

Overview of the Playbook for Investment in "Quality ICT Infrastructure"

July 2017

Foreword

■ Background

- Information and communication technology (ICT) has become an indispensable tool for social and economic activities, and it is also an infrastructure that promotes sustainable and inclusive economic and social growth.
- Various stakeholders are making efforts toward ICT infrastructure improvements so that all people throughout the world will be able to enjoy the benefits of ICT infrastructure. Among them, the idea that it is necessary to consider the quality of ICT infrastructure (in addition to the quantity) is widespread in order for the ICT infrastructure to contribute to the resolution of social problems of the nation or region and to lead to the sustainable development of the economy and society.
- "Quality ICT Infrastructure" may first appear costly. However, since it is easy to use and durable, "Quality ICT Infrastructure" is indeed cost-effective in the long run, contributing to economic development and social problem solving.
- At the G7 ICT Ministers' Meeting in Takamatsu, Kagawa in April, 2016, it was included in the Opportunities for collaboration that "Japan welcomes collaboration on initiatives to promote quality ICT infrastructure and share information on its development and deployment". In response to this, "International symposium on 'Quality ICT Infrastructure'" was held in March, 2017. In that symposium, the Ministry of Internal Affairs and Communications (MIC), Japan announced that it was formulating a playbook regarding investment in "Quality ICT Infrastructure".

■ Objective

- This playbook seeks to provide the basic concept of "Quality ICT Infrastructure", useful suggestions and best practices to develop "Quality ICT Infrastructure" for ICT policy makers, procurement managers, and personnel in charge of ICT infrastructure.
- We hope this playbook will accelerate various efforts of stakeholders around the world to develop "Quality ICT Infrastructure" which contributes to sustainable and inclusive economic and social growth.
- This playbook will be reviewed in the future on a timely basis.

Uniqueness of ICT Infrastructure (1)

■ ICT infrastructure is roughly divided into two categories.

1) ICT as Infrastructure (ICT infrastructure itself)

- ◆ Hard infrastructure : physical ICT network functions
(optical submarine cables, terrestrial digital broadcasting facilities, satellites, data centers etc.)
- ◆ Soft infrastructure : ICT services and platforms
(IoT/AI platforms, cybersecurity related systems, big data related systems etc.)

➤ ICT provides value as infrastructure.

2) ICT for Infrastructure (Infrastructure utilizing ICT)

- ◆ Railroad, Aviation, Road etc.
Functional improvement of public infrastructure(durability improvements/ demand forecasting)
- ◆ Public administration, Agriculture, Education, Disaster prevention, Health and Medical care etc.
Improvements in the activity content and environment for social infrastructure

➤ Enhancing the value of existing infrastructure by utilizing ICT.

Uniqueness of ICT Infrastructure (2)

- Uniqueness of ICT infrastructure (comparison with physical infrastructure such as bridges and roads)
 - 1) Network building
 - As an existing part might be a bottleneck to achieve the full performance of installed ICT infrastructure, consideration should be given not only to installed ICT infrastructure itself, but to the entire network (other existing ICT infrastructure or systems to be connected)
 - 2) Value-affecting operation and maintenance
 - The operation and maintenance of infrastructure plays a key role in providing the value of the infrastructure correctly
 - Operation and maintenance costs might be the same as the initial cost

Uniqueness of ICT Infrastructure (3)

■ Uniqueness of ICT infrastructure (comparison with physical infrastructure such as bridges and roads)

3) Shorter life cycle

- Hardware : relatively short, compared with that of physical infrastructure hardware
- Software : increasingly becomes obsolete, because of fast technological innovation speed and expiration of support to basic software (OS etc.)

4) Recurrence of renewal and version upgrading

- Hardware : Reinforcement might be necessary to improve the performance corresponding to economic growth.
- Software : Modification and expansion of application software might be necessary (e.g. complying with changes in regulations and institutions, responding to newly discovered needs)

Quality of ICT Infrastructure—Principle and Significance of “Quality Infrastructure”

- The importance of “Quality Infrastructure” is widely shared in the international community.

1) United Nations

- The United Nations Summit in September 2015 adopted the 2030 Agenda for Sustainable Development as an international goal from 2016 through 2030.
- The agenda set up the Sustainable Development Goals (SDGs).
- One of the goals is to build strong resilient infrastructure and promote inclusive and sustainable industrialization and innovation. It is clearly stated that the goal is to **develop high-quality, reliable, sustainable, and tough infrastructure**.

2) G7 Ise-Shima Summit

- Principles for Promoting Quality Infrastructure Investment with excellent environmental performance and durability were confirmed in the G7 Ise-Shima Summit in May 2016. In the principles, the G7 members declared that they would encourage the relevant stakeholders, namely governments, international organizations, including multilateral development banks (MDBs), and the private sector such as in PPP projects, to introduce and promote a transparent and competitive procurement process by **taking full account of** the value for money and **quality of infrastructure**, while also saying that they would **make infrastructure investment and provide support** in line with the principles.

3) G-20 Hangzhou Summit

- In the G20 Leaders’ Communique at the G20 Hangzhou Summit in September 2016, the participants reaffirmed the commitment to promote investment focusing on infrastructure in terms of both quantity and quality, and the G20 members welcomed the Joint Declaration of Aspirations on Actions to Support Infrastructure Investment by MDBs, including their announcements of **quantitative ambitions for high-quality infrastructure projects** within their respective institutional mandates.
- The Communique stated that the G20 members stressed the importance of quality infrastructure investment, which aimed to ensure economic efficiency in view of life-cycle cost, safety, resilience against natural disaster, job creation, capacity building, and transfer of expertise and know-how on mutually agreed terms and conditions, while addressing social and environmental impacts and aligning with economic and development strategies.



“Quality infrastructure” and investment for it are necessary to achieve the purpose of growth.

Quality of ICT Infrastructure—What is “Quality ICT Infrastructure”? (1)

- "Quality ICT Infrastructure", for example, has the following characteristics.
 - ✓ The initial cost may not always be low, but the infrastructure will be easy to use and it will ensure excellent maintainability and last a long time because of its robustness. Thus, it is greatly expected that the infrastructure will contribute to economic development and resolution of social problems.
 - ✓ From a long-term perspective, it will be cost effective and inexpensive.
 - ✓ It will contribute to the achievement of sustainable, inclusive, and economical and social growth.

ICT infrastructure from which high value is expected in return for payment

in terms of economy, effectiveness, and efficiency when considering the life cycle cost and quality or conformity of the ICT infrastructure.

E.g., a certain type of ICT infrastructure




	ICT infrastructure A	ICT infrastructure B
Initial cost	High (twice the cost of infrastructure B)	Low
Maintenance cost (yearly)	Low (half the cost of infrastructure B)	High
Life expectancy/lifetime	Long	Short
	↓	↓
Life cycle cost	Low	High

=> It can be said that ICT infrastructure A has high economic efficiency and the life cycle cost is reduced even though the initial cost is high.

Quality of ICT Infrastructure—What is “Quality ICT Infrastructure”? (2)

■ Why is "Quality ICT Infrastructure" necessary?

- ✓ If it is difficult to secure a budget due to limited financial circumstances, excessive importance tends to be attached to the initial cost without sufficiently considering the quality at the time of ICT infrastructure planning and procurement.
- ✓ This results in a failure in the use of the ICT infrastructure as planned or scheduled, lack of system operability and long-term durability of the ICT infrastructure, the noncompliance of the infrastructure with international standards, high maintenance and operation costs, and insufficient environmental consideration.



In order to achieve high-quality growth, "Quality ICT Infrastructure" investment is desired in response to the ICT infrastructure demand of the country and region.

* By clarifying the real needs for ICT infrastructure and utilizing know-how (e.g. mobilizing finance schemes), **it will be possible to procure ICT infrastructure equipped with comparatively high superiority with consideration to its quality**, while staying within the budget constraints.

(See the Appendix for introduction examples of quality-ensured ICT infrastructure.)

■ In terms of the achievement of long-term growth, the quality as well as the price of ICT infrastructure is important.

1) A case where too much emphasis was placed on the initial cost.

- A country decided to order the installation of a telecommunications network to a manufacturer in a project because of its low initial cost. However, as the manufacturer took a strategy to sell the initial introduction block at a low cost and gain a profit from the expansion part, eventually the total cost including maintenance charges became high.

2) A case where the planning or requirement definition of ICT infrastructure was insufficient

- A country’s policy of communications network construction was not clear, and the country easily accepted a number of manufacturers’ proposals to install equipment for free for a fixed-line telephone project. As a result, various telephone switchboards exist in a mixed state, which causes inefficiency and a maintenance labor and increasing costs.

3) A case where the maintenance or operation of ICT infrastructure was not fully considered

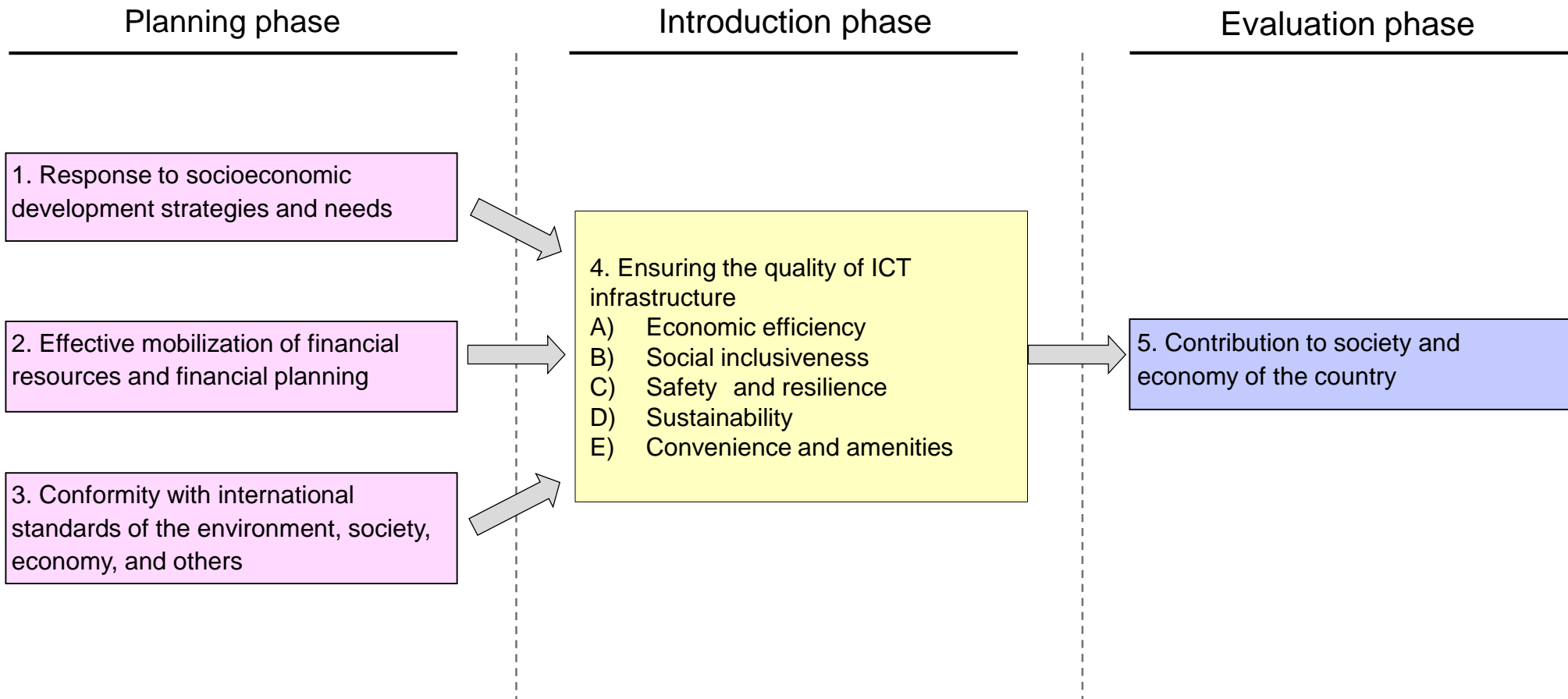
- A country introduced a surveillance camera system with a finance of several tens of billion yen from another country. Support for the operation method and human resource development, however, was not sufficient and the system was left without being activated.

4) A case where a master plan on the introduction of ICT infrastructure was not formulated

- A country agreed to receive support from a developed country for improvements in a logistics-related business project, but the operator of the business did not specify a master plan or ideal image specifically and had to work on measures that could produce results in a short term. The project differed from the content of the planned long-term support of the developed country, and it became difficult to obtain continuous support and investment.

Quality of ICT Infrastructure— “Quality ICT Infrastructure” and Its Necessity

- Examples of elements for achieving "Quality ICT Infrastructure" investment include the following ones.



Quality of ICT Infrastructure— “Quality ICT Infrastructure” and Its Necessity

- Examples of elements for achieving "Quality ICT Infrastructure" investment include the following ones.

Phase	Elements for achieving "Quality ICT Infrastructure" investment	Description
Planning	1. Response to socioeconomic development strategies and needs	Formulating the ICT master plan or long-term plan and designing the project consistent with people's needs and requests for the resolution of problems along with dialogues and cooperation with other governments and international development financial institutions for the plan.
	2. Effective mobilization of financial resources and financial planning	Securing budgets for "Quality ICT Infrastructure" investment and utilizing investments and loans from overseas
	3. Conformity with international standards of the environment, society, economy, and others	Reducing impacts on the environment and society and planning and designing of ICT infrastructure in accordance with international standards and not with one's own standards.
Introduction	4. Ensuring the quality of ICT infrastructure	Features of ICT infrastructure itself
Evaluation	5. Contribution to society and economy of the country	Effects and achievements brought about by “Quality ICT Infrastructure”. * Job opportunity creation, ICT human resource development and capacity building are included.

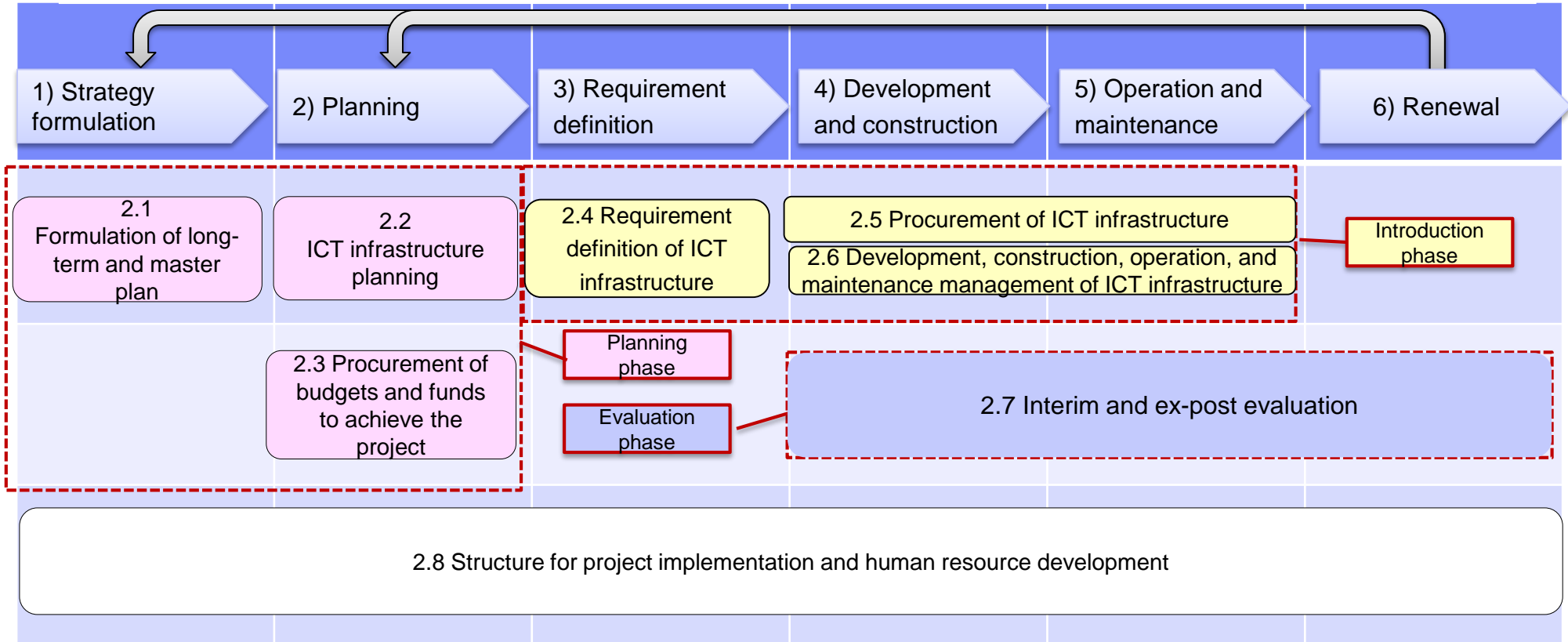
“Quality ICT Infrastructure”—Content of Quality of ICT Infrastructure

■ Examples of Quality elements of ICT infrastructure (Depending on the type of ICT infrastructure, not all of these elements are applicable.)

Quality elements of ICT infrastructure	Description	Elements for achieving "Quality ICT Infrastructure" investment Developmental connection with contribution to the society and the economy of the own country
A) Economic efficiency	<ul style="list-style-type: none"> ■ High economic value from a long-term perspective on ICT infrastructure <ul style="list-style-type: none"> • Low total cost (lifecycle cost) of the development, operation, maintenance from a long-term perspective. 	<p><Solution of social issues by "Quality ICT Infrastructure" and contribution to economic growth></p> <ul style="list-style-type: none"> ■ Securing financial resources for economic development <ul style="list-style-type: none"> • procurement of new revenue sources with new profits by improving or altering its revenue mechanism. ■ Ensuring social inclusiveness <ul style="list-style-type: none"> • Society that is equal and can withstand changes in the social structure by the bridging of the digital divide. ■ Improvements in social resilience <ul style="list-style-type: none"> • Creating a strong society through the protection of people’s lives and assets. ■ Development of job opportunities and human resources <ul style="list-style-type: none"> • Development of ICT infrastructure operators and creation of job opportunities for the operation.
B) Social inclusiveness	<ul style="list-style-type: none"> ■ Development of ICT infrastructure (with high social inclusion) that will include socially disadvantaged regions and people or improvements in social inclusion by using ICT. <ul style="list-style-type: none"> • Provided across urban areas (covering distant, non-profitable, low population density areas) • Used equally in social and economic strata. 	
C) Safety and resilience	<ul style="list-style-type: none"> ■ Improvements in the safety and resilience of ICT infrastructure or improvements in safety and resilience of social infrastructure <ul style="list-style-type: none"> • Achievement of a stable communication environment with less malfunctions • High durability against natural disasters, such as typhoons, floods, earthquakes, and human disasters, such as cyberattacks 	
D) Sustainability	<ul style="list-style-type: none"> ■ Reduction of the burden on the global (or regional) environment by the development and operation of ICT infrastructure or utilization of ICT infrastructure with improvements in the sustainable harmonization of ICT infrastructure with the environment ■ Contribution of ICT infrastructure to sustainable development of the social and economic environment <ul style="list-style-type: none"> • In line with the development and change of the socio-economic environment, height of the feasibility of the gradual introduction of infrastructure and the continuity and expandability of business related to ICT infrastructure 	
E) Convenience and amenities	<ul style="list-style-type: none"> ■ Ease of the operation, maintenance, and management of ICT infrastructure or high quality of services provided by social infrastructure through the use of ICT. 	

Implementation Process of ICT Infrastructure Projects

■ In order to develop "Quality ICT Infrastructure", it will be necessary to implement appropriate measures in the following six steps.



Measures to Develop “Quality ICT Infrastructure” (1)

■ Examples of measures to develop "Quality ICT Infrastructure" at six steps.

Measures	Content of measures	Specific examples
2.1 Formulation of master plan	(1) Clarification of ICT infrastructure development and implementation plans according to the purpose.	<ul style="list-style-type: none"> • Formulation of master plans, such as national broadband plans and cybersecurity plans. • Discussing the feasibility of the plans with local governments and telecommunications carriers. • Holding policy dialogues with other countries and conducting researches with domestic and overseas consultants and vendors in order to make effective use of budgets.
	(2) Sharing information and exchanging opinions with stakeholders.	
2.2 ICT infrastructure planning	(1) Achievement of necessary ICT infrastructure performance and functions.	<ul style="list-style-type: none"> • Clarification of the order of infrastructure development, estimated costs, and investment effects through the implementation of feasibility study (FS). • Grasping the introduction status of ICT infrastructure, information exchange with ICT vendors and consultants, and confirmation on compliance with international standards.
	(2) Performance of ICT infrastructure and dialogues with cooperating organizations with cooperation requests.	
2.3 Procurement of budgets and funds to achieve the project	(1) Study on appropriate budget and fund acquisition at the planning Step.	<ul style="list-style-type: none"> • Utilization of public funds as media for domestic development of infrastructure and introduction of private funds (i.e., active use of investments and loans from overseas and infrastructure-related funds, ODA in other countries, multilateral development banks (MDBs), and private companies' investments).
	(2) Procurement of budgets and funds by domestic and foreign investments and loans.	
2.4 Requirement definition of ICT infrastructure	(1) Implementation of requirement definition with consideration of high quality.	<ul style="list-style-type: none"> • With consideration of needs, materializing the scope and functions of the ICT infrastructure and clearly stating them in a specification sheet.

Measures to Develop “Quality ICT Infrastructure” (2)

■ Examples of measures to develop "Quality ICT Infrastructure" at six steps.

Measures	Content of measures	Specific examples
2.5 Procurement of ICT infrastructure	(1) Selection of procurement method suitable for the procurement situation of ICT infrastructure to be introduced.	<ul style="list-style-type: none"> Implementation of comprehensive evaluation bidding method and technical proposal and negotiation method.
2.6 Development, construction, operation, and maintenance management of ICT infrastructure	(1) Project management, control, and coordination between related projects.	<ul style="list-style-type: none"> Establishment and operation of a project management office (for project management work and technical support and coordination of matters related to a number of projects).
2.7 Interim and ex-post evaluation	(1) Evaluating the degree of achievement of required specifications at the end of each step of the project.	<ul style="list-style-type: none"> Calculation of investment effect, improvements in ICT infrastructure and study of function expansion, evaluation of workers, and comparison of plans and actual results.
	(2) Planning by quantitative evaluation and monitoring and the recognition and change of business improvement points based on the comparative evaluation of actual results.	
	(3) Summarizing lessons for similar projects for the future.	
2.8 Structure for project implementation and human resource development	(1) Human resource development and system development.	<ul style="list-style-type: none"> Development of human resources such as policy makers and concept makers, as well as human resources who have extensive knowledge on ICT infrastructure, human resources who are good at raising funds for domestic and foreign investments and loans, training of personnel with detailed knowledge and experience on ICT infrastructure technology, and utilization of overseas programs and consultants.
	(2) Utilization of overseas programs for effective human resource development.	

(1) Submarine Cable

■ Points

- ✓ The government led the construction of a submarine cable for the purpose of improvements in the telecommunications environment, expansion of the future use of large-volume data, and an increase in economic merits.
- ✓ The finance scheme of an international development financial institution was utilized to quickly secure the huge amount of funds necessary for laying the cable.



■ Features of the "Quality ICT Infrastructure" project

Quality elements of the project: **Effective mobilization of financial resources and financial planning and Ensuring the quality of ICT infrastructure (economic efficiency, social inclusiveness, safety and resilience, sustainability, convenience and amenities)**

Background		<ul style="list-style-type: none"> ✓ A great demand increase in telecommunications in the future was expected in emerging countries including the country. ✓ Not only entertainment video contents but also educational video contents was increasing. Therefore, the country felt the need to develop a high-capacity telecommunications environment in order to watch high-capacity contents satisfactorily.
Phase	Step	Efforts
Planning	2) Planning and designing	<ul style="list-style-type: none"> ✓ The government of the country focused on securing high-capacity telecommunications, from which <u>improvements in the telecommunications environments of the country and neighboring countries</u> would be expected along with <u>the economic development of the country as a result revenues from attracting data centers and telecommunications hubs</u>. Accordingly, the country decided to construct a submarine cable. ✓ However, when the country decided to build a submarine cable, another country in the same region decided to lay a different submarine cable. The economic merits could have been lost if the other country had started the operation of the submarine cable. Therefore, the country had to select a contractor promptly and secure the funds. ✓ A huge amount of money was urgently needed for the submarine cable, but the country thought that it was difficult to cover the entire project with only its own funds. Therefore, the country <u>promptly procured the funds for the construction from a financing scheme (buyer's credit) provided by an international development financial institution of a developed country</u> and started laying the submarine cable.
Introduction & Evaluation	3) Requirement definition – 6) Renewal	<ul style="list-style-type: none"> ✓ At the time of laying the long-distance line, the country decided the required specifications by referring to other submarine cable projects already implemented. ✓ The country selected the contractor as a result of appropriate technical screening and started the construction of the submarine cable.

(2) Construction of Optical Fiber Network

■ Points

- ✓ A high-capacity and high-speed telecommunications environment has been achieved with the procurement of optical fiber cable.
- ✓ With consideration of past failure experiences, the country procured a product of high quality, the operation of which was not dependent on workers' skills, and planned to conduct quality construction work to ensure the stable operation of the submarine cable for a long term. Furthermore, the country expected labor and cost reduction after the operation of the submarine cable.
- ✓ The country planned to accumulate its know-how in the country and operate it only with the country's own talented personnel by receiving educational support from a company with laying know-how.



■ Features of the "Quality ICT Infrastructure" project

Quality elements corresponding to the project: **Ensuring the quality of ICT infrastructure (economic efficiency, social inclusiveness, safety and resilience, sustainability, convenience and amenities) and contribution to the society and the economy of the country**

Background		<ul style="list-style-type: none"> ✓ The country anticipated a telecommunications demand expansion in the future and felt the necessity of environment improvements that would allow high-capacity, high-speed telecommunications performance. ✓ Issues, such as improper work, poor connections, and the early deterioration of products occurred to the country in the past because it ordered products and installation work at low introduction costs when it developed its telecommunications network. As a result, a stable telecommunications environment had not been achieved, and a situation with no re-procurement or reconstruction of products continued.
Phase	Step	Efforts
Planning	2) Planning and designing	<ul style="list-style-type: none"> ✓ In order to achieve high-capacity, high-speed telecommunications performance, the country planned to lay out an optical fiber network (with overhead lines). ✓ The country planned to maintain the optical fiber network with the introduction of high-quality products allowing everyone to install with ease by reflecting past failure experiences in order to establish a stable telecommunications environment. This made it possible to operate the optical fiber network stably for a long time. Furthermore, the country expected a total cost reduction by reducing the trouble of exchanging products and labor at the time of installation. ✓ Quality construction was not always performed in the country, where construction procedures were sometimes ignored and protective equipment was left in an exposed state. Therefore, the country planned technical instructions from the contracting company in order to conduct high-quality installation work with only domestic human resources.
Introduction & Evaluation	3) Requirement definition – 6) Renewal	<ul style="list-style-type: none"> ✓ The country defined the requirements in consultation with the contractor in order to select a company with rich know-how to handle reliable products and supervise the installation work. The country selected a suitable contractor and is currently advancing the work.

(3) Telecommunications Network Deployment

■ Points

- ✓ The country entered a joint operation agreement with a private company that has know-how in order to have the country's human resources accumulate maintenance know-how while securing maintenance funds.
- ✓ The development of the network has been successfully bridging the digital divide. Furthermore, the improved availability of base stations has achieved a comfortable telecommunications environment.



■ Features of the "Quality ICT Infrastructure" project

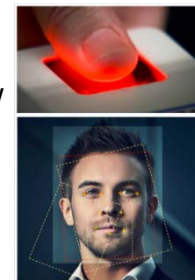
Quality elements of the project: **Ensuring the quality of ICT infrastructure (economic efficiency, social inclusiveness, safety and resilience, sustainability, convenience and amenities), Contribution to society and economy of the country**

Background		<ul style="list-style-type: none"> ✓ The country had obvious problems in the telecommunications environment because there was no efficiently developed network. ✓ Although the country felt the necessity for the development of an efficient network, the country thought that it was difficult for the country's telecommunications companies to develop the same by themselves and that a foreign company's cooperation was required.
Phase	Step	Efforts
Planning	2) Planning and designing	<ul style="list-style-type: none"> ✓ For improvements in the communications network, the country decided to liberalize the telecommunications sector and allowed the participation of foreign telecommunications companies. ✓ <u>With the aim of accumulating telecommunications development know-how and utilizing the funds of foreign companies</u>, the country planned to conclude a joint operation agreement.
Introduction & Evaluation	3) Requirement definition – 6) Renewal	<ul style="list-style-type: none"> ✓ The country utilized the know-how of the investment company that signed a joint operation contract and defined the requirements. ✓ Utilizing the know-how of the investment company, <u>the country's human resources have been developing the telecommunications services while the country has been training human resources so that they can operate and maintain the services without overseas assistance.</u> ✓ <u>The telecommunications services covering 97% of the population have achieved a base station availability rate of 99% or more</u>, thus achieving a comfortable telecommunications environment. The development of the telecommunications services is ongoing.

(4) Biometric Authentication System

■ Points

- ✓ The country decided to procure a biometric authentication system with high authentication accuracy ensured by state-of-the-art technology for the purpose of replacing the existing biometric authentication system with low authentication accuracy and promoting the utilization and application of ICT. By doing so, the country is planning to secure the safety of people and improve their convenience.
- ✓ The country requested technical support for a year and established the system that the country's human resources could operate without overseas assistance.



■ Features of the "Quality ICT Infrastructure" project

Quality elements of the project: **Response to economic and social development strategies and needs, Ensuring the quality of ICT infrastructure (in terms of economic efficiency, social inclusiveness, convenience and amenities), and Contribution to society and economy of the country**

Background		<ul style="list-style-type: none"> ✓ The accuracy of the existing biometrics authentication system of the country was low and the country felt the necessity for introducing a highly accurate biometric authentication system. ✓ By introducing a highly accurate biometric authentication system, the country thought that it could utilize the system in many ways, including the country's citizen ID management and criminal investigation and expected to secure the safety of people and improvement of their convenience.
Phase	Step	Efforts
Planning	2) Planning and designing	<ul style="list-style-type: none"> ✓ The country demanded a biometric authentication system with high authentication accuracy to link with an existing database in which individual biological information was recorded. ✓ In introducing a highly accurate biometric authentication system, the country collected information on biometrics systems from vendors from around the world and conducted a study on the installation of the system. As a result of the study, the company found that the biometric authentication system provided by a vendor of a developed country matched the country's needs. Therefore, the country invited the vendor to explain the biometric authentication system and confirmed the conformance of the system with the actual needs. ✓ The country requested technical assistance for a year to local human resources so that the system could be operated without overseas assistance.
Introduction & Evaluation	3) Requirement definitions – 6) Renewal	<ul style="list-style-type: none"> ✓ In cooperation with the contractor of the developed country, defined necessary requirements in order to procure the biometric authentication system according to the needs. ✓ The country has been preparing to introduce the highly accurate biometrics authentication system with this contractor and to operate it to link with the existing database.

(5) Solid-state Weather Radar System

■ Points

- ✓ Introducing, in a planned manner, the solid-state weather radar systems that are more accurate, more economical, easier to maintain and have less environmental impact than conventional electron tube radar systems.
- ✓ The solid-state weather radar system ensures the safety and resilience of society and contributes to the sustainability of the country by effectively utilizing frequency resources.



■ Features of the "Quality ICT Infrastructure" project

Quality elements of the project: **Ensuring the quality of ICT infrastructure (in terms of economic efficiency, social inclusiveness, convenience and amenities) and Contribution to society and economy of the country**

Background		<ul style="list-style-type: none"> ✓ To reduce repeated flood damage, it is important to provide accurate weather forecast and quick evacuation information. For this purpose, deploying weather radar all over the country is indispensable. ✓ Considering the demand of frequency usage such as the beginning of IoT age and high increase in the capacity of wireless LAN and communication device such as smartphones, interference between weather radar and wireless LAN is concerned.. ✓ Taking the above-mentioned into account, well-planned deployment of the new solid state weather radars which can achieve efficient use of frequency is desired.
Phase	Step	Efforts
Planning	2) Planning and designing	<ul style="list-style-type: none"> ✓ <u>The country planned to introduce the solid-state weather radar system ensuring the efficient use of frequency, the rapid and accurate acquisition of observation information , while providing ease of operation at a reduced running cost with the mitigation of environmental impact.</u>
Introduction & Evaluation	3) Requirement definitions – 4) Development and construction	<ul style="list-style-type: none"> ✓ The country changed the procurement specifications to cover the solid-state weather radar systems as well as conventional weather radar systems and selected the contractor through an appropriate technical examination.
	5) Operation and maintenance – 6) Renewal	<ul style="list-style-type: none"> ✓ The failure rate of operation is quite low. The country confirmed the advantages such as the efficient use of frequency, the highly accurate observation, low operation cost, and high availability of the radar system. Therefore, the country is proceeding the planned transition from conventional electron tube radar systems to the solid-state radar system.

For inquiries about this playbook, please contact
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