standards and laws related to the embedded system and the system of the standards • Product safety and environmental preservation	• Evaluating technologies with regard to their relationship with intellectual properties • Collecting and understanding trends concerning standards and laws • Evaluating products with embedded systems from the viewpoints of safety and environmental preservation
	11-4 Risk analysis	Instruct staff to conduct risk analysis for the planned embedded system, and give appropriate instructions for risk management based on the analysis results.	• Risk management	• Appropriately evaluating the risk analysis results • Based on the risk analysis results, instructing staff to conduct work in each lifecycle process of the product
	11-5 Development of the procurement policy	Understand the planned embedded system's element technologies, and specify an appropriate procurement policy based on the relationship with the company's technology level.	• Procurement methods • Vendor trends • Industry trends for each element technology • Company's technology resources	• Evaluating the cost analysis results in cases where the company's technologies are used and where the technologies and products are procured • Making medium- and long-term decisions based on the business strategy

Major category	Minor category	Outline	Required knowledge	Required skills
	11-6 Evaluation of consistency with business strategy	Evaluate the expansion of the embedded system planning based on the relationship with the business strategy, and make a decision.	• Business strategy • Market trends • SWOT analysis	• Keeping track of market trends related to the planned embedded system • Analyzing and evaluating the competitiveness of the company's products • Evaluating the positioning of the planned embedded products from the perspective of the business strategy • Analyzing changes in external and internal environments and developing a management strategy in consideration of optimal utilization of management resources
	11-7 Confirmation and adjustments of requirements	Analyze the requirements for the planned embedded system, and adjust and confirm the functional requirements and environment requirements within the appropriate scope and summarize them as requirements specifications in order to promote the plan.	• Market trends and user needs for the planned embedded products • Business strategy	• Understanding requirements for the embedded system and environment conditions, and adjusting them based on the relationship with the company's sales strategy