

**Data Collection Survey on
Okinawa-type Vitalization of Information and
Telecommunication Industry
in the Pacific Region**

Final Report

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Panasonic Excel International Co., Ltd.

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Abbreviation

ADB	Asian Development Bank
APCN2	Asia Pacific Cable Network
APITT	Advanced and Practical IT Training
APT	Asia-Pacific Telecommunity
ARRNet	Australia's Academic and Research Network
ASP	Application Service Provider
ATH	Amalgamated Telecom Holdings Limited
AV	Audio Video
AusAID	The Australian Agency for International Development
BPO	Business Process Outsourcing
C/P	Counter Part
CAD	Computer Aided Design
CEO	Chief Executive Officer
CROP	Council of Regional Organizations in the Pacific
DVC	Deputy Vice Chancellor
EOJ	Embassy of Japan
FBE	Faculty of Business and Economics
FINTEL	Fiji International Telecommunications Limited
FSTE	Faculty of Science Technology and Environment
GIX	Global Internet Exchange
GNI	Gross National Income
GNP	Gross National Product
HR	Human Resources
IC/R	Inception Report
ICT	Information and Communication Technology
ICTC	Information and Communication Technology Center
IT	Information Technology
IT/R	Interim Report
ITCS	Information Technology & Computing Services
ITOP	IT Professional Personnel Development Program (Information Technology Okinawa Professionals)
ITS	Information Technology Services
ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
NDA	Nago Development Authority
OJT	On the Job Training
OSC	Okinawa Software Center
OSS	Open Source Software
PALM	Pacific Islands Leaders Meeting
PEICO	Panasonic Excel International Co., Ltd.
PIF	Pacific Islands Forum
PIFS	Pacific Islands Forum Secretariat
PITA	Pacific Islands Telecommunications Association
PTC	Pacific Telecommunications Council

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PTL	Pacific Technologies Limited
PacCERT	Pacific Computer Emergency Response Team
PiRRC	Pacific ICT Regulatory Resource Center
SCCN	Southern Cross Cable Network
SCIMS	School of Computing, Information and Mathematical Sciences
SCSC	Southern Cross Submarine Cable
SDN	Software-Defined Network
SEA-ME-WE3	South-East Asia-Middle East-Western Europe
SINU	Solomon Islands Natural University
SPC	Secretariat of the Pacific Community
SPSE	The South Pacific Stock Exchange
STCL	Solomon Telekom Company Ltd.
SaaS	Software as a service
TA	Technical Assistance
TAF	Telecommunications Authority of Fiji
TCC	Tonga Communications Corporation
TCL	Tonga Cable Limited
TCSI	Telecommunication Commission Solomon Islands
TFL	Telecom Fiji Limited
TFR	Tax Free Region
TFZ	Tax Free Zone
USP	The University of the South Pacific

List of Country Name

Official name of country	Name of country used in this report
Republic of Fiji	Fiji
Kingdom of Tonga	Tonga
Solomon Islands	Solomon Islands
Republic of Vanuatu	Vanuatu
Independent State of Samoa	Samoa
Independent State of Papua New Guinea	Papua New Guinea
Australia	Australia
New Zealand	New Zealand

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Summary

1 Outline

1.1 Background

Japan's Relationships with Pacific Island Nations

To strengthen its relationships with Pacific Island Nations, Japan has hosted a “Pacific Islands Leaders Meeting (PALM)” once every three years since 1997. The “Okinawa Kizuna Declaration” (kizuna means “strong bond”) was adopted at the sixth PALM (PALM6) held in Okinawa in May 2012. The Kizuna Declaration emphasized the possibility that, because of the geographical and climatic similarity between Okinawa and Pacific Island Nations, knowledge and experience unique to Okinawa could be used more fully to help develop those island nations.

Spiraling Growth in the Islands of Okinawa

Okinawa Prefecture is made up of 160 islands spread across an area 1,000 km from east to west and 400 km from north to south. Industries can only expand so far there because its market is small and it is far removed from the large markets of Tokyo and other major cities. Creating employment opportunities is an especially challenging issue; Okinawa has the highest unemployment rate in all of Japan. To tackle the issue, Okinawa came up with the “Okinawa Multimedia Island Concept” in September 1998 and began discussing specific policy for the development of an ICT industry to stand behind tourism as the number-two industry in the prefecture and working on building submarine cables and other projects toward that end. They developed and implemented two 10-year plans that began in 2002, the “Okinawa Promotion Plan” and the “Okinawa Information and Communications Industry Development Promotion Plan,” which led into the “Okinawa 21st Century Vision” unveiled in March 2010. The “21st Century Vision” is a 10-year plan that began in 2012 and, in tandem with the “Okinawa Smart Hub Concept,” names and promotes the ICT industry as a new, leading industry for creating jobs and reinvigorating local business.

While the challenges of quantitatively expanding related industries in ICT and increasing added value still need to be met, the initiatives have produced some results: over 200 ICT companies creating new jobs for over 20,000 people came to Okinawa from outside the islands in the decade leading up to 2011.

Pacific Island Nations: Challenges and Development Opportunities

Pacific Island Nations have much in common with Okinawa: small in size with low populations, isolated from other parts of themselves across wide expanses of ocean, and remote from major cities. They lack competitive industries of their own and have amassed huge trade deficits, so they generally rely on fishing fees from foreign fishing boats, development assistance and money sent from relatives working on ships on the open ocean or in places like the United States, Australia and New Zealand to prop up their economies. The importance of enhancing connectivity via submarine cables was emphasized at the 2012 PIF, and that emphasis has caused expectations for the ICT

industry to mount. With aid from the Asian Development Bank (ADB) and the World Bank, submarine cables that enable the launch of all sorts of services connected to Tonga in August 2013 and will connect to Solomon Islands some time after next year, and many are watching intently to see whether the cables will lead to the creation of new business opportunities.

Applicability of Okinawa Knowledge and Experience to Pacific Island Nations

This survey reviewing the efforts Okinawa Prefecture has put in to develop an ICT industry and the results produced by those efforts, which were largely initiated by the prefecture itself. This survey extensively studies the environment surrounding ICT in Pacific Island Nations, particularly Fiji, which is already connected via submarine cable, and Tonga, which was connected in this August, 2013, and Solomon Islands, which will become connected in the near future, in terms of everything from socioeconomic trends to population and geopolitical characteristics and industrial structure. In so doing at this point in time, the survey serves to analyze the similarities and differences between these nations and Okinawa and examine whether the vast knowledge and experience gained in the development and expansion of Okinawa Prefecture can be used to create new business opportunities and develop new industries.

1.2 Purpose

This survey serves to examine the applicability of Okinawa Prefecture's knowledge and experience to Pacific Island Nations by gathering and confirming information about the environment surrounding ICT in Pacific Island Nations after gathering and verifying information about efforts Okinawa Prefecture has put in to develop an ICT industry and the results produced by those efforts, which were largely initiated by the prefecture itself but also include efforts by Japan and Okinawan municipalities.

1.3 Scope

- | | | |
|--|---|--|
| (1) Field survey areas | : | Okinawa Prefecture, Fiji, Tonga, Solomon Islands |
| (2) Counterpart institutions in charge | : | Fiji: Ministry of Industry and Trade
Investment Fiji
Department of Communications |
| | | Tonga: Ministry of Information and Communications
(under control of the Office of the Prime Minister) |
| | | Solomon Islands: ICT Support Unit, Ministry of Finance & Treasury
Government Communication Unit, the Office of the Prime Minister |
| (3) Scope of survey in Japan | : | Okinawa Prefecture Department of Commerce, Industry and Labor, IT Industry Promotion Division |

- (4) Related local institutions : Secretariat of the Pacific Community (SPC)
The University of the South Pacific (USP)
Pacific Islands Forum Secretariat (PIFS)
International Telecommunication Union (ITU)
Pacific Islands Telecommunications Association (PITA)
ICT Association of Fiji, Pacific ICT Regulatory Resource Center
(PiRRC)
- (5) Other donors : Asian Development Bank (ADB)
AusAID(The Australian Agency for International Department)
- (6) Telecommunications businesses : Okinawa GIX Okinawa Co., Ltd.
Fiji ATH, FINTEL, TFL, Vodafone, Digicel,
Mindpearl, Kidanet, etc.
Tonga TCC, Digicel, etc.
Solomon Islands Solomon Telekom, Bemobile, etc.

1.4 Survey schedule and survey team members

The work period was scheduled for the 5 months between September 2013 and January 2014, with a survey period of 57 days.

2 Contents of Activities

2.1 Data Collection Survey in Okinawa Prefecture

General Industrial Policy on Okinawa Prefecture and Position of the ICT Industry

Following the reversion of Okinawa to Japanese administration in 1972, the Government of Japan had launched the “Okinawa Promotion and Development Plan” a total of three times by 2001. The main aim of the plans was to close the gap with the mainland and establish fundamental infrastructure for self-reliant development. The government and Okinawa Prefecture then set forth the “Okinawa Promotion Plan” for a decade from 2002 to 2011.

Building a self-reliant economy through private sector initiative needed a core industry that could lead the prefecture together with the tourism and leisure industry. For this purpose, the ICT industry was chosen with the hope that establishment of ICT infrastructures and the development of ICT technologies would eliminate the “barriers between the mainland and Okinawa in terms of physical distance and time” and enable the prefecture to take advantage of its unique attributes in hospitality, nature, history, culture etc. The Government of Japan and Okinawa prefecture placed it at the heart of its promotion plan for Okinawa Prefecture with the conviction that the ICT industry would solve the issue of physical distance while allowing the prefecture to utilize its nature, history, culture and other unique characteristics, and thus be able to become the prefecture’s core industry.

In September 1998, Okinawa Prefecture formulated the “Okinawa Multimedia Island Concept” for the ICT industry to make the prefecture one of the frontiers of multimedia services and a pioneering model of an advanced ICT society creating new industries for the 21st century.

Then in 2002, Okinawa Prefecture formulated the “Okinawa Promotion Plan” as its 10-year plan. Okinawa Prefecture put the plan into practice as an industrial policy and set out the 10-Year “Okinawa ICT Industry Promotion Plan” covering the second (3 years) and third (4 years) phases. The plan aimed to establish ICT industry clusters and make Okinawa an international ICT hub in the Asia-Pacific region by accumulating existing companies and attracting new companies to Okinawa; developing and securing advanced human resources; and strategically and efficiently developing ICT infrastructures.

In May 2012, the prime minister made a decision on the “Basic Policy for the Promotion of Okinawa” with an eye for promotion in the coming decade. In such circumstances, the “Okinawa 21st Century Vision” was created to look ahead to the future and envisage an Okinawa that the citizens there would find desirable.

Based on the “Okinawa 21st Century Vision”, the government formulated and is promoting “the Basic Plan for the Okinawa 21st Century Vision” with a term of 10 years from 2012 to 2022, and “the Implementation Plan for the Okinawa 21st Century Vision” comprised of two phases of five years each.

Programs (including policy finance) and Implementation Status of ICT Industry Promotion in Okinawa Prefecture

The Okinawa ICT Industry Promotion Plan was carried out in three plans and implemented from

2002 to 2011. The policies in each phase over the entire period of Plans 1 to 3 emphasize attracting and supporting call centers, which have the potential to hire a large number of workers. The second and third plans expanded coverage for support and training in the higher order processes of industry. This support targeted software and systems development with their larger production values, as well as BPO and other industry fields with more complicated structures and more added value.

Okinawa Prefecture planned to create jobs and increase total production in order to achieve sustainable growth in ICT-related industries. Doing so required expanding and advancing the information services industry and further concentration in the content and software industries. The plan aimed to take advantage of Okinawa's geographic advantages to become an international ICT hub for the Asian/Pacific Island region and further concentrate, expand and develop ICT-related industries. This approach continued into the Phase 3 plan, which aimed to strengthen the Okinawa brand by forming an international ICT hub, a gathering place for ICT industries. It also aimed to revitalize and boost the global competitiveness of ICT industries in Japan by alleviating the risk of concentrating everything in Tokyo. This approach aimed to create jobs and increase total production.

The prefecture established three major fields and six policy fields within the Okinawa ICT Industry Promotion Plan in an effort to train those in ICT-related industries. These fields are as given below:

Three Major Fields	Six Policy Fields
① Information Services	① Facility Improvement
② Software Development	② Human Resources Development
③ Content	③ Telecommunications Cost Reduction
	④ Software Development Support
	⑤ Content Creation Support
	⑥ Promotion Activities

In support of software development, the prefecture initiated policies to become involved in upper processing and to revitalize near-shore development and OSS businesses. The software development industry in Okinawa faces several issues. First, they have low total production as many corporations are set up to receive subcontracted work. Also, they must improve competitiveness by improving technical abilities and lowering development costs. Two approaches were regarded as important in resolving these issues: becoming involved in upper processing and revitalizing near-shore development and OSS businesses.

Okinawa Software Center Co., Ltd. was established in 2008 with support from Okinawa ICT industrial groups and companies in Okinawa and elsewhere. Established to increase involvement in upper processing and revitalize near-shore development, it has had success in its objectives.

The Ryukyu Soft Business Support Center was established as part of the Information Industry Association of Okinawa in 2011 to revitalize OSS businesses by leading a movement away from receiving outsourced works to a business model based on in-house products and services. It has proven successful in promoting such activity.

Incubation facilities and parks have been built as policy initiatives in facility improvement. Incubation facilities were built mainly in municipalities. In terms of parks, Okinawa IT Shinryo Park

was built in Uruma City, and Future International City of Finance and IT was built in Nago City. At the time of the survey in September 2013, Okinawa IT Shinryo Park has attracted 17 companies, and 22 companies have moved into Future International City of Finance and IT.

Results from Okinawa Prefecture ICT Industries

The “Okinawa ICT Industry Promotion Plan” was carried out in three phases over 10 years from 2002 to 2011. Plans from three major fields and six policy fields were put into action over each period. The project cost during Phase 1 was 14.92 billion yen, 10.27 billion yen during Phase 2 and 17.13 billion yen during Phase 3.

These project costs were put toward training in ICT industries in the three major fields and six policy fields. The results were 31,845 employees in 2011 (the end of Phase 3), which is 3.7 times the 8,600 employees in 2000, the reference year prior to the start of the plan. Total production in 2011 was 348.2 billion yen, 2.5 times the total production of 139.1 billion yen in 2000. The number of corporations that relocated to Okinawa was 237 by 2011, 4.4 times the 54 that had relocated by 2000. These are high-level results over the 12 years studied.

Remaining Challenges and New Policies for the Development of Okinawa ICT Industries

One issue is total production per employee, which remains low at approximately 10 million yen total through all three phases. The challenge will be to become involved in fields that can produce higher total production values. Total production per employee is extremely low in call centers and information services for both originally Okinawan and relocated companies, standing at under five million yen.

To overcome these hurdles, the prefecture is pushing to reinforce policies for HR development, promotion activities, subsidy systems and financing systems.

Hierarchical Structure of ICT Industries

Generally speaking, ICT industries can be understood in a bottom-to-top layered structure as shown in Figure 2.1-1. The bottom is the “Infrastructure Layer”, which consists of the submarine cables and other basic infrastructure and industries that operate these infrastructures. The second is the “Direct-Use Layer”, which consists of industries that directly use ICT infrastructure facilities. The third is the “Service Layer”, which consists of industries that use the first two layers to provide various services based on ICT. The fourth is the “Application layer”, which consists of industries that use the three previous layers and ICT to provide applications. Finally, the Human Resources Development layer provides personnel fit for jobs across all layers.

In general, and along with the passage of time, the ICT industry expands upward from the Infrastructure Layer, the bottom, up through to the Direct-Use Layer, Service Layer and Application Layer. Within the Layer as well, things are becoming virtualized, more strongly integrated with networks and combined with Services. In other words, development and expansion in terms of time moves from the lower layers toward the upper, and, within layers, from the categories on the left

toward those on the right, becoming more technically advanced. Categorizing ICT industries into layers and organizing and analyzing them in this way allows us to see how they are progressing and have the directions in which their development and expansion will move in the near future.

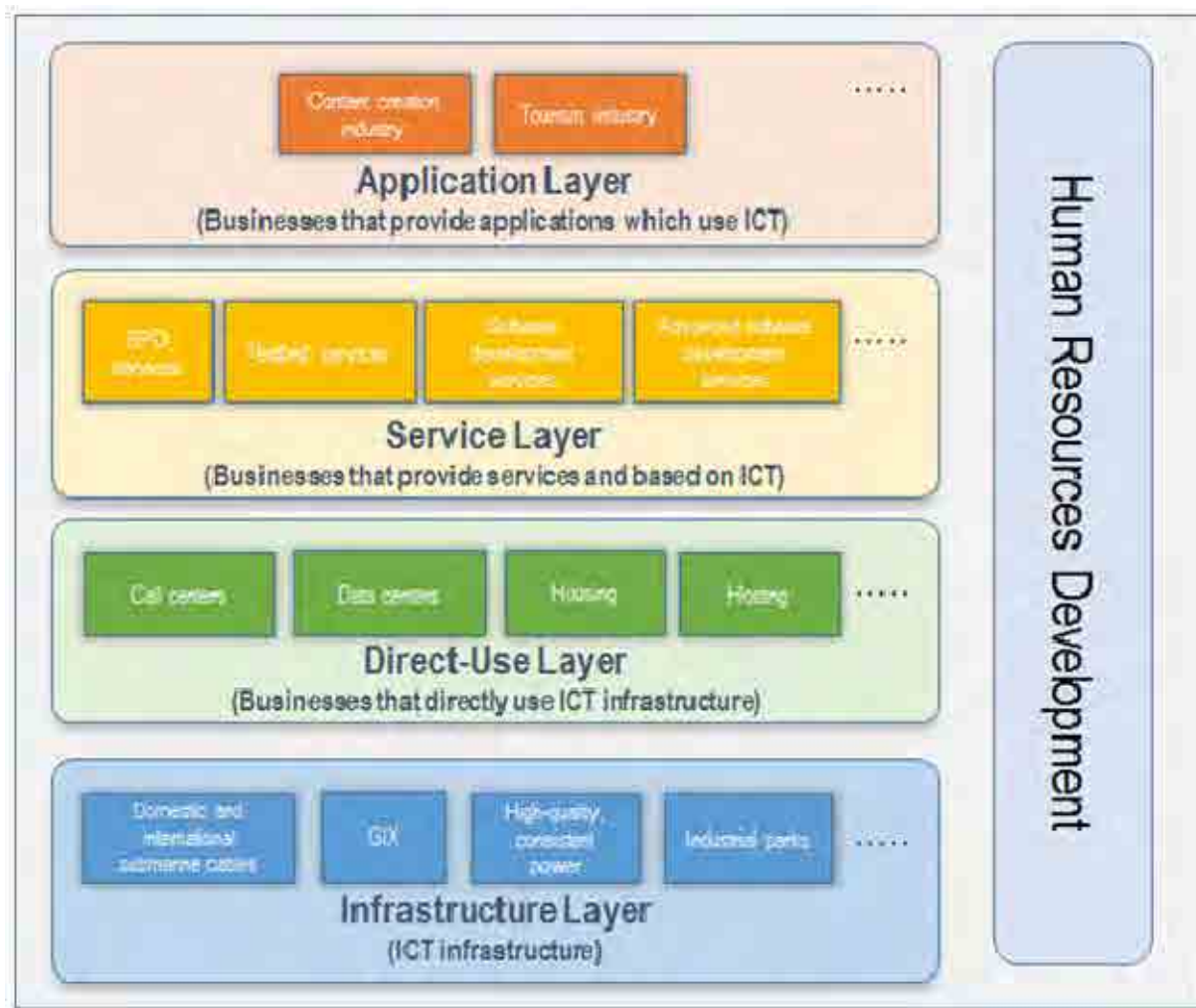


Figure 2.1-1 Hierarchical Structure of a Typical ICT Industry

While the samples are few for the surveyed companies in Okinawa Prefecture when placed in layers in terms of time, trends do surface.

In the matrix, this shows two developments in attracting ICT industries to Okinawa. The first is further development and expansion into upper layers, and the second is horizontal expansion on the lower layer in which technological innovation breeds higher functionality.

2.2 Collection Survey in Fiji

General Industrial Policy and the Position within the ICT Industry

In 2008, the government of Fiji issued Telecommunications Promulgation 2008. This promulgation strives to strengthen the telecommunications industry by enacting policies that move away from a monopoly and towards market liberalization.

ICT policy is covered in the Fiji National Policy Final Draft, which was released on August 30, 2012. Telecommunications Authority of Fiji (TAF) said in an interview that the policy is still under review and has not yet been enacted.

Section 48 of Telecommunications Promulgation 2008 sets forth the following services in an effort to achieve universal service:

- | |
|---|
| <ul style="list-style-type: none">• Telephone services that use fixed-telephones, mobile or other technologies• Public telephone and shared phone services• Internet services• Other services specified by Cabinet ministers under proposals from administrative bureaus |
|---|

Source: *Telecommunications Promulgation 2008*

The promulgation guarantees that users in designated areas will be able to use these services at fair, reasonable costs.

The maintenance status of the ICT infrastructure

The Fiji telecommunications market started deregulation in 2007, with market competition starting in the mobile communications sector. FINTEL was established in 1989 and, in the 25-year period from its inception until 2014, it has enjoyed a monopoly as the international communications gateway operator. However, in June 2009, the government approved the use of telecommunications businesses other than FINTEL for providing international telecommunications and serving as international communications gateway providers for call services and data communication in order to promote further liberalization and more market competition. This resulted in a portion of international communication fees (which had been acting as an impediment) to drop to approximately one fifth of their previous level.

Fiji was connected to submarine cable Southern Cross Cable Network (SCCN) in 2001, which provided them with a high-capacity, high-quality connection to Australia, New Zealand and the United States. Before the market was liberalized, FINTEL was the sole backhauler (provider of connections between submarine cables and domestic access lines); since 2009, FINTEL and TFL are the backhaulers.

Fiji was the first Pacific Island Nation to connect to SCCN and could eventually serve as a hub. Additionally, the laying of a new submarine cable between Fiji and Vanuatu began on the Fiji side on November 10, 2013 and reached land at Port Vila in Vanuatu on November 25. Service is slated to begin in January 2014. Plans call for the cable to begin service at 20 Gbps in January 2014 and also call for the laying of a second cable bound for Noumea, New Caledonia from Port Vila. The completion of this route to Vanuatu and the existing route to Tonga create a fork in the SCCN at Fiji; Fiji is already a hub. In addition, ADB said they are considering connecting to Samoa via submarine cable. Three routes from Fiji, Tonga and Hawaii have been proposed. The route from Hawaii is

unlikely to win because it is the longest, so if the connection to SCCN comes from Fiji or Tonga, it will increase Fiji's importance as a communications hub.

Programs and Implementation Status of ICT Industry Promotion

Established in 1980, Investment Fiji provides industrial and business education that touches on the export of products and services and offers various services that encourage investment. In doing so, Investment Fiji strives to create employment opportunities, increase economic activity, acquire foreign currency for the benefit of the Fijian economy and help improve the standard of living to eradicate poverty.

Investment Fiji defines seven operations that make up an ICT industry. Fiji possesses them all and strives to attract foreign businesses with its abundant, English-speaking workforce, low operating costs, prime location and ease of doing business due to its position as an Oceanian hub, availability of services, and the advantages of policy and legislation that benefits corporations and consumers.

ICT Operations
• Call center operations
• Mail management operations
• Data/receipt processing operations
• Hosting/housing operations
• Software development operations
• Audio visual operations
• Disaster recovery and management operations

Source: *Sector Profile 2013, Investment Fiji*

In terms of ICT industrial parks, the Fijian government has established USP Statham ICT Park and ATH Technology Park in the capital of Suva, and the Kalabu ICT Economic Development Zone roughly 10 km northeast of the Suva. They have set various incentives for the Kalabu ICT Economic Development Zone.

In addition, the Revenue and Customs Authority led the effort to prepare Fiji Tax and Customs Incentives and introduced policies for tax breaks to encourage investment and attract businesses. The hotel, audio visual, agriculture, ICT and manufacturing industries are eligible for these tax breaks, and additional tax free regions (TFR) have been established in the northern and eastern regions. There are ICT industry tax incentives to provide new ICT-related businesses that operate under certain conditions with 13-year exemptions on business income.

Results in the ICT Industry

Government strategies for attracting ICT industry businesses appear to have been successful in attracting businesses to the Kalabu ICT Economic Development Zone and to ICT-related industry

parks. The strategies attracted traditional call center, BPO and software development businesses and created jobs and service exports. In addition, some businesses in the ICT industry choose not to venture into the special tax zone set up by the government or ICT-related industry parks. While small in scale, new, expertise-oriented call center and software operations are developing.

It is particularly notable that, while there are many examples of foreign companies venturing into the Fiji and Oceania region markets, Fijian companies that provide new, high value added BPO services, though small, are being established.

Challenges for IC Industry Growth

ICT industry growth in Fiji aims to acquire foreign currency by responding to foreign demand, as well as to create and expand domestic employment opportunities. To achieve these targets, they have established parks and a TFZ, as well as tax breaks. Those policies have resulted in the attraction of companies (foreign and domestic) to industrial parks and the TFZ to some degree, which in turn has resulted in the creation and expansion of employment opportunities.

However, several challenges remain for ICT industry policies in Fiji.

- ① Industrial parks and the TFZ
 - 1 Industrial parks and the TFZ contain few companies attracted
- ② The domestic ICT industry
 - 1 The ICT industry contains few Fijian companies
 - 2 Telecommunications businesses see many young workers relocate overseas
- ③ HR development
 - 1 The small number of educational institutions
 - 2 The small number of business opportunities

Hierarchical Structure of the ICT Industries

One noteworthy milestone in Fiji's ICT industry is the connection to the Southern Cross Cable Network (SCCN), an international submarine cable, in 2001 and its commencement of operation. This significantly improved the communication quality and bandwidth between Fiji and Australia, New Zealand and the United States. Another noteworthy milestone is the liberalization of the telecommunications market from 2007 to 2009. TFL joined FINTEL in providing international lines through the submarine cable, which lowered international usage fees. The period marked the beginning of a competitive market with multiple providers of mobile and international services.

Looking at the layers with time points plotted based on these changes to the Fijian telecommunications environment, ICT industries appear in the Direct-Use Layer and the ICT-sourced services layer. It is clear that, among call centers (an ICT industry that uses telecommunications), international call center business Mindpearl ventured into Fiji under ideal conditions. Furthermore, the company that started providing BPO services, ANZ, surfaced prior to the deregulation period from 2007 to 2009, and is expanding into new BPO operations focused on network services rather than back office services.

Companies in the software industry, another sector of the ICT industry, were establishing themselves even earlier than those in the call center and BPO industries since software companies do not have as many uses for telecommunications as do those in the call center and BPO industries.

In the 10 years following the 2001 completion of the international submarine cable, the Infrastructure Layer became liberalized and the market became competitive, and companies in the Direct-Use Layer and Service Layer (ICT Source) were established and began operating. At the current point in time, companies in the Application Layer (ICT User) have not yet appeared.

2.3 Collection Survey in Tonga

General Industrial Policy and the Position within the ICT Industry

At the opening address for the Pacific Islands Chapter of the Internet Society (PICISOC) Annual Conference in September 2013, Tongan Prime Minister Lord Tu’ivakano said, “Connecting to the submarine cable will make an essential contribution to economic prosperity which will enhance the quality of life of Tongan citizens. . . . the government’s policy for the ICT sector continues to be driven by the expectation that increased accessibility and connectivity to the network will result in economic growth and social development.” He also said in his address that the government was on the verge of determining a broadband investment strategy to increase global interest in investing and development in growing sectors in Tonga and that they had reduced Internet rates per gigabit by 60% and cut fees for dedicated lines by 95%.

Dramatic improvement to the telecommunications service environment thanks to the submarine cable connection has heightened expectations for economic and industrial development and an improved quality of life for Tongan citizens.

At this point in time, none of the relevant government ministries have publicized policies related to the growth of ICT-related industries.

The maintenance status of the ICT infrastructure

The liberalization of telecommunications in Tonga began in 2002 and produced competition in the telecommunications market. Shoreline Communication, Ltd. received its license in 2002 and entered the mobile communications market under the TonFon brand. This pushed communications fees down more than 20% for all services, with both mobile subscribers and internet users doubling.

Tonga became the first country to be connected to the SCCN through linking with the Fiji station as part of the World Bank, Pacific Regional Connectivity Program. This has enabled high-capacity and high-quality data communication with Australia, New Zealand and the United States. Domestic carriers then began to connect to the submarine cable.

Programs and Implementation Status of ICT Industry Promotion

No program related to ICT industry promotion has been established.

Results in the ICT Industry

No specific program related to ICT industry promotion has been established, but private call centers have been launched thanks to the connection to the international submarine cable.

ProComm Services is a call center established in 2013 and is fully funded by a Japanese corporation.

Challenges for IC Industry Growth

Tonga currently lacks administrative policy to support ICT industry growth and under the present conditions it is necessary to begin from this point. If administrative policy support was created it would enable foreign business attraction and domestic business establishment support. Challenges toward achieving this include establishing tax breaks, TFZs and financing systems.

The lack of ICT personnel in Tonga is a major challenge that affects not only the growth of the ICT industry but also the operation of social infrastructure. The Tongan government is very interested in introducing e-government, but it lacks the ICT personnel to support e-government. ICT personnel are not being cultivated because there are few opportunities to for technical skill development in Tonga. This lack of technically skilled workers is problematic in terms of running the country's critical systems as well.

Far-reaching personnel development is a critical element of ICT industry growth. Tonga needs to cultivate ICT engineers and also to focus on vocational training schools to educate workers who will operate call centers and BPO businesses.

Hierarchical Structure of the ICT Industries

Looking at the hierarchical structure of the ICT industries in Tonga with the Survey Team's Tongan survey destinations plotted in their layers in terms of time.

Two noteworthy events that have impacted Tonga's ICT industry are the deregulation of the telecommunications market in 2002 and the connection to the Southern Cross Cable Network (SCCN), an international submarine cable and its commencement of operation. Though the Tongan telecommunications market is small, its deregulation lowered domestic telecommunications costs and improved service. This caused the number of subscribers to increase, but the environment does not respond to foreign demand. The ICT industry focuses on domestic demand in the Infrastructure Layer. The connection to SCCN will lead the Tongan ICT industry into the Direct-Use Layer, and it will happen in Tonga more quickly than it happened in Fiji.

2.4 Collection Survey in Solomon Islands

General Industrial Policy and the Position within the ICT Industry

One of the Solomon Islands government's goals put forth in its Medium Term Fiscal Strategy: 2011–2016 issued in August 2011 is to continue structural reform to make Solomon Islands an easy contry in which to invest and operate. In 2010, timber exports contributed to the GDP amidst the recovery of the market, and telecommunication business was right alongside construction and trade as factors that accelerated GDP growth.

The Solomon Islands government holds that structural reform creates not only opportunities for economic growth but also employment, new investment, low inflation, balanced wages and a healthy overall economy.

The liberalization of the Solomon Islands telecommunications market in 2009 has increased the range of mobile telecommunications coverage, dramatically improved service and significantly reduced telecommunications costs. As a result, the number of mobile subscribers has increased rapidly.

The Government Communication Unit of the Office of The Prime Minister & Cabinet indicated during the Survey Team's survey that awareness of the ICT industry is low because the Solomon Islands are yet to be connected to the submarine cable. However, they went on to say that they expect the ICT industry to create a large market once the cable is complete. The unit said that this is why the government does not have concrete plans for ICT industry policies.

The maintenance status of the ICT infrastructure

The Solomon Islands government announced in its Medium Term Fiscal Strategy: 2010–2015 issued in August 2010 that it and Solomon Telekom Company Ltd. (STCL) agreed to end the latter's exclusive license. In response, STCL cut telecommunications fees 50% and announced that its entire mobile communications network would migrate to 3G GSM.

The end of STCL's exclusive license and the liberalization of the telecommunications market allowed Bemobile Solomon Islands (Bemobile) to enter the market in August 2010. In December 2009, Bemobile invested 200 million SBD (about 3 billion JPY) to build a 2.5/3G network, and it provides a wide range of new services. As a result, the number of subscribers increased dramatically from the time the market was liberalized.

Programs and Implementation Status of ICT Industry Promotion

No program related to ICT industry promotion has been established.

Results in the ICT Industry

No specific program related to ICT industry promotion has been established, and international lines depend on expensive satellite communications because Solomon Islands is not yet connected to an international submarine cable.

Even in such an environment, a company called Advanced Technologies Ltd. has established itself and expanded into one new business after another, responding to domestic ICT demand by providing services from network design to equipment procurement, installation, wiring, and post-operation remote monitoring. Advanced Technologies Ltd. is a local company established in 2009 and funded entirely by Solomon Islanders.

Challenges for ICT Industry Growth

The issues in ICT industrial development in the Solomon Islands can be divided into three main fields: ICT policy, HR education and development, and infrastructure.

The first challenge is a lack of ICT policy. The government has not yet developed a vision for ICT. Solomon Islands liberalized its telecommunications market and proposed ICT policy later than other Pacific Island Nations, and it is behind them in launching an ICT industry as well.

The second challenge is HR Development. One thing that each survey destination mentioned was the lack of organizations providing ICT-related personnel training in Solomon Islands. The government has not focused on ICT personnel training because Solomon Islands is not yet connected to an international submarine cable and lacks a telecommunications environment. With the submarine cable expected to be connected and online by 2015, Solomon Islands needs to develop ICT personnel right away.

Many students go abroad to study ICT, and many of them stay abroad because there are few employment opportunities in Solomon Islands.

There is a wide demand for human resources in order to start up the ICT industry. Demand for a vocational training school is particularly high. SINU, Solomon Islands' only national university, used to be a college offering training but is now a university, which is why there are currently no vocational training schools in Solomon Islands. A challenge is to establish an ICT training center that can offer training in actual fields that have taken root within the ICT industry.

The third challenge is to maintain infrastructure. The power situation in Solomon Islands is grim. The supply is barely enough to meet demand, so electrical overload causes frequent power outages, leading many users to set up emergency power systems as backup.

Hierarchical Structure of the ICT Industries

Looking at the Solomon Island ICT industry hierarchical structure plotted in the layers in terms of time for the local companies visited, deregulation of the local telecommunications market in 2009 had notable impact on the local ICT industry. This allowed mobile telecommunications company Bemobile Solomon Islands to enter the Solomon Islands telecommunications market in 2010.

Advanced Technologies Ltd., a company that provides services from network design to equipment procurement, installation, wiring, and post-operation remote monitoring, was established in the Service Layer (ICT Source) concurrently with the liberalization of the telecommunications market, but the two events are not directly related.

The international submarine cable to Solomon Islands is still in the planning stages and is slated to begin operating in 2015, so the country depends on high-cost satellite communications for its international lines. Thus, the telecommunications and ICT markets are focused on domestic demand, and an ICT industry has not yet been established.

3 Possibilities for Using Experience from Okinawa Prefecture and the Support for ICT Industry Development in Pacific Island Nations

3.1 Matrix Analysis of Layer Structures in ICT Industries

Overlay of Layer Structures in the ICT Industries of each Country

Although the number of samples for ICT industry hierarchical structures in Okinawa, Fiji, Tonga, and Solomon Islands analyzed in Chapter 2 is small, they have been placed in an overlay to analyze trends. The colors representing each prefecture/country are: ●Okinawa, ●Fiji, ●Tonga, ●Solomon Islands. In order to see the correlation between the liberalization of telecommunications and the increase in the number of carriers, the timing of telecommunications liberalization in each country is specified. The carriers established due to the effects of liberalization are signified by ovals; blue is for Fiji, red is for Tonga, and green is for Solomon. Additionally, in order to see the correlation between the emergence of ICT industries and international submarine cables, the timing for the start of international submarine cable operation is also shown. The overlaid results are shown in Table 3.1-1.

Table 3.1-1 Overlay of ICT Industry Hierarchical Structures in Okinawa and each Country

20XX	00	01	02	03	04	05	06	07	08	09	10	11	12	13
Application Layer (ICT User)	Industries covered in Okinawa													
Marketing														
Translation services for the hearing impaired														
Creation of mobile contents for Gekiga (graphic novels)														
e-Commerce for local specialty products														
Service Layer (ICT Source)	Industries covered in Fiji													
Evaluation/Research														
BPO														
Education (e-Learning)														
CAD design														
Advanced software development														
Software development														
FX-related support														
Design services														
Direct-Use Layer	Industries covered in Tonga													
Call centers														
Data centers														
Infrastructure Layer	Industries covered in Solomon													
Carriers														
Network management (GIX/IGW)														
Special zones														
Liberalization of the telecommunications market			Tonga											
Start of international submarine cable operations		★ Fiji												★ Tonga

Bird's-eye View of Overlaid ICT Industry Hierarchical Structures in Okinawa and each Country

In Fiji, various industries in the ICT industry sector are conducting business in the Infrastructure Layer, the Direct-Use Layer, and the ICT-sourced services layer. Fiji was connected to international submarine cables relatively early in 2001, and has been successful in setting tax incentives and special zones to attract ICT industries. With this, call centers in the Direct-Use Layer and BPO industries in the ICT-sourced services layer have been gradually developed over the last 10 or so years.

In Tonga, industries have been established up to the second, or Direct-Use Layer. However, since they only recently started using international submarine cables in 2013 and have not yet established any policy for attracting ICT industries, their ICT industry layer is thin.

Solomon Islands has advanced into the ICT-sourced services layer, but as international submarine cables have not yet been connected, overall they are still in the Infrastructure Layer enhancement phase, centering on domestic telecommunications business.

In Okinawa, companies have been placed and conduct business in each of the Infrastructure Layer, Direct-Use Layer, ICT-sourced services layer and ICT applications layer. Okinawa continues to progress from the lower layers to the upper layers. Okinawan measures for developing its ICT industry have been effective, attracting companies and new start-ups to each layer and expanding both employment and output.

3.2 Challenges of ICT Industry Development in Fiji, Tonga, and Solomon

Current State of and Challenges with Domestic Demand-type ICT Industries

In each country, the number of subscribers for mobile communication systems increased as the free market was furthered through the liberalization of telecommunications. Since the penetration ratio (ratio of population) in Fiji is close to complete market saturation, the future issue will be increasing output by offering a higher level of service including a shift to 3G.

In Tonga and Solomon Islands, the penetration ratio is still just above 50%; the market will still expand.

The number of subscribers for domestic fixed broadband services is low in each country. The cause for this is that the network has been monopolized and the development of ADSL has been insufficient. The maintenance of fixed systems will also be an issue in the future expansion of internal demand.

Current State of and Challenges with Foreign Demand-type ICT Industries

The current conditions of the environment for foreign demand-type ICT industries in each country that have been brought to light through past surveys and analyses are summarized in Table 3.2-1.

Table 3.2-1 Current state of the environment for foreign demand-type ICT industries

Country	International submarine cables	Support measures for industry development	ICT HR development	Employment opportunities
Fiji	Operational	Special tax zones, preferential tax systems, etc.	Insufficient reservoir of skilled human resources	Few
Tonga	Operational	None	<ul style="list-style-type: none"> • Insufficient reservoir of skilled human resources • Few HR development organizations 	Very few
Solomon Islands	Not connected	None	<ul style="list-style-type: none"> • Insufficient reservoir of skilled human resources • Almost no HR development organizations 	Almost none

Six policies in Okinawa Prefecture and the Current State and Challenges of Each Country

After formulating a vision and planning policies and strategies that follow that vision, measures will be created as an implementation plan based on those policies and strategies. This process will be an important approach for developing the prefecture and the nation.

In Okinawa Prefecture, six policies were put forth based on this vision and by incorporating demand outside the prefecture in order to further develop ICT industries. With this, results were produced in terms of output, attraction of companies, and job creation. These six policies are listed below.

- i Establishment of facilities
- ii HR development
- iii Actively attracting industries
- iv Reduction of telecommunications costs
- v Support for software development
- vi Support for contents creation

Table 3.2-2 looks at the ICT industries, industry support measures, and status of special zones surveyed in each country thus far and how they overlay with Okinawa Prefectural policies.

Table 3.2-2 Issues regarding each measure in each country

Measures	Fiji	Tonga	Solomon Islands
Current state of ICT policies	Created	Not created	Not created
Establishment of facilities	USP Statham ICT Park, etc. are established.	No Park or incubation facilities.	No Park or incubation facilities.
HR development	Insufficient reservoir of skilled human resources	Insufficient reservoir of skilled human resources	Insufficient reservoir of skilled human resources
		Few HR development organizations	Almost no HR development organizations
Stimulation of activities to attract industries	Special tax zones, tax breaks measures are established.	No incentives measures for stimulating the attraction of ICT industries.	No incentives measures for stimulating the attraction of ICT industries.
Reduction of telecommunications costs	No support measures for telecommunications costs.	No support measures for telecommunications costs.	No support measures for telecommunications costs.
Support for software development	No support measures for software development.	No software development industries.	No software development industries.
Support for contents creation	No contents-creation industries. Emphasis is placed on film industry.	No contents-creation industries.	No contents-creation industries.

All three countries share the same issues regarding HR development. In each of the countries, the reservoir of skilled, ICT-related human resources is insufficient. Additionally, there is a shortage in the broad range of ICT related human resources, from the vocation training school to university levels.

The development of ICT policies, active attraction of industries and the establishment of facilities are also issues faced by Tonga and Solomon Islands. These are especially pressing issues for Tonga, where international submarine cables have been laid and conditions incorporating foreign demand have just started. For Solomon Islands, since international submarine cables have yet to be connected, an environment incorporating foreign demand has not been created. Therefore, the active attraction of industries and the establishment of facilities has a low level of importance at this moment.

None of the countries have set support policies for telecommunications costs. In Okinawa Prefecture's support measures for telecommunications costs, the prefecture does not merely subsidize costs. Instead, a company called Tropical Techno Center, Co., Ltd., which was established with investments from the prefecture and private companies, is able to reduce the cost of telecommunications lines by procuring the lines in bulk and contracting with telecommunications companies. Tropical Techno Center Co., Ltd. is thus positioned as a telecommunications line reseller. The companies that use these lines procure them from Tropical Techno Center. Instead of simply subsidizing costs, this method of support that introduced a system to reduce the cost of telecommunications lines is effective.

In terms of support for software development, since software development industries exist only in Fiji, the target is limited to Fiji.

Challenges with New Service Infrastructure

ICT, due to the nature of the services provided, has an impact on the activities of the government and administrative services. These include e-Government and e-Administrative Service, the development of which requires efforts specific to the small size of Pacific island nations. Development issues are as follows:

i Infrastructure development for e-Government and e-Administrative Service

The examination of shared infrastructure that takes into account the compatibility of both unique and common functions is an issue. These issues are shared themes among Oceanian countries, and should be addressed with the Pacific Islands Forum (PIF) /USP in the central role.

ii Infrastructure development for the USP Cloud Data Center

In connection with the item above, USP is considered to be an appropriate organization as its public nature for shared infrastructure. USP plans to aggregate the databases currently spread across the departments and migrate distributed deployments to the cloud to help spread risk. The study and assessment of plans for its possible utilization in e-Government and e-Administrative Service systems, including its convenience and reliability as a shared infrastructure is an issue for consideration. These issues should be addressed by USP in the central role while collaborating with PIF and other entities.

3.3 Framework of Support for ICT Industry Development in the Pacific (proposed)

The support that Japan can conduct in Fiji, Tonga, and Solomon Islands is proposed below.

Before formulating specific measures, ICT policies must first be developed. The initial approach will be to formulate a vision that firmly describes the hopes and goals of the countries. For Tonga and Solomon Islands, it is possible for Japan to provide support in formulating ICT policies that include their future vision, policies, and strategies. This will be positioned as Priority 1.

The proposed support that Japan can conduct in each country is shown in Table 3.3.-1. This reflects five of the six measures taken in Okinawa to develop ICT industries, not including content creation support. Priority for support other than HR development in Solomon Islands is low, since development will be conducted while monitoring the progress of the plan to lay submarine cables. The priority order for each is shown in the table as a relative sequence.

For development support for ICT industries, HR development will be assigned Priority 2, following the provision of support for formulating ICT policies. Since the reservoir of skilled human resources is insufficient in each country, support will be provided as regional cooperation by establishing courses in ICT-related vocational training schools and universities with the aim of building up skilled human resources. The creation of an educational environment is also an important target for support for Tonga and Solomon Islands in particular, as neither country sufficiently has an educational environment. In terms of HR development, it is also necessary to examine what distance learning can be offered in each country in conjunction with USP using USPNet and the HR development support available for

face-to-face instruction at vocational training schools and universities in each country.

Priority 3 is assigned to support for Tonga, where international submarine cables have already been connected and have begun operations. As part of this, providing support for measures to establish Park and incubation facilities, as well as support in establishing incentives that will help attract ICT industries is a prime task.

Priority 4 is assigned to support for establishing telecommunications cost subsidies as a wide area support measure. Measures using telecommunication line resellers, as were used in Okinawa, are expected to be effective.

Priority 5 is assigned to support measures for software development. This will be support targeted for Fiji as the only country with a software development industry. Outside software development companies will step in to handle the upper processes. Here, the work of two companies will be valuable: Okinawa Software Center, who aims to bring projects back to Okinawa, and Ryukyu Software Business Support Center, looking to become an OSS distributor.

Priority 6 is the same as Priority 3, but it will be developed in accordance with the progress of connecting international submarine cables in Solomon.

Table 3.3-1 Proposed support for each country

Measures	Fiji	Tonga	Solomon Islands
ICT Policy		Priority:1	Priority:1
		Developing ICT Policy	Developing ICT Policy
Establishment of facilities		Priority: 3	Priority:6
		Individual support	Individual support
		Support for establishing park and incubation facilities.	Support for establishing park and incubation facilities.
HR development	Priority: 2		
	Support as regional cooperation		
	Support for establishing courses in ICT-related vocational training schools and universities with the aim of building up skilled human resources.		
Stimulation of activities to attract industries		Priority: 3	Priority: 6
		Individual support	Individual support
		Support for establishing incentives for stimulating the attraction of ICT industries.	Support for establishing incentives for stimulating the attraction of ICT industries.
Reduction of telecommunications costs	Priority: 4	Priority: 4	Priority: 4
	Individual support	Individual support	Individual support
	Support for establishing telecommunication cost subsidies	Support for establishing telecommunication cost subsidies	Support for establishing telecommunication cost subsidies
Support for software development	Priority:5		
	Individual support		
	Support for software development		

Through this survey, we were able to understand the current situation and issues in the ICT field for the Oceanian countries of Fiji, Tonga, and Solomon. Additionally, it was shown that the process and results of the successful systematic development of ICT industries in Okinawa can be applied to ICT industry development in Oceanian countries and used as proposals for support development.

Furthermore, in order to further advance the support plan more concretely, it is important for Japan to continue to support the strategic development of ICT industries in the target countries of Oceania.

Support for strategic development of ICT industries for each country

For ICT industry development, support for formulating ICT policies and their implementation strategies, and for formulating specific measures that follow these strategies is important as a part of strategic development support. Along this process, the appropriate measures can be selected from several possibilities for implementation. There will be a proposal for strategic development support of ICT industries.

Okinawa has positioned the ICT industry as an industry that incorporates foreign demand and increases output and employment. Formulating a vision and planned strategies, Okinawa has developed concrete measures using many different approaches. By skillfully incorporating a telecommunication line reselling system, support for reducing telecommunications costs was achieved. Additionally, in an effort to compensate for weaknesses and expand on the strengths of the Okinawa software industry, consortium-like software development companies and the Okinawa Software Center were created, and open source software was used to keep development costs down. The Ryukyu Software Business Support Center was also created to provide development support for products independently produced by companies. Introducing these approaches in a workshop format would be an effective method of support, so we propose this as one of the support measures.

Furthermore, for e-Government and e-Administrative Service infrastructure development, we propose to assist PIF/USP in establishing a shared infrastructure as unique and common functions of the systems and services.

We propose supporting USP in cooperation with PIF, etc. in their examination of plans for the use of the USP Cloud Data Center infrastructure in e-Government and e-Administrative Service systems, including its effectiveness, convenience and reliability as a shared infrastructure in the region.

1. Outline

1.1 Background

(1) Japan's Relationships with Pacific Island Nations

To strengthen its relationships with Pacific Island Nations, Japan has hosted a “Pacific Islands Leaders Meeting (PALM)” once every three years since 1997. The “Okinawa Kizuna Declaration” (kizuna means “strong bond”) was adopted at the sixth PALM (PALM6) held in Okinawa in May 2012. The Kizuna Declaration emphasized the possibility that, because of the geographical and climatic similarity between Okinawa and Pacific Island Nations, knowledge and experience unique to Okinawa could be used more fully to help develop those island nations.

(2) Spiraling Growth in the Islands of Okinawa

Okinawa Prefecture is made up of 160 islands spread across an area 1,000 km from east to west and 400 km from north to south. Industries can only expand so far there because its market is small and it is far removed from the large markets of Tokyo and other major cities. Creating employment opportunities is an especially challenging issue; Okinawa has the highest unemployment rate in all of Japan. To tackle the issue, Okinawa came up with the “Okinawa Multimedia Island Concept” in September 1998 and began discussing specific policy for the development of an ICT industry to stand behind tourism as the number-two industry in the prefecture and working on building submarine cables and other projects toward that end. They developed and implemented two 10-year plans that began in 2002, the “Okinawa Promotion Plan” and the “Okinawa Information and Communications Industry Development Promotion Plan,” which led into the “Okinawa 21st Century Vision” unveiled in March 2010. The “21st Century Vision” is a 10-year plan that began in 2012 and, in tandem with the “Okinawa Smart Hub Concept,” names and promotes the ICT industry as a new, leading industry for creating jobs and reinvigorating local business.

While the challenges of quantitatively expanding related industries in ICT and increasing added value still need to be met, the initiatives have produced some results: over 200 ICT companies creating new jobs for over 20,000 people came to Okinawa from outside the islands in the decade leading up to 2011.

Over a period longer than a decade, Okinawa Prefecture has gradually developed around the ICT industry to improve infrastructure, support policy, attract businesses from outside and develop human resources; the prefecture has produced results by developing a new industry to help overcome its geographical limitations. Determining direction and promoting support and expansion are critical elements to developing a new industry because, although expansion needs to meet the needs of the times, the individual approaches will require long-term to produce

results. Okinawa Prefecture has gained ample knowledge and experience through thorough planning, confident investment and development policy, and steady expansion.

(3) Pacific Island Nations: Challenges and Development Opportunities

Pacific Island Nations have much in common with Okinawa: small in size with low populations, isolated from other parts of themselves across wide expanses of ocean, and remote from major cities. They lack competitive industries of their own and have amassed huge trade deficits, so they generally rely on fishing fees from foreign fishing boats, development assistance and money sent from relatives working on ships on the open ocean or in places like the United States, Australia and New Zealand to prop up their economies. The importance of enhancing connectivity via submarine cables was emphasized at the 2012 PIF, and that emphasis has caused expectations for the ICT industry to mount. With aid from the Asian Development Bank (ADB) and the World Bank, submarine cables that enable the launch of all sorts of services connected to Tonga in August 2013 and will connect to Solomon Islands some time after next year, and many are watching intently to see whether the cables will lead to the creation of new business opportunities.

The Information and Communication Technology (ICT) field and ICT industry have developed remarkably, and they are expanding with increasing speed. Access lines are also improving and expanding quickly in line with submarine cables and other backbone lines. The proliferation of access lines has joined the laying of backbone lines and building of ICT parks and other related facilities as catalysts driving the expansion of the Internet and promotion of its use, and it will continue to grow and expand exponentially. The Internet and access lines that will continue to expand as they feed off each other can help island nations overcome the challenges of small size, isolation and remoteness and accelerate the growth of new industries.

Networks are also integrating with services and developing as cloud services, and the synergistic effects of human resources development in the ICT field are raising hopes for industrial development and business opportunities.

(4) Applicability of Okinawa Knowledge and Experience to Pacific Island Nations

This survey reviewing the efforts Okinawa Prefecture has put in to develop an ICT industry and the results produced by those efforts, which were largely initiated by the prefecture itself. This survey extensively studies the environment surrounding ICT in Pacific Island Nations, particularly Fiji, which is already connected via submarine cable, and Tonga, which was connected in this August, 2013, and Solomon Islands, which will become connected in the near future, in terms of everything from socioeconomic trends to population and geopolitical characteristics and industrial structure. In so doing at this point in time, the survey serves to analyze the similarities and differences between these nations and Okinawa and examine whether the vast knowledge and experience gained in the development and expansion of Okinawa Prefecture can be used to create new business opportunities and develop new industries.

1.2 Purpose

Given the background above, Panasonic Excel International Co., Ltd. (PEICO) implemented this survey for the following purpose:

This survey serves to examine the applicability of Okinawa Prefecture's knowledge and experience to Pacific Island Nations by gathering and confirming information about the environment surrounding ICT in Pacific Island Nations after gathering and verifying information about efforts Okinawa Prefecture has put in to develop an ICT industry and the results produced by those efforts, which were largely initiated by the prefecture itself but also include efforts by Japan and Okinawan municipalities.

Below are important points for this survey based on the purpose above. This survey will achieve its objectives and produce results because those who implement it will pay full attention to these important points.

Important Points for Implementing This Survey

- (1) When gathering information in Okinawa Prefecture, organize and analyze in chronological order the policy and efforts initiated by the prefecture (including those of Japan and Okinawan municipalities) and the results of that policy and those efforts after clarifying the background and reasons behind the industry's rise to becoming the leading industry. Use aids like diagrams and charts to visually organize and analyze the information.
- (2) The development of the ICT industry in Okinawa Prefecture was largely initiated by the prefecture itself, but the policy and efforts of Japan and Okinawan municipalities are also targets for this survey.
- (3) Gather and analyze information from both Okinawa Prefecture (the side trying to attract businesses from outside) and corporations (the side being attracted). Write columns on any stories or anecdotes that characterize viewpoints of either side.
- (4) Once similarities and differences between Okinawa Prefecture and Pacific Island Nations have been sorted out, examine whether the knowledge and experience from developing the ICT industry in Okinawa can be used to create new business opportunities and develop industries in Pacific Island Nations. To promote the applicability of that knowledge and experience and lower barriers against applying it, consider what kind of support and efforts are needed from whom (the government, private businesses, JICA and other assistance agencies, etc.).
- (5) Search for and analyze any local strategies or studies related to the ICT industry promoted and implemented by the Secretariat of the Pacific Community (SPC), the University of the South Pacific (USP) and other local organizations and institutions.
- (6) Since ADB and the World Bank are providing support for connection via submarine cables in Tonga and Solomon Islands, stay in touch with them when gathering information about related support from other donors (and provide information gathered to them as needed).

- (7) The Japanese Foreign Ministry's economic assistance policy limits cooperation with Fiji, which is under provisional military rule, to (i) contribute to areas such as education, health, and support for the socially vulnerable to improve civilian lifestyles; (ii) contribute to the resolution of and improvement upon issues at the regional level; and (iii) far-reaching matters that benefit other island nations. The implementation of this study is not immediately related to cooperation for the ICT industry of Fiji, and it is important that relevant agencies do not misunderstand this fact as field surveys are being carried out.
- (8) To make the survey more efficient, consider flight schedules and other factors for the secondary field surveys in Fiji, Tonga and Solomon Islands.
- (9) To make the survey more efficient, use existing survey reports and other resources. Also, obtain demand projections and as much statistical forecasting data as possible to analyze upcoming trends.

1.3 Scope

- (1) Field survey areas : Okinawa Prefecture, Fiji, Tonga, Solomon Islands
- (2) Counterpart institutions in charge : Fiji: Ministry of Industry and Trade
Investment Fiji
Department of Communications
Tonga: Ministry of Information and Communications (under control of the Office of the Prime Minister)
Solomon Islands: Ministry of Finance & Treasury, ICT Support Unit and Telecommunications Department in the Office of the Prime Minister
- (3) Scope of survey in Japan : Okinawa Prefecture Department of Commerce, Industry and Labor, IT Industry Promotion Division
- (4) Related local institutions : Secretariat of the Pacific Community (SPC)
The University of the South Pacific (USP)
Pacific Islands Forum Secretariat (PIFS)
International Telecommunication Union (ITU)
Pacific Islands Telecommunications Association (PITA)
ICT Association of Fiji, Pacific ICT Regulatory Resource Center (PiRRC)
- (5) Other donors : Asian Development Bank (ADB)
AusAID(The Australian Agency for International Department)
- (6) Telecommunications businesses : Okinawa: GIX Okinawa Co., Ltd.
Fiji: ATH, FINTEL, TFL, Vodafone, Digicel, Mindpearl, Kidanet, etc.
Tonga: TCC, Digicel, etc.
Solomon Islands: Solomon Telekom, Bemobile, etc.

1.4 Survey schedule and survey team members

(1) Work schedule

The work period was scheduled for the 5 months between September 2013 and January 2014, with a survey period of 57 days.

(2) Survey team member structure

The survey team consisted of two personnel. The survey team configuration is shown in table 1.4-1

Table 1.4-1 Survey team structure

Duties	Name	Affiliation
General coordination, policies and human resource development for the ICT industry	Kazuyoshi Fukushima	Panasonic Excel International Co., Ltd.
ICT technologies	Hiroshi Sasanuma	Private consultant

(3) Work schedule table

The work schedule is shown in table 1.4-2

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Table 1.4-2 Overall Project Work schedule

Work Items	2013				2014
	Sept	Oct	Nov	Dec	Jan
(1) Preparatory Work in Japan •Gathering existing documentation in Okinawa, Fiji, Tonga and the Solomon Islands •Creating an IC/R including the field survey plan and submission/revision with the JICA Southeast Asia and Pacific Department	□				
(2) Primary Field Survey •Discuss/revise IC/R with JICA Okinawa •Interview/data gathering from related agencies on the following items: *Socio-economic trends *Position of industrial policies generally and the ICT industry *The organization, system and budget of development within the ICT industry *Maintenance situation of the ICT industry's infrastructure *Development policies within the ICT industry and situation of implementation *Attraction of ICT corporations, details of assistance strategies and results *Details and results of personnel training within the ICT industry *Details and results of special districts and facilities within the development of the ICT industry *Results of development within the ICT industry and future issues •Report on the survey results to JICA Okinawa	■				
(3) Primary work in Japan •Organize and analyze primary survey information and report the IT/R to the JICA Southeast Asia and Pacific Department		□			
(4-1) Secondary Field Survey (Fiji) •Discussion & review of the IT/R with JICA Fiji Office •Interviews and information gathering about the following items at related agencies *Strategies, organization and budget of the ICT domain in Oceania *Socio-economic trends *Position of the ICT industry *The policies, organization and budget of development within the ICT industry *Maintenance status of the infrastructure of the ICT industry *Current status and issues of the ICT industry *Assistance from other donors in the ICT domain •Explanation of the efforts and results of Okinawa's ICT industry development to related agencies •Report of field survey results to JICA Fiji Office		■	■		
(4-2) Secondary Field Survey (Tonga) •Discussion & review of the IT/R with JICA Tonga Office •Interviews and information gathering about the following items at related agencies: *Socio-economic trends *Position of the ICT industry *The policies, organization and budget of the ICT industry *Maintenance status of the infrastructure of the ICT industry *Current status and issues of the ICT industry *Development plan & vision following the submarine cable maintenance *Assistance from other donors in the ICT domain •Explanation to related agencies of the efforts and results of Okinawa's ICT industry development •Report of field survey results to JICA Tonga Office		■			
(4-3) Secondary Field Survey (Solomon Islands) •Discussion & review of the IT/R with JICA Solomon Islands •Interviews and information gathering about the following items at related agencies: *Socio-economic trends *Position of the ICT industry *The policies, organization and budget of the ICT industry *Maintenance status of the infrastructure of the ICT industry *Current status and issues of the ICT industry *Development plan & vision following the submarine cable maintenance *Assistance from other donors in the ICT domain •Explanation of the efforts and results of Okinawa's ICT industry development to related agencies •Report of field survey results to JICA Solomon Islands		■			
(5) Organization work in Japan •Organization and analysis of information gathered and investigation of the applicability of Okinawa experiences to Pacific Island nations, and report of the FD/R to JICA •Incorporate JICA's comments and create and submit the F/R				□	□
Report	▲ IC/R	▲ IT/R		▲ FD/R	▲ F/R

General overview/IT industry policies & personnel training and IC technology (shared)

2. Contents of Activities

2.1 Data Collection Survey in Okinawa Prefecture

2.1.1 Outline of Activities

Following preparatory work in Japan, the Survey Team conducted the first domestic survey (Okinawa) between the period of September 8 and 21, 2013. The Survey aimed at data collection through hearings with relevant organizations in Okinawa Prefecture (the prefectural government, private companies in the relevant sector, etc.), gathering relevant documents and carrying out other activities.

The Survey Team visited relevant organizations such as governmental organizations, prefectural and municipal organizations, and private companies. The team selected municipal organizations based on such criteria as municipalities designated as special zones (Special Zone for Financial Business and Special Information and Communications Industry Zones) or ICT Industry Development Zones, and those with a large number of private companies and business incubation facilities to attract private companies. As for private companies, the Survey Team visited those selected according to preset criteria (outlined below) and separated into various layers.

Criteria for Selection of Private Companies to Visit

- Located in a special zone or industrial development zone
- Attracted to Okinawa
- Launching business in Okinawa and hiring a large number of workers
- Located in the IT Shinryo Park
- Located in Special Financial and ICT Zone (Future International City of Finance and IT)
- Belonging to all the layers

Table 2.1.1-1 lists organizations visited. Additionally, the schedule for the surveys performed at these organizations is provided at the end of the report (Schedule 1)

The Survey Team chiefly confirmed the following matters at the organizations visited.

(1) Okinawa Office of Telecommunications, Ministry of Internal Affairs and Communications (MIC)

Category		Check item
1. Programs	General	1) ICT industry programs undertaken by MIC in Okinawa (Special zones subject to tax treatment, development of ICT cities, etc.)
	Information hub	2) Outline of ICT hub building in Okinawa for the Asia-Pacific region
		3) Progress in, current state of and issues within the plan to build ICT hubs
	HR development	4) (Outline and results of) HR development programs in Okinawa Prefecture
Infrastructure	5) Current state of ICT infrastructure development in Okinawa	

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	development	Prefecture
	R&D	6) Current state of and issues for attracting ICT-related R&D to Okinawa Prefecture

(2)Okinawa Prefecture

Category		Check item
1. Industrial support programs	General	1) Project costs, employment, production and companies advancing to Okinawa by sector
		2) Types of support programs, implementation periods and project costs
		3) Number and trends in the number of cases to which support programs are applied, and the ratio of cases compared to the planned amount
	Financing	4) Loan support programs (operating and development funds)
	HR development	5) HR development support programs
		6) HR development-related subsidies
	Employment development	7) Employment development-related subsidies
	Cost reduction	8) Telecommunications cost reduction support
		9) Taxation support and benefit programs
	Infrastructure	10) Infrastructure development program
2. Industrial structure	General	1) Objectives of ICT industrial development and characteristics of the ICT industry in Okinawa Prefecture
		2) Trends in production and the number of workers by industry in Okinawa Prefecture
3. ICT industry	Details	1) Trends in production and number of workers in ICT industry in Okinawa Prefecture
	Comparison with national average	2) Ratio of production in the ICT industry in Okinawa relative to the total production of the ICT industry in Japan (rank of Okinawa in Japan)
4. Prefectural status	Labor	1) Trends in the working age population and the ratio relative to national total, by age segment
		2) Employment situations of high-school graduates in and outside the prefecture
		3) Employment situation of university graduates in and outside the prefecture
	Educational standard	4) Trend in the university entrance rate and the ratio relative to the national rate
	Living standard	5) Annual income and ratio to price levels (Okinawa and nationwide)
5. Others		1) Difficult tasks for making Okinawa Prefecture more attractive
		2) Difficult tasks for drawing up programs
		3) Difficult tasks for promoting programs

(3)Urasoe City

Category		Check item
1. Industrial support programs	General	1) Types of support programs
		2) Number of cases to which support programs are applied
	Financing	3) Details of financing programs
	Taxation support	4) Details of taxation support and benefit programs
	HR development	5) Details of HR development support programs
		6) Details of HR development-related subsidies

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	Employment development	7) Details of employment development-related subsidies
	Cost reduction	8) Telecommunications cost Support Project, etc.
2. Support facilities	Urasoe Industry Promotion Center “Yui-no-Machi”	1) Details of the Park 2) Number of users
3. Others	General	1) Difficult tasks for making Urasoe City more attractive 2) Difficult tasks for drawing up programs 3) Difficult tasks for promoting programs

(4)Uruma City

Category		Check item
1.Industrial support programs	General	1) Types of support programs
		2) Number of cases to which support programs are applied
	Financing	3) Details of financing programs
	Taxation support	4) Details of taxation support and benefit programs
	HR development	5) Details of HR development support programs
		6) Details of HR development-related subsidies
	Employment development	7) Details of employment development-related subsidies
	Cost reduction	8) Telecommunications cost Support Project, etc.
2.Support facilities	Okinawa IT Shinyo Park	1) Details of the Park
		2) Number of users
	Ichui Gushikawa Jinbunkan	3) Details of the facility
		4) Number of users
	Uruma City ICT Business Support Center	5) Details of the Center
		6) Number of users
3.Others	General	1) Difficult tasks for making Uruma City more attractive
		2) Difficult tasks for drawing up programs
		3) Difficult tasks for promoting programs

Table 2.1.1-1 List of Organizations Visited for Survey in Okinawa Prefecture

No	Layer
	Name of organization visited/Address Summary
O-1	Administrative organs
	<p>Okinawa Office of Telecommunications, MIC, Information and Communication Division Kafuna Asahibashi B-1 zone, 1-9 Asahi-machi, Naha City</p> <p>The division makes various programs and measures known to the prefectural and municipal governments and related organizations, and also commits itself to the realization of the objectives of such programs in collaboration with local governments and organizations. Programs include creation of new values for industrial promotion through expansion of digital terrestrial broadcasting services, elimination of areas with no access to broadband services and launching “ubiquitous zones”.</p>
O-2	Administrative organs
	<p>Regional Economy Division Economy, Trade and Industry Department Okinawa General Bureau Government of Japan Naha Regional Common Building No.2 for Government Offices 9th Floor, 2-1-1 Omoro-machi, Naha City</p> <p>The division promotes programs under industry-academia partnerships, supports regional economic associations, development of industrial human resources, etc. on the premise that industrial development will increase employment opportunities for local citizens, increase their income and improve the overall economic welfare of citizens in the prefecture.</p>
O-3	Administrative organs
	<p>Okinawa Prefectural Government Information Policy Division, Department of Planning IT Industry Promotion Division, Department of Commerce, Industry & Labor Okinawa Prefectural Government Office 8th Floor, 1-2-2 Izumizaki, Naha City</p> <p>These divisions play key roles in the promotion of the ICT industry in Okinawa Prefecture.</p>
O-4	Administrative organs
	<p>Information Industry Associations of Okinawa (public interest incorporated association) Okinawa Industry Support Center 505, 1831-1 Oroku, Naha City</p> <p>The association, as a public incorporated association, promotes the information service industry and local computerization in the prefecture to contribute to the social and economic development of the prefecture. Currently, it is actively working on vitalization of ICT-related industries and HR development, both of which are objectives of the principle concept, “Okinawa IT Shinryo Park”.</p>
O-5	Administrative organs
	<p>Urasoe City Government, Commerce and Industry Section of Civil Affairs Division Urasoe City Hall 5th Floor, 1-1-1 Ahacha, Urasoe City</p> <p>Special Information and Communications Industry Zones and ICT Industry Development Zones The city has a municipal industry promotion center called “Yui-no-Machi”. The city has succeeded in attracting private companies from outside the prefecture.</p>
O-6	Administrative organs
	<p>Industrial Site and Employment Promotion Division, Department of Economy Uruma City Uruma City Ishikawa Borough, 1-1 Ishikawa Ishizaki, Uruma City</p> <p>Special Information and Communications Industry Zones and Designated Information and Communications Industry Development Zones Uruma City has many ICT-related facilities including Okinawa Shinryo Park, Uruma IT Business Support Center, and Ichui Gushikawa Jibunkan.</p>
O-7	Administrative organs
	<p>Nago Development Authority (NDA) (specified nonprofit corporation) Nago City Multimedia Hall, 224-3 Toyohara, Nago City</p>

No	Layer
	<p>Name of organization visited/Address</p> <p>Summary</p> <p>Special Information and Communications Industry Zones, Designated Information and Communications Industry Development Zones and Special Zone for Financial Business Nago City has many ICT-related facilities including the Future International City of Finance and IT, and the Nago Industry Support Center.</p>
O-8	<p>HR</p> <p>Job Center of the Faculty of Engineering, University of the Ryukyus Senbaru 1, Nishihara-cho, Nakagami-gun</p> <p>A national university founded in 1950. Located in the Ryukyu Islands, having unique characteristics in its nature, culture and history, the university's everlasting mission is to welcome the challenges of developing human resources who are committed to the world's peace and welfare and have a rich sense humanity and responsibility.</p>
O-9	<p>HR</p> <p>Okinawa National College of Technology Department of Information and Communications System Engineering Department of Media Information Engineering 905 Henoko, Nago City</p> <p>A national college of technology founded in 2004 and located in Henoko, Nago City. The college has four departments: Machine System Engineering; Information and Communications System Engineering; Media Information Engineering; and Biological Resources Engineering. It also has an advance course, Creative System Engineering.</p>
O-10	<p>Infrastructure Layer Industry park</p> <p>Okinawa IT Shinyo Park Room 101, Okinawa IT Shinryo Park Core Function Support Facility, 14-17 Suzaki, Uruma City</p> <p>Okinawa IT Shinryo Park is an important project through which Okinawa Prefecture aims to create a major hub for both the domestic and international information and communications industries. The term "Shinryo" means "bridge with Asia".</p>
O-11	<p>Service Layer (ICT Source) Information services</p> <p>Okinawa Open Laboratory (general incorporated association) Room 211, Okinawa IT Shinryo Park Core Function Support Facility, 14-17 Suzaki, Uruma City</p> <p>The laboratory aims to serve as a basis to create an environment where global companies and human resources gather, and also as an international R&D hub to integrate software-defined networking (SDN) that is a revolutionary element of network technologies, and cloud computing technologies that are a revolutionary element for global ICT infrastructure.</p>
O-12	<p>Service Layer Information services</p> <p>Fujitsu Learning Media Okinawa Ltd. Rooms 212-214, Okinawa IT Shinryo Park Core Function Support Facility, 14-17 Suzaki, Uruma City</p> <p>The Okinawa branch of Fujitsu Learning Media offers cutting-edge training services and supports clients in Okinawa and elsewhere in Japan, as well as Asia, for their human resources development. Specifically, it offers seminars, E-learning and other training services; planning and operation of training programs, and support to training services.</p>
O-13	<p>Application Layer (ICT User) Translation services for hearing impaired persons</p> <p>Iscec Japan Ltd. Room 207, Ichui Gushikawa Jibunkan, 468 Kawasaki, Uruma City</p> <p>The company offers unique ICT solutions to support communication. Its major services include mobile information security services (e-ear), translation services to produce character information for hearing impaired persons.</p>

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No	Layer
	Name of organization visited/Address
	Summary
O-14	<p>Service Layer (ICT Source) CAD designing</p> <p>Okinawa Design Center, UNITEC Inc. Room 112, Okinawa IT Shinryo Park Core Function Support Facility, 14-17 Suzaki, Uruma City The center was founded on April 1, 2010, as a “development center for manufacturing in East Asia” by UNITEC Inc. (head office in Tokyo).</p>
O-15	<p>Service Layer (ICT Source) Advanced software development</p> <p>Okinawa IT Shinryo Park Development Center, Okinawa Software Center Co., Ltd Rooms 201-209, Okinawa IT Shinryo Park Core Function Support Facility, 14-17 Suzaki, Uruma City Okinawa Software Center Inc. (OSC) was founded in October 2008 as a pioneering activity center for the Okinawa IT Shinryo Park. Forty-five private companies in and outside Okinawa Prefecture jointly promote to gather ICT development strengths in the prefecture and create a hub for joint R&D activities with an eye to making it a near-shore basis of software development.</p>
O-16	<p>Direct-Use Layer Call centers and data centers</p> <p>Qualysite Technologies Inc. Mirai-2, 195-3 Toyohara, Nago City The company, an affiliate to Canon Marketing Japan Group, engages in ICT solutions. Specializing in Java, the affiliate engages in system development services, O&M for data centers and other related services. The number of employees: 144 (as of April 2013)</p>
O-17	<p>Direct-Use Layer Call centers</p> <p>Uruma Contact Center in Okinawa, Aicam Inc. Uruma City IT Business Support Center Bld. No.3, 2-20-1 Ishikawa-Akazaki, Uruma City The operation of a contact center, BPO services specializing in insurance services, consulting services, and temporary and contract manpower services</p>
O-18	<p>Service Layer (ICT Source) Advanced software development</p> <p>OCC Inc. 2-17-1 Takushi, Urasoe City One of the major private companies in Okinawa. It offers services related to system integration, cloud services, iDC services, disaster recovery, network solutions, security solutions and computer maintenance, among other things.</p>
O-19	<p>Service Layer (ICT Source) FOREX-related support</p> <p>Okinawa Branch, Gaitame.com Co., Ltd. Okiden Head Office Annex 6th Floor, 5-2-1 Makiminato, Urasoe City Head office in Tokyo. It has relocated the customer call center and system development team from the head office to Okinawa.</p>
O-20	<p>Direct-Use Layer Data centers</p> <p>First Riding Technology Inc. Okiden Head Office Annex, 5-2-1 Makiminato, Urasoe City Internet solution center and contact center</p>
O-21	<p>Service Layer (ICT Source) BPO</p> <p>Okinawa Center, HR One Corp. 1-1-18 Nishihara, Urasoe City</p>

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No	Layer
	<p>Name of organization visited/Address</p> <p>Summary</p> <p>The center offers outsourcing services of personnel affairs chiefly related to salary payments. Integrating tasks and systems, the center offers services to more than 200 private companies.</p>
O-22	<p>Application Layer (ICT User) EC of products made in Okinawa</p> <p>EC Division, Droog Inc. Nago Multimedia Center, 224-3 Toyohara, Nago City</p> <p>The company offers affiliates and internet advertisements, creative production and BPO services.</p>
O-23	<p>Direct-Use Layer Data centers</p> <p>TSYS Okinawa Data Center Mirai-3, 195-3 Toyohara, Nago City</p> <p>The center offers processing services related to various payment cards for Japan and countries in Asia.</p>
O-24	<p>Application Layer (ICT User) Production of moving images and contents for mobile and smart phones</p> <p>TIDA-WORKS Inc. Nago Multimedia Center, 224-3 Toyohara, Nago City</p> <p>The company produces contents for the leading website of mobile comics, 2-D and 3-D contents, etc.</p>
O-25	<p>Application Layer (ICT User) Marketing</p> <p>Mediaflag Okinawa Inc. Nago Multimedia Center, 224-3 Toyohara, Nago City</p> <p>The company offers sales enhancement services to businesses engaging in “over-the-counter and store retail services” by taking three approaches, “know-how of distribution”, “field marketing systems” and “media crews”.</p>
O-26	<p>Infrastructure Layer Network operation</p> <p>Okinawa Cross Head Co., Ltd. Okiden Naha Building 9th Floor, 114-4 Asahi-machi, Naha City</p> <p>Taking advantage of its network technologies, the company offers the following services to users in and outside the prefecture:</p> <ul style="list-style-type: none"> * System integration * Dispatch of engineers * 24h-365day services of monitoring and operating network and systems * Cloud services “CUMO” * High-speed direct line services between GIX Okinawa and Hong Kong
O-27	<p>Infrastructure Layer Network operation</p> <p>GIX Okinawa Co., Ltd. Okiden Naha Building 9th Floor, 114-4 Asahi-machi, Naha City</p> <p>GIX Okinawa Corporation was founded in 2010 by Okinawa Cross Head Co., Dova Corporation offering the one-stop ICT solutions and First Riding Technology Inc. which engage in Internet data center business. With support from the “Okinawa GIX Utilization Business Support Project”, the company is preparing for full-scale commercialization of Okinawa global IX.</p>

2.1.2 Social and Economic Trends in Okinawa Prefecture

(1) Population

According to data available on October 1, 2010 when the Survey was in progress, Okinawa Prefecture had a population of approximately 1.39 million, the 30th most populous out of 47 prefectures in Japan. The total area is 2,276km², the 44th largest. The prefecture was ranked relatively high, 9th, in terms of population density, which is approximately 612 people/km².

By age, the proportion of the youth population (aged under 15) to the total population stood at 17.7% (ranked 1st amongst all prefectures); that of the working-age population (aged 15-64) at 64.5% (ranked 6th); and that of elderly population (aged 65 and above) at 17.3% (ranked 47th). In other words, the proportion of the working-age population is relatively high, while that of youth population is also high compared to other prefectures.

Table 2.1.2-1 shows the latest estimates of the population.

Table 2.1.2-1 Okinawa Population

Item	Data	Change from the previous month
Total	1,415,796	+913
Males	694,752	+523
Females	721,044	+390
Total households	547,943	+654

Source: *Websites of Okinawa Prefecture: Estimated Population as of September 1, 2013*

(2) Location

In Okinawa Prefecture, the southern half of the Nansei Islands, which extend from Kyushu to Taiwan, are located at around 24-28 degrees northern latitude and 122-132 degrees eastern longitude. They comprise of 160 islands (of 0.01 km² or larger) scattering around a vast area approximately 400km north and south and approximately 1,000km east to west.

Table 2.1.2-2 shows the location information and a summary of the geography, Figure 2.1.2-1 the location of the prefecture.

Table 2.1.2-2 Location Information and Summary of Geography

Item	Data			
Endpoint	<i>Northern end</i>		<i>North latitude</i>	<i>East longitude</i>
	Northern end of Ioutorishima Island		27°53'08" N	128°13'20" E
	Distance from Naha		Approx. 193km	
	<i>Southern end</i>		<i>North latitude</i>	<i>East longitude</i>
	Southern end of Hateruma island		24°02'44" N	123°47'18" E
	Distance from Naha		Approx. 460km	
	<i>Eastern end</i>		<i>North latitude</i>	<i>East longitude</i>
	Maguro-misaki of Kitadaito Island		25°57'05" N	131°19'56" E
	Distance from Naha		Approx. 366km	
	<i>Western end</i>		<i>North latitude</i>	<i>East longitude</i>
Irizaki of Yonakuni Island		24°26'58" N	122°56'01" E	
Distance from Naha		Approx. 516km		
Geography	<p>On the Okinawa Main Island, Kunigami-gun is a mountainous area rich in water and thus has many dams. The central and southern parts of the island are chiefly hilly or flat. Other islands are relatively flat except Ishigaki and Iriomote Islands. Miyako Island secures water from an underground dam.</p> <p>Naha city is located at the center of East Asia: Fukuoka Taipei and Shanghai are located within a 1,000km radius; Tokyo, Osaka, Seoul, Beijing, Hong Kong and Manira within a 2,000km radius; and Sapporo and Hanoi within a 3,000km radius.</p> <p>Since Okinawa is an island prefecture, transportation from, to and among the islands are limited to airplanes and ships.</p>			

Sources: *The 55th Statistical Yearbook of Okinawa Prefecture (2012 edition)* /
Okinawa Prefecture Civil Protection Plan revised in March 2012

Data Collection Survey on Okinawa-type Vitalization of Information and Telecommunication Industry in the Pacific Region

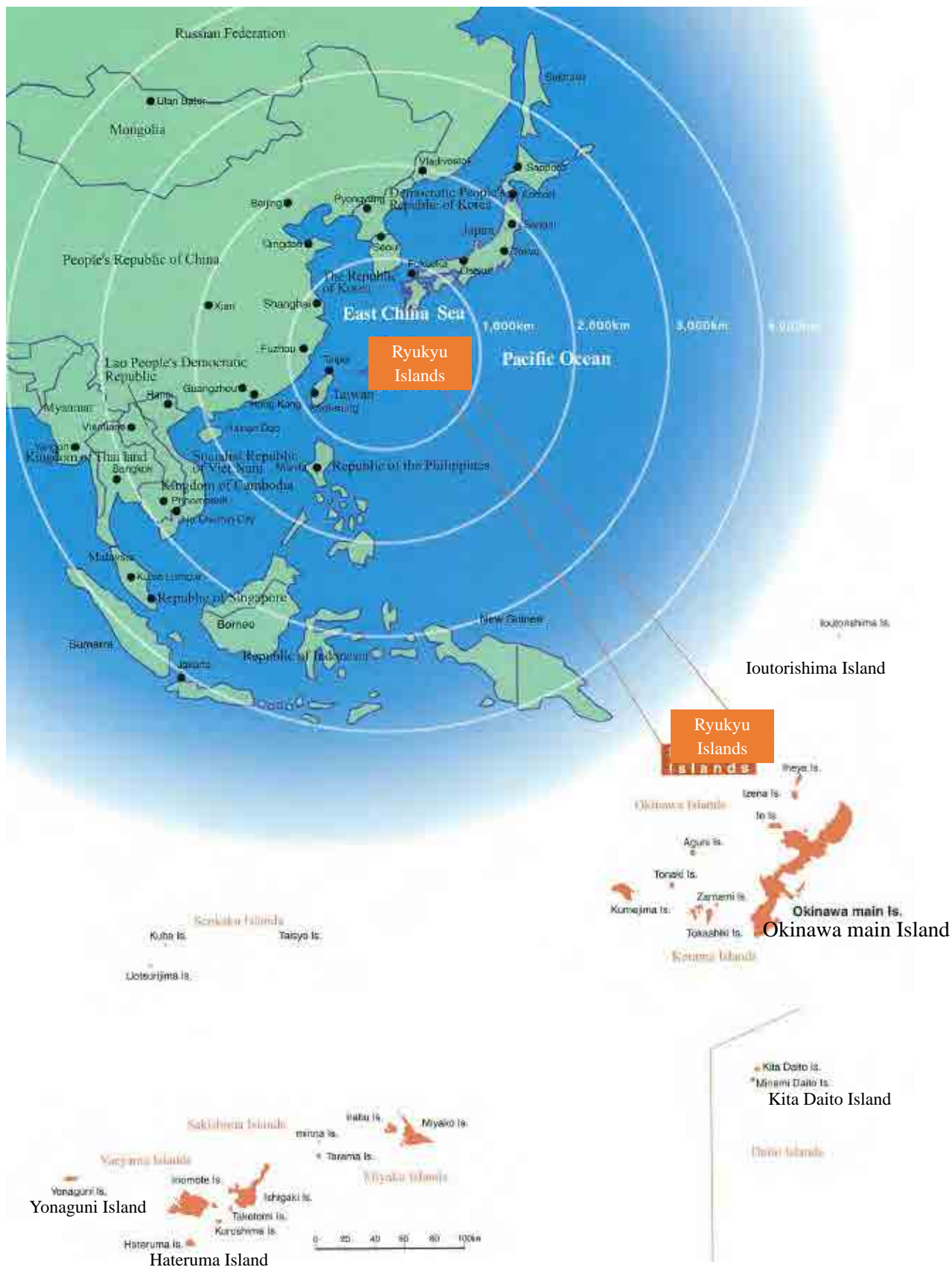


Figure 2.1.2-1 Location of Okinawa Prefecture

Source: *Outline of Okinawa Prefecture*(Date of Issue:February 2008)-, Okinawa Prefecture

(3) GDP

Table 2.1.2-3 shows comparisons of Gross Domestic Product (GDP) for Okinawa Prefecture and Japan as a whole in FY2009 and FY2010.

Table 2.1.2-3 Comparisons of GDP between Okinawa Prefecture and Japan

	Item	Actual value (100 million yen)		Growth rate (%)	
		FY2009	FY2010	FY2009	FY2010
Okinawa	Prefectural GDP (nominal)	37,213	37,256	1.5	0.1
	Prefectural GDP (real)	37,944	38,174	1.2	0.5
	Prefectural income	28,239	29,204	2.0	△0.1
	Prefectural income per capita (1,000 yen)	2,039	2,025	1.5	△0.7
Entire country	GDP (nominal)	4,738,592	4,792,046	△3.2	1.1
	GDP (real)	4,954,172	5,109,924	△2.1	3.1
	National income	3,425,189	3,492,777	△3.5	2.0
	National income per capita (1,000 yen)	2,676	2,729	△3.4	2.0
Prefectural income level per capita (whole country = 100)		76.2	74.2		

Sources: *Summary of Prefectural Accounts Statistics for FY 2010 in the "Prefectural Accounts Statistics" from the websites of Okinawa Prefecture*

Note 1: The values for the country are from the "National Accounts Statistics for FY2010", Cabinet Office.

Note 2: GDP (nominal and real) are values for each fiscal year from the expenditure side.

Note 3: Prefectural GDP (real) and GDP (real) are both chain linked.

The Prefectural income per capita is approximately 75% of the national income per capita: the income level of people in Okinawa is lower.

(3) Major Industries

Table 2.1.2-4 shows trends in production volumes by industry in Okinawa Prefecture. The figures are based on the input-output table for 2005. These tables are published every five years and (with no mid-term estimates being created) the next table to follow the FY2005 version is the FY2010 version. However, as the FY2010 version is still being produced and is yet to be released, the FY2005 version is currently the latest version available. Among the primary, secondary and tertiary industries in 2005, the production volume of the tertiary industry was the largest, 4,400,803 million yen, followed by the secondary industry with 1,226,708 million yen and the primary industry with 105,192 million yen. The ratios of production volumes in the primary, secondary and tertiary industries were 1.8%, 21.3% and 76.3%, respectively: the ratio of the tertiary industry was predominant.

In terms of industrial classification, "medical, insurance, social insurance and social welfare" in the tertiary industry ranked the first in production volume, totaling 626,750 million yen. This was

followed by “commerce” (535,882 million yen), “real estate” (524,151 million yen), “transport” (493,062million yen), “services for individuals” (490,727 million yen) and “government services” (391,078 million yen), all of which are also classified into the “tertiary industry”. “Building work (building and repair work)” (363,097 million yen) within the secondary industry ranked 7th, followed by “services for business establishments” (317,093 million yen) and “finance and insurance” (280,831 million yen), again in the tertiary industry; and “civil engineering work” (275,982 million yen), within the secondary industry, ranked 10th.

The production volume of “information and communications” ranked 13th, totaled 209,923 million yen.

That of “agriculture” (84,437 million yen) ranked first in the primary industry but 16th in all industrial divisions.

Table 2.1.2-4 Table of Production Volumes in Okinawa Prefecture by Industrial Division
(Unit: million yen)

		Prefectural production volume			Nationwide production volume	Growth rate		Comparison to nationwide
		1995	2000	2005	2005	July 2000	Dec 2005	2005
Primary industry		118,965	108,154	105,192	13,154,575	-9.10%	-2.70%	0.80%
100	Agriculture	97,400	86,521	84,437	10,275,669	-11.20%	-2.40%	0.80%
200	Forestry	513	1,193	1,757	1,268,738	132.60%	47.30%	0.10%
300	Fisheried	21,052	20,440	18,998	1,610,168	-2.90%	-7.10%	1.20%
Secondary industry		1,530,094	1,578,901	1,226,708	370,288,728	3.20%	-22.30%	0.30%
400	Mining	16,411	19,080	18,970	1,008,381	16.30%	-0.60%	1.90%
500	Manufacture of food	246,930	268,113	218,143	35,936,744	8.60%	-18.60%	0.60%
600	Manufacture of textile mill products	8,527	5,430	4,280	4,374,791	-36.30%	-21.20%	0.10%
700	Manufacture of lumber and wood products	9,695	6,773	5,520	4,925,662	-30.10%	-18.50%	0.10%
800	Manufacture of pulp, paper and paper products	7,748	6,478	6,190	7,903,898	-16.40%	-4.40%	0.10%
900	Manufacture of chemical and allied products	4,946	6,424	8,257	27,486,950	29.90%	28.50%	0.00%
1000	Manufacture of petroleum and coal products	232,039	241,814	154,348	16,920,170	4.20%	-36.20%	0.90%
1100	Manufacture of ceramic, stone and clay products	66,881	61,795	49,699	7,155,929	-7.60%	-19.60%	0.70%
1200	Manufacture of iron and steel	17,846	13,994	27,600	25,756,606	-21.60%	97.20%	0.10%
1300	Manufacture of non-ferrous metals and products	2,001	2,475	2,077	7,330,007	23.70%	-16.10%	0.00%
1400	Manufacture of fabricated metal products	43,330	36,613	32,728	12,484,448	-15.50%	-10.60%	0.30%
1500	Manufacture of general machinery	4,466	10,483	8,907	30,378,490	134.70%	-15.00%	0.00%
1600	Manufacture of electrical machinery, equipment and supplies	2,316	2,623	2,451	43,055,469	13.30%	-6.60%	0.00%
1700	Manufacture of transportation equipment	4,486	19,863	12,809	53,016,318	342.80%	-35.50%	0.00%
1800	Manufacture of precision machinery	211	365	675	3,722,693	73.00%	84.90%	0.00%
1900	Manufacture of miscellaneous industrial products	32,288	36,598	34,975	25,594,848	13.30%	-4.40%	0.10%
2000	Building and repair work	411,163	392,431	363,097	39,835,071	-4.60%	-7.50%	0.90%
2100	General civil engineering work and construction work	418,810	447,549	275,982	23,402,253	6.90%	-38.30%	1.20%
Tertiary industry		3,713,684	4,208,359	4,400,803	559,264,243	13.30%	4.60%	0.80%
2200	Electricity, gas and heat supply	138,479	146,028	154,580	18,677,166	5.50%	5.90%	0.80%
2300	Water and waste disposal business	67,822	83,317	78,917	8,112,152	22.80%	-5.30%	1.00%
2400	Commerce	449,434	455,647	535,882	106,274,512	1.40%	17.60%	0.50%
2500	Finance and insurance	164,220	229,300	280,831	41,586,785	39.60%	22.50%	0.70%
2600	Real estate	381,048	582,844	524,151	66,205,935	53.00%	-10.10%	0.80%
2700	Transport	408,700	414,287	493,062	40,779,842	1.40%	19.00%	1.20%
2800	Information and communications	193,489	175,863	209,923	45,935,957	-9.10%	19.40%	0.50%
2900	Government services	373,989	417,188	391,078	26,981,744	11.60%	-6.30%	1.40%
3000	Education and scientific research	288,118	277,091	252,314	33,824,257	-3.80%	-8.90%	0.70%
3100	Medical, insurance, social insurance and social welfare	430,148	551,578	626,750	50,084,100	28.20%	13.60%	1.30%
3200	Miscellaneous public services	39,384	38,794	45,495	5,030,634	-1.50%	17.30%	0.90%
3300	Services for business establishments	269,486	310,725	317,093	63,749,150	15.30%	2.00%	0.50%
3400	Services for individuals	509,367	525,697	490,727	52,022,009	3.20%	-6.70%	0.90%
3500	Other services n.e.c.	47,280	38,187	34,196	5,485,828	-19.20%	-10.50%	0.60%
3600	Endogenous sector	5,410,023	5,933,601	5,766,899	948,193,374	9.70%	-2.80%	0.60%

Source: website of Okinawa Prefecture,
Chapter 2 "Size and Functions of Prefectural Economy"
in the Input-Output Table for 2005

2.1.3 General Industrial Policy on Okinawa Prefecture and Position of the ICT Industry

Following the reversion of Okinawa to Japanese administration in 1972, the Government of Japan had launched the "Okinawa Promotion and Development Plan" a total of three times by 2001. The main aim of the plans was to close the gap with the mainland and establish fundamental infrastructure for self-reliant development. The government and Okinawa Prefecture then set forth the "Okinawa Promotion Plan" for a decade from 2002 to 2011.

The plan aimed to build a self-reliant economy through private sector initiatives and to actualize the potential of Okinawa, one of the frontiers of Japan.

A number of these national government and Okinawa plans steadily improved social infrastructure in Okinawa and dramatically improved convenience for citizens in the prefecture.

[Setting out the ICT industry as a core industry of Okinawa]

Building a self-reliant economy through private sector initiative needed a core industry that could lead the prefecture together with the tourism and leisure industry. For this purpose, the ICT industry was chosen with the hope that establishment of ICT infrastructures and the development of ICT technologies would eliminate the “barriers between the mainland and Okinawa in terms of physical distance and time” and enable the prefecture to take advantage of its unique attributes in hospitality, nature, history, culture etc. The Government of Japan and Okinawa prefecture placed it at the heart of its promotion plan for Okinawa Prefecture with the conviction that the ICT industry would solve the issue of physical distance while allowing the prefecture to utilize its nature, history, culture and other unique characteristics, and thus be able to become the prefecture’s core industry.

As the first step for integration and incubation of businesses in the ICT industry, the prefecture started to make efforts to attract and invite call centers.

Column (1)

Call centers as a pioneering sector for promotion of the ICT Industry

At an early stage, the policy to attract the ICT industry focused on call centers, since it could substantially contribute to improvement in the unemployment rate that had been a serious issue of Okinawa Prefecture.

The operation of call centers is based on the skill of communicating with callers, so the first task was to launch introductory education to employees in accordance with the nature of call center operation. Faced with this task, Okinawa Prefecture offered training opportunities customized for individual call centers, which was certainly a key factor for the success.

Hearing surveys at several private firms found that ex-call center workers were playing active roles in the ICT businesses in Okinawa. The surveyed private firms highly evaluated workers having experienced call center work, who took advantage of their high communication skills to facilitate work flow in sales and other departments where the interface with customers was important but most of the staff members were engineers and system engineers. The surveys also found that some ex-call center workers were assigned to tasks at higher levels afterwards.

(1) The Okinawa Multimedia Island Concept, and ICT Industry Promotion Plan

In September 1998, Okinawa Prefecture formulated the “Okinawa Multimedia Island Concept” for the ICT industry to make the prefecture one of the frontiers of multimedia services and a pioneering model of an advanced ICT society creating new industries for the 21st century.

Based on the “Okinawa Promotion Plan” formulated in 2002 by Okinawa Prefecture, the prefectural version of the “Okinawa Promotion Plan” was officially acknowledged as the country’s ten-year plan. Okinawa Prefecture put the plan into practice as an industrial policy and set out the 10-Year “Okinawa ICT Industry Promotion Plan” covering the second (3 years) and third (4 years) phases. The plan aimed to establish ICT industry clusters and make Okinawa an international ICT hub in the Asia-Pacific region by accumulating existing companies and attracting new companies to Okinawa; developing and securing advanced human resources; and strategically and efficiently developing ICT infrastructures.

Figure 2.1.3-1 outlines the ICT Industry Promotion Policies Implemented So Far: that is, the “Okinawa Multimedia Island Concept”, the “Okinawa Promotion Plan” and the “Okinawa ICT Industry Promotion Plan”.

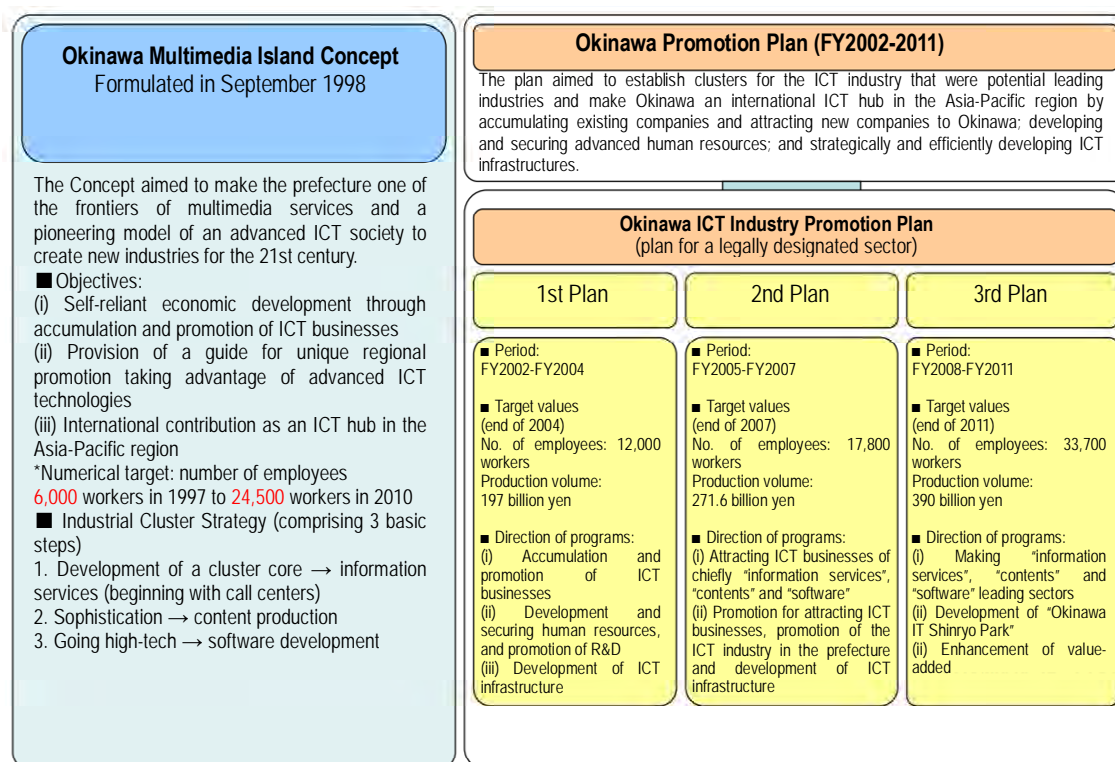


Figure 2.1.3-1 ICT Industry Promotion Policies Implemented So Far

Source: “On IT Industry in Okinawa Prefecture” published on May 24, 2013, IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government

The prefecture promoted various industries other than the ICT industries in line with the “Okinawa Promotion Plan”. It set out the “Okinawa Tourism Promotion Basic Plan” as a ten-year plan

comprised of three phases similar to the promotion plan for the ICT industry. It also set out similar promotion plans for agriculture, forestry and fisheries, and a ten-year “Okinawa Industrial Promotion Plan” for other industries also comprised of three phases. These plans have yielded a degree of results.

The “Okinawa Promotion Plan” has also yielded certain results, particularly in the fields of industry incubation, growth in tourism and an accumulation of ICT businesses. There are, however, some issues unsolved: the conditions for self-reliant development have not completely been established in terms of, for example, the prefectural income and unemployment rate. The prefecture is still required to tackle issues and disadvantages arising from the nature of being an island prefecture which is high-cost structure, small market size and far from metropolitan markets.

(2) The Okinawa 21st Century Vision Plan

In May 2012, the prime minister made a decision on the “Basic Policy for the Promotion of Okinawa” with an eye for promotion in the coming decade.

In 1972, Okinawa Prefecture was returned from US military administration to Japan. At that time, the prefecture lagged considerably behind all prefectures on the mainland of Japan: the social infrastructure was as yet underdeveloped and the economy was import oriented and heavily dependent on US bases. To turn around this situation, the government launched a total of three “Okinawa Promotion and Development Plans” which extended for 30 years with a basic focus on eliminating the gap with the mainland through social infrastructure development. In the following decade, the government launched the “Okinawa Promotion Plan”, setting out the building of a self-reliant economy through private sector initiatives as one of the plan’s basic policies. Thanks to these plans, Okinawa Prefecture has seen development of its social infrastructure, an increase in employed workers, growth in tourism and other results. Despite all this, however, the prefecture has yet a number of issues unsolved: low prefectural income per head, a high unemployment rate, the disadvantages of an island economy, inability to become an independent economy and a great burden arising from the presence of US military bases. In such circumstances, the “Okinawa 21st Century Vision” was created to solve these issues, take advantage of the unique characteristics of Okinawa, find out what should be left and what should be changed, look ahead to the future and envisage an Okinawa that the citizens there would find desirable in 20 years’ time.

The “Okinawa 21st Century Vision” aims to satisfy the new needs of each Okinawan, which are summarized into five future visions and four specific issues. The five visions for the future seek to establish islands “which care for the nature, history, tradition and culture of Okinawa”, “where people are rich in spirit and can live safe and comfortably”, “which are full of a sense of fulfillment, hope and vitality”, “which are open to the world where all kinds of people can live together” and “where people can demonstrate various abilities to create a new future”. On the other hand, the four specific issues to be solved are “to solve the issues with US military bases and to find a way of using the sites where US armed forces are stationed”, “to overcome the disadvantageous conditions as an island

prefecture and contribute to the national interest”, “to create an island zone and build traffic networks linked to Okinawa” and “to respond to the expansion of autonomy”.

Based on the “Okinawa 21st Century Vision”, the government formulated and is promoting “the Basic Plan for the Okinawa 21st Century Vision” with a term of 10 years from 2012 to 2022, and “the Implementation Plan for the Okinawa 21st Century Vision” comprised of two phases of five years each.

The Basic Plan presents nine industrial promotion measures which adhere to one of the future visions, “islands full of a sense of fulfillment, hope and vitality”: these are, “development of infrastructure to build a self-reliant economy”, “formulation of world class standard tourist sites”, “advancement and diversification of ICT-related industries”, “formulation of an international logistics base to build a bridge between Asia and Japan”, “promotion of science and technology, and formulation of intelligent and industrial clusters”, “creation of new industries taking advantage of the attraction and superiority of Okinawa”, “promotion of agriculture, forestry and fisheries taking advantage of the subtropical climate and other characteristics of Okinawa”, “promotion of small and medium-sized enterprises supporting the regional economy” and “promotion of manufacturing and formulation of local brands”. Together with this, the Basic Plan also aims to undertake employment measures; secure various human resources; develop conditions for settlement on remote islands; promote industries taking advantage of the characteristics of these remote islands; promote effective use of the former sites of US military bases; and take advantage financial policy.

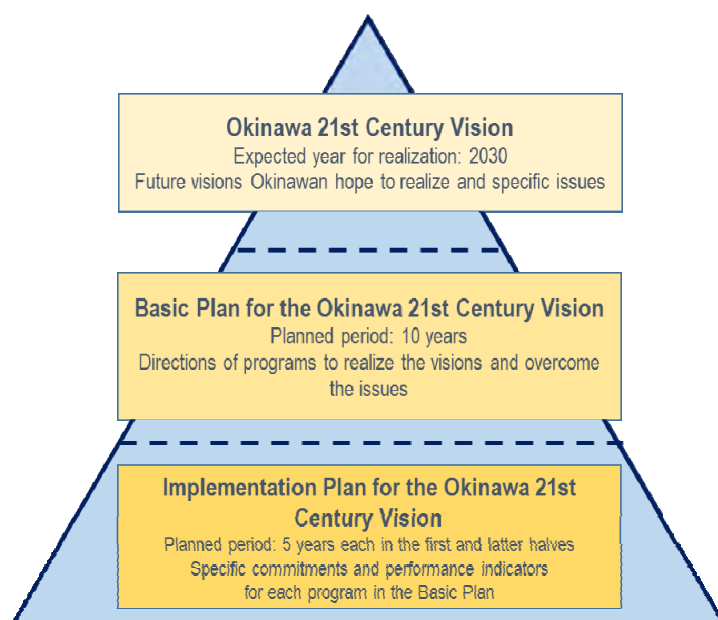


Figure 2.1.3-2 Relations among the 21st Vision, Basic Plan and Implementation Plan

Source: “On IT Industry in Okinawa Prefecture” published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government

(3) Okinawa Smart Hub Concept: Action Plan I

Each industry is currently working on the formulation and promotion of a ten-year plan for the next decade in response to the “Implementation Plan for the Okinawa 21st Century Vision”. Following various survey activities, the prefectural government has formulated the “Basic Plan for Promotion of Tourism” in Okinawa for the tourism industry and the “Okinawa Smart Hub Concept” as the basic policy for ICT industry through the study of “New Okinawa ICT Industry Promotion Plan (provisional name) “. In line with this, the prefecture has formulated and is currently engaging in the “Okinawa Smart Hub Concept: Action Plan I” for a three-year term from 2012 to 2014.

The “Okinawa Smart Hub Concept” aims to make the prefecture one of the “international smart hubs in Asia” in the coming ten years. According to the concept, Okinawa will attract and culminate businesses, human resources and knowledge from within and outside the country, where the ICT industry will contribute to the creation of new values and co-development of countries and regions in Asia. For this purpose, the concept sets out five basic principles and presents five sectorial programs in Action Plan I. Figure 2.1.3-3 shows the basic principles and programs of the “Okinawa Smart Hub Concept”, and Figure 2.1.3-4 a conceptual image of flow towards the Okinawa Smart Hub.

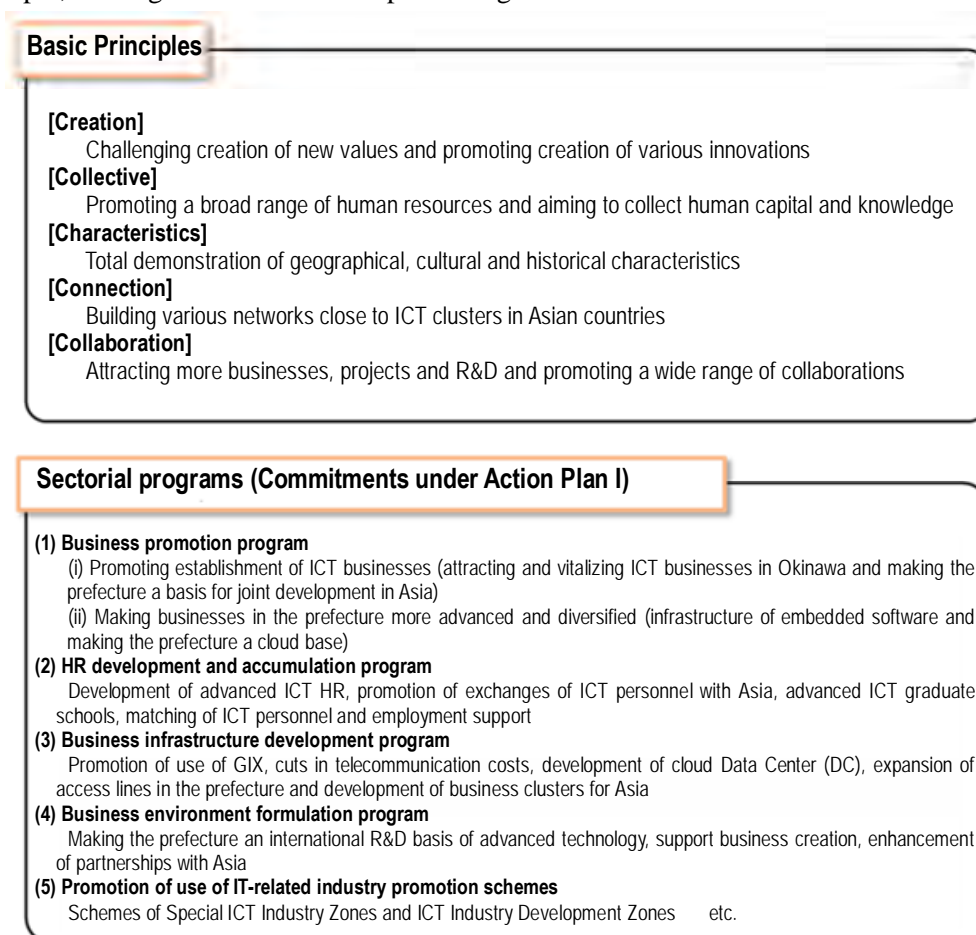


Figure 2.1.3-3 The Basic Principles and Sectorial Programs in the Okinawa Smart Hub Concept

Source: “On ICT Industry in Okinawa Prefecture” published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government

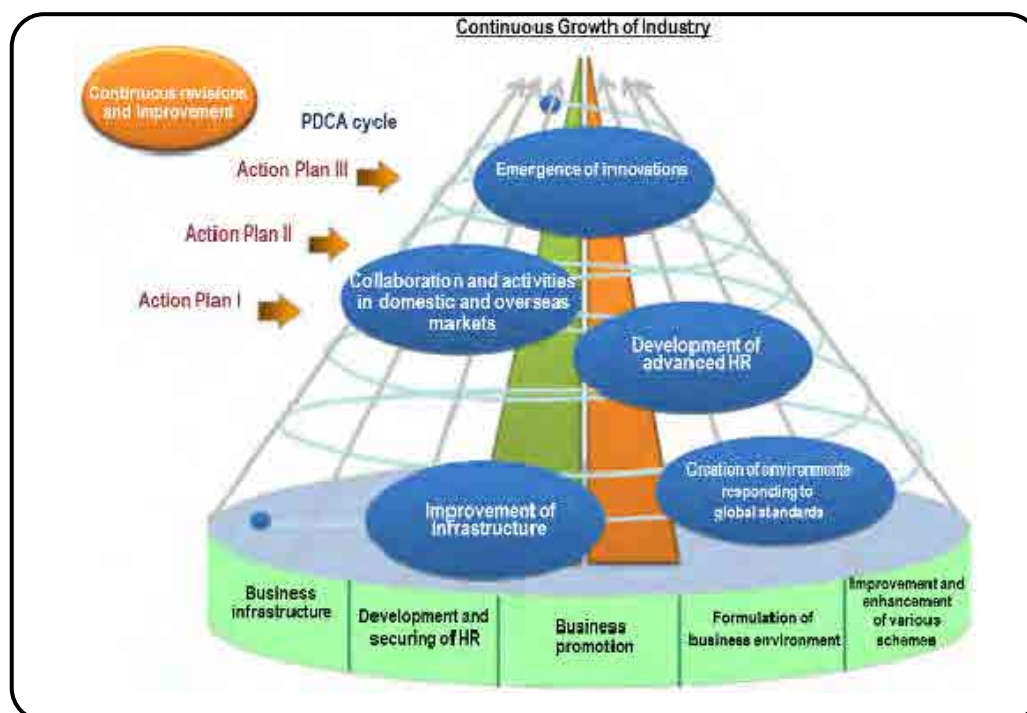


Figure 2.1.3-4 Realization of Okinawa Smart Hub

Source: “On IT Industry in Okinawa Prefecture” published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government

2.1.4 Budget, Organizations and Systems related to Development of the ICT Industry in Okinawa

(1) Budget

According to the Report on the Survey for Formulation of the “New Okinawa ICT Industry Promotion Plan (provisional name)” released in March 2012, the program costs of the 1st to 3rd Okinawa ICT-related Industry Promotion Plans were, 14,919 million yen (3 years), 10,273 million yen (3 years) and 17,131 million yen (4 years), respectively, as summarized in Table 2.1.4-1.

The cost of programs related to the development of facilities and equipment accounts for the largest share of the total cost of each plan. The average cost of programs related to telecommunication cost reductions during the planned period increased from the first to second plans, but fell in the third plan. This appears to be attributable to a reduction in line costs and an ease of burden on private companies. The cost of software development support programs increased over the period of the three plans. Behind this lie the fact that support to business opportunities and HR development was enhanced later, and that the third plan started to cover the upper stream of the industry and introduce open source software (OSS) for further expansion of business opportunities. The cost of support to contents production decreased over the period perhaps because businesses had introduced audio and video facilities to meet Multimedia Boom during the period of the first plan and had changed in the flow of contents production from personal computers to mobile phones and smart phones. Contents production requires sensibility and artistic sense, so producers must be trained to have the relevant educational background. As a business, on the other hand, it is relatively easy to establish production environments though barriers to market entry may be high. Moreover, as in any field of the ICT

industry, it is fairly quick to set up the business. In the market of content, production companies have broken entry barriers and can more easily launch products on a commercial basis, so that HR development does not necessarily match the commercialization. This also appears to be a cause of a reduction in the cost of relevant programs.

A large proportion of the cost of the first plan was directed to programs supporting business start-ups and attraction, but the proportion fell in the second and third plans; HR development programs accounted for an increasingly large share of the cost in the subsequent plans.

The cost of HR development programs continued to increase from the first to the third plan.

Table 2.1.4-1 Program Cost by Planned Period and Category of Programs

Unit: million yen

Category	1st Plan (2002- 2004)		2nd Plan (2005 - 2007)		Third Plan (2008 - 2011)		Total
	A: Accumulated cost over the planned years						
	B: Annual average in the planned period						
	A	B	A	B	A	B	
Facilities and equipment	10,060	3353.3	6,322	2107.3	11,550	2887.5	27,939
HR development	827	275.7	1,161	387.0	2,229	557.3	4,217
Telecommunications cost reductions	1,135	378.3	1,296	432.0	1,235	308.8	3,666
Software development support	278	92.7	1,174	391.3	1,839	459.8	3,291
Contents production support	1,760	586.7	144	48.0	61	15.3	1,965
Vitalization and attraction of businesses	859	286.3	176	58.7	217	54.3	1,252
Total	14,919	4973.0	10,273	3424.3	17,131	4282.8	42,323

Source: *the Report on the Survey for Formulation of the "New Okinawa IT Industry Promotion Plan (provisional name)"*, March 2012

The figures in the shaded columns are calculated based on the report.

(2) Organizations and Schemes

Okinawa Prefecture promotes incubation of the ICT industry not only on its own but also in collaboration with municipalities such as with the IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government of each municipal government. It also has relevant government corporations to smoothly implement programs.

For example, the Nago Development Authority (NDA), established as a specified nonprofit corporation in Nago City, which is designated as a Special Financial Business and ICT Industry Zone, engages in programs to attract and support ICT-related and finance-related businesses. It also serves as a consulting agency to provide businesses showing an interest in business operation in Okinawa with the most appropriate support programs and subsidies. Local governments are responsible for screening applications submitted by private companies but cannot give any advice on issues that private companies may have before submitting applications for any programs. Thus, the NDA, has yielded results in attracting private companies and promoting employment.

Figure 2.1.4-1 shows an association chart and scheme of organizations involved in ICT industry incubation, and Table 2.1.4-2 lists organizations, their functions and programs implemented in the field of ICT industry incubation.

Data Collection Survey on Okinawa-type Vitalization of Information and Telecommunication Industry in the Pacific Region

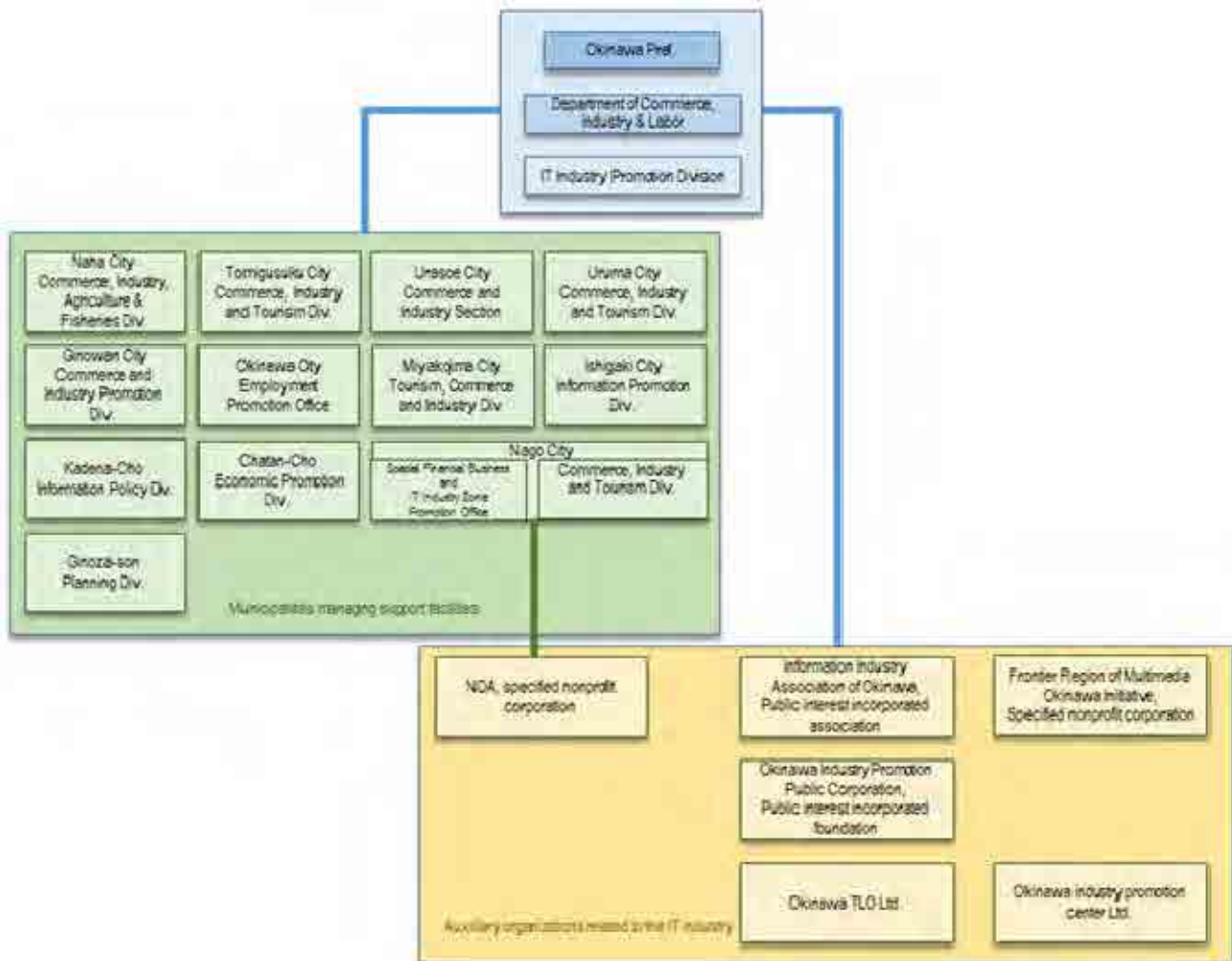


Figure 2.1.4-1 Association Chart of Organizations involved in ICT Industry Incubation

Table 2.1.4-2 List of Organizations, Functions and Programs Implemented in the ICT Industry Incubation

Category	Name/Function/Programs implemented
Prefecture	<p>IT Industry Promotion Division Department Department of Commerce, Industry & Labor, Okinawa Prefectural Government</p> <p>1. Planning of support schemes</p> <ul style="list-style-type: none"> (1) Information and Communications Cost Support Project (2) Incentives for Employment of the Youth in Okinawa (3) Support for Human Resources Development (4) ICT human resources development <ul style="list-style-type: none"> ▪ Seminars on Development of Information Technology Okinawa Professionals (ITOPs) (carried out by the Okinawa IT HR Development Council) ▪ Seminars on Development of Finance Human Resources <p>2. Establishment of special zones</p> <ul style="list-style-type: none"> (1) Special Zone for Financial Business <ul style="list-style-type: none"> ▪ Special Financial zone across the entire city of Nago 1) Preferential tax policies <ul style="list-style-type: none"> ➤ Reductions in corporate tax liability in Special Finance Zone <ul style="list-style-type: none"> ▪ Tax deduction scheme: 35% for 10 years (reduction in the effective tax rate) ▪ Exemption from taxation on investment corporations ▪ Reduction or exemption from enterprise tax, real estate acquisition tax and fixed asset tax ▪ Exclusion from special landholding tax 2) Cost reduction programs <ul style="list-style-type: none"> ➤ Reductions in corporate tax liability in Special Financial zone ➤ Telecommunication cost reductions support ➤ Subsidy for employment of youth (Special measures of the Ministry of Health, Labor and Welfare applicable to Okinawa Prefecture) ➤ HR development taking advantage of seminars on development of finance HR and other programs (2) Special Information and Communications Industry Zones and Information and Communications Industry Development Zones <ul style="list-style-type: none"> ▪ The prefecture positions the ICT industry as one of its core industries and implements promotion to attract and accumulate related businesses. 1) Information and Communications Industry Development Zones <ul style="list-style-type: none"> ➤ Areas covered: 24 municipalities Naha City, Uruma City, Ginowan City, Miyakojima City, Ishigaki City, Urasoe City, Nago City, Itoman City, Okinawa City, Motobu-cho, Yomitan Village, Kadena-cho, Chatan-cho, Kitanakagusuku Village, Nakagusuku Village, Nishihara-cho, Tomigusuku City, Yaese-cho, Yonabaru-cho, Haeburu-cho, Ginoza Village, Nanjo City, Onna Village and Kin-cho ➤ Preferential tax policies <ul style="list-style-type: none"> ▪ National taxes Exemption from taxation on investment corporations (carry-forward: 4 years) Machinery, equipment, fittings and fixtures: 15% Buildings, auxiliary facilities and structures: 8% ▪ Local tax Reduction or exemption from enterprise tax, real estate acquisition tax and fixed asset tax

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Category	Name/Function/Programs implemented
	2) Special Information and Communications Industry Zones <ul style="list-style-type: none"> ➤ Areas covered: 5 municipalities Naha City, Urasoe City, Nago City, Ginoza Village and Uruma City ➤ Preferential tax policies <ul style="list-style-type: none"> ▪ National tax: income deductions: 40% for 10 years
Municipalities	<p>Commerce, Industry, Agriculture & Fisheries Div., Naha City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Naha Business Incubate Office <p>Commerce and Industry Section of Civil Affairs Division, Urasoe City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Urasoe City Industry Promotion Center, “Yui-no-Machi <p>Commerce, Industry and Tourism Div., Planning Dept., Tomigusuku City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Tomigusuku City IT Industry Promotion Center <p>Commerce and Industry Promotion Div., Ginowan City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Ginowan Bayside Information Center (G-Wave) <p>Economic Promotion Div., Chatan-Cho</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Mihama Media Station <p>Employment Promotion Office, Okinawa City</p> <p>(1) Operation of support facilities</p> <ul style="list-style-type: none"> ▪ Okinawa City Telework Center ▪ Okinawa City IT Work Plaza ▪ Okinawa City Mobile Work Plaza <p>Information Promotion Div., Kadena-Cho</p> <p>(1) Operation of support facilities</p> <ul style="list-style-type: none"> ▪ Kadena-cho Multimedia Center ▪ Kadena-cho Call Center <p>Industrial Site and Employment Promotion Division, Uruma City</p> <p>(1) Operation of support facilities</p> <ul style="list-style-type: none"> ▪ Ichui Gushikawa Jibunkan ▪ Butenkan, Ishikawa Region Development Center ▪ Uruma City IT Business Support Center <p>Planning Div., Ginoza Village</p> <p>(1) Operation of support facilities</p> <ul style="list-style-type: none"> ▪ Ginoza Server Farm ▪ Ginoza Server Farm 2 <p>Special Financial Zone and Special Information and Communications Industry Zones Promotion Office, Nago City</p> <p>(1) Planning, coordination and promotion of programs in Special Financial Zone and Special Information and Communications Industry Zones</p> <p>(1) Operation of support facilities Future International City of Finance and IT</p> <ul style="list-style-type: none"> ▪ Nago Multimedia Center ▪ Mirai No.1 ▪ Mirai No.2 ▪ Mirai No.3 <p>(2) Maintenance and management of programs related to Special Financial Zone and Special Information and Communications Industry Zones</p> <p>(3) Coordination, etc. with NDA</p>

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Category	Name/Function/Programs implemented
	<p>(4) Other matters related to Special Financial Zone and Special Information and Communications Industry Zones</p> <p>(5) Matters related to computerization of regional matters</p> <p>Commerce, Industry and Tourism Div., Nago City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Nago Industry Support Center <p>Tourism, Commerce and Industry Div., Miyakojima City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Miyakojima IT Industry Center <p>Information Promotion Div., Planning Dept., Ishigaki City</p> <p>(1) Operation of support facility</p> <ul style="list-style-type: none"> ▪ Ishigaki IT Business Support Center
Related governmental corporations	<p>Frontier Region of Multimedia (FROM) Okinawa Initiative, Specified nonprofit corporation</p> <p>(1) Spontaneous industry promotion</p> <p>(1) Development and securing of HR</p> <ul style="list-style-type: none"> ▪ Projects with the Parents and Children's Network ▪ ICT professional personnel development program ▪ Project for development of advance ICT human resources <p>(2) R&D support</p> <ul style="list-style-type: none"> ▪ Project for formulation of plans to realize establishment of ICT and finance-related businesses in Okinawa ▪ Model project for financial human resources development in Okinawa <p>(2) Industry promotion by attracting businesses</p> <p>(1) Project to support measures to attract businesses in the data center industry, etc. (Consultation, etc.)</p> <p>(2) Projects to support vitalization of businesses entering the markets in Okinawa (HR development), etc.</p> <p>Information Industry Associations of Okinawa (public interest incorporated association)</p> <p>(1) Enlightenment and dissemination</p> <p>(2) Gathering and provision of resources</p> <p>(1) IT Professional Personnel Development Program (ITOP)</p> <p>(2) Programs to enhance ICT human resources development</p> <p>(3) Formulation of the basic plan for establishment of Okinawa Cloud infrastructure</p> <p>(4) Survey for Formulation of the "New Okinawa ICT Industry Promotion Plan (provisional name)</p> <p>(5) Development and demonstration program for next-generation highly reliable and energy-saving IT infrastructure technology in FY2011</p> <p>(6) IT professional personnel development program</p> <p>(7) Support for ICT industry core personnel development</p> <p>(3) Collaboration and exchange</p> <p>(4) Technical exchange</p> <p>(5) Education and training</p> <p>(6) Development of technologies (Training and seminars on acquisition of the latest technologies)</p> <p>Nago Development Authority (NDA), (specified nonprofit corporation)</p>

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Category	Name/Function/Programs implemented
	<ul style="list-style-type: none"> (1) Management and operation of incubate facilities (2) Management and operation of facility infrastructure in Special Financial Zone and Special Information and Communications Industry Zones (1) Special Financial Zone and Special Information and Communications Industry Zones in Nago City, designated administrators (3) Programs for attracting and supporting businesses related to ICT and finance (1) Promotion programs in special zones Acceptance of programs related to promotion of programs in Special Financial Zone and Special Information and Communications Industry Zones in Nago (4) Public relations and event planning (5) HR development planning and implementation (6) Network-related programs
	<p>Okinawa Industry Promotion Public Corporation, (public interest incorporated foundation)</p> <ul style="list-style-type: none"> (1) The corporation undertakes programs related to enhancement of the business infrastructure of SMEs and the promotion of business start-ups in Okinawa, along with various programs necessary for industrial promotion, and thus contributes to sound development of industries in Okinawa Prefecture. (2) According to the Okinawa Promotion Plan formulated in FY2002 by the Prefectural Government, the corporation positions the tourism and leisure, ICT, processing and trade, and health food industries as key industries, strategically encouraging them and steadily promoting programs and projects to make the economy self-reliant through private initiatives. (1) Business counseling (2) Business start-up support (3) Support to R&D and new businesses (4) Holding of seminars
	<p>Okinawa Industry Support Center Ltd.</p> <ul style="list-style-type: none"> (1) Operation of support facility <ul style="list-style-type: none"> · Okinawa Industry Support Center
	<p>Okinawa TLO Ltd.</p> <ul style="list-style-type: none"> (1) Support of industrial development by taking advantage of knowledge accumulated at universities, etc. in Okinawa (1) Technical support (technical counseling and support, matching, creation of research projects, etc.) (2) Support related to intellectual properties (discovery and use of patent rights and know-how, and building and promotion of strategies for intellectual properties) (3) Support to business management (business counseling services such as formulation and promotion of business management strategies, building and promotion of marketing strategies) (4) Support for human resources development (support for development of business and technical personnel) (5) Support for industrial policies (support for formulation and promotion of local industrial promotion programs, etc.)

2.1.5 Status of IT Infrastructure Development in Okinawa Prefecture

(1) Submarine Telecommunications Cable Systems

Table 2.1.5-1 lists major submarine telecommunications cable systems that were commercialized after 1995 and which connect Japan to foreign countries. Okinawa Prefecture is linked to two systems - China-US CN connecting China to the USA, and SEA-ME-WE3 connecting Southeast Asia to the Middle East and Western Europe – out of 17 systems. Two systems connect Japan to Southeast Asia: SEA-ME-WE3, also linked to Okinawa, and the Asia Pacific Cable Network (APCN2) that comes from Southeast Asia to Australia and to the mainland of Japan. Both have more or less the same coverage. APCN2, enhanced to 40Gbps in 2001, has now the same capacity as SEA-ME-WE3.

China-US CN is connected to two points in Japan: Okinawa and Chiba Prefectures. Okinawa is connected with Southeast Asia and the U.S.A. via SEA-ME-WE3 and China-US CN, respectively.

GIX Okinawa Co., Ltd. offers the shortest route to Hong Kong, Taiwan and China using SEA-ME-WE3.

Figure 2.1.5-1 shows an image of international submarine telecommunications cable systems around Japan.

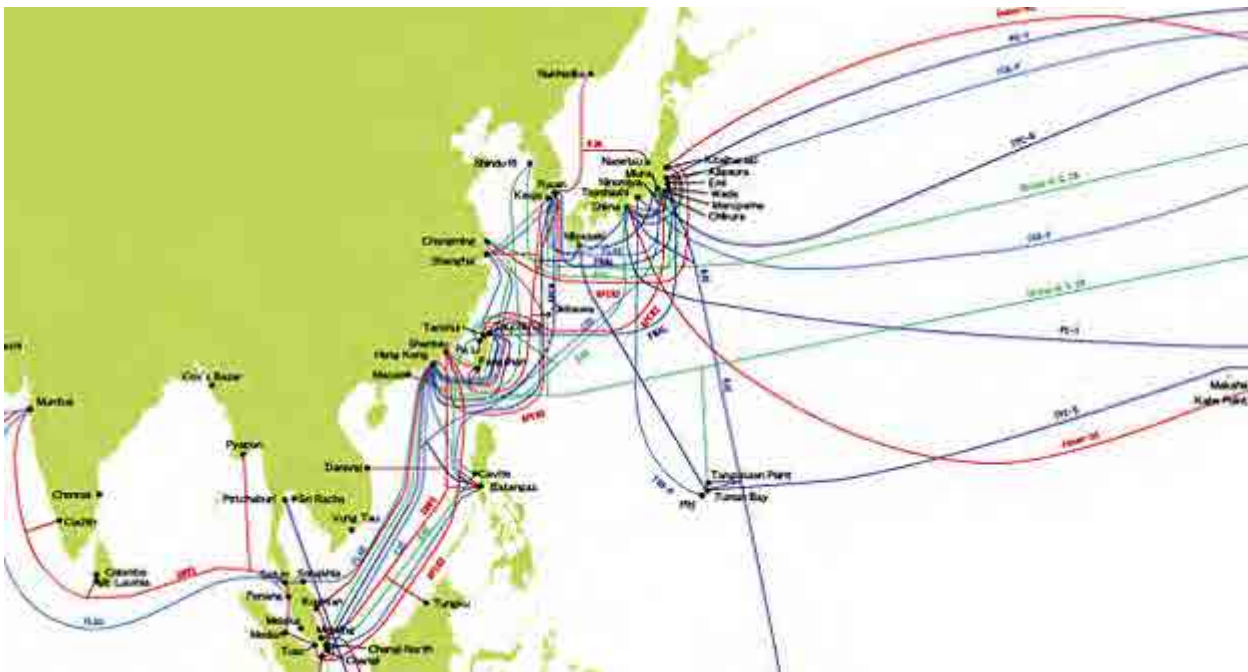


Figure 2.1.5-1 International Submarine Telecommunications Cable Systems around Japan

Source: *the 2007 Whitepaper on Telecommunications*, p.55,
Ministry of Internal Affairs and Communications

(2) Electricity

Table 2.1.5-1 shows the trends in electric power generation and the maximum power of the electric power companies and Table 2.1.5-3 the trends in their maximum power supply load calculated from the figures in Table 2.1.5-2.

The Okinawa Electric Power Company, Inc. (OEPC) has the second lowest maximum electric power for use in comparison to supply power (output), next to the Hokuriku Electric Power Company, Inc. This means that the OEPC has high excess supply capacity. It is the only electric power company in Japan that has no nuclear power plant, though it is successful in providing a stable supply of electricity.

Despite this, the prefecture has frequent typhoons and resultant outages. To deal with this, industrial parks and other facilities have adopted underground cable laying to secure a stable supply together with duplication of the electricity system. Areas with ICT businesses have prepared non-utility power generation facilities and storage batteries for stable power supply.

Table 2.1.5-1 List of International Submarine Telecommunications Cable Systems
That Started operation after 1995 and Are Connected to Japan

Operation started	Name of cable system		Landing place / carrier	Design capacity
Pacific				
1995	TPC-5CN	CN (on the Cable Network)	The USA (Bandon, Oregon State for ATT and Morro Bay, California State for MCI), Guam, Hawaii, and Japan (KDDI in Miyazaki; and KDDI in Kanagawa)	20Gbps
1999	PC-1		Japan and the USA	640Gbps
2000	China-US CN		China (Shanghai and Chaozhou), the USA (Bandon, Oregon State and San Luis Obispo, California State for ATT). Branches: Japan (NTT in Okinawa; and KDDI in Chiba) , ROK, Taiwan and Guam	80Gbps
2001	Japan-US CN		Japan (Kita-Ibaraki for NTT, Chiba for SB and Mie for KDDI) , the USA (Morro Bay, California State for WorldCom (MCI International), Manchester, California State for ATT and Mākaha, Hawaii for GTE)	640Gbps
2002	TGN-P		Japan (Chiba and Aichi) ,the USA (Hillsboro, Oregon State, Los Angeles, California State, Guam)	5.12Tbps
2010	Unity	EAC-Pacific	Japan (Chiba for KDDI) , the USA (Los Angeles, California State for Carrier Neutral Co-location)	4.8TBps
Asia				
1995	R-J-K		Japan, ROK and Russia	560Mbps×2
1996	APCN	Asia Pacific Cable Network	Japan (Miyazaki for KDD) , ROK, Hong Kong, the Philippines, Taiwan, Thailand, Malaysia, Singapore and Indonesia Branches: Australia via Indonesia	20Gbps
2001	A-J-C		Japan, Australia and Guam	320Gbps
2001	APCN2	Asia Pacific Cable Network	Japan (Kita-Ibaraki for NTT and Chiba for KDDI) , ROK, China (Shanghai and Chaozhou), Taiwan, Hong Kong, the Philippines, Malaysia and Singapore	2.56Tbps
2001	C2C		Japan, ROK, China, Taiwan, Hong Kong, the Philippines and Singapore	7.68Tbps
2001	FNAL/RNAL		Japan, ROK, Taiwan and Hong Kong	3.84Tbps
2001	EAC		Japan, ROK, Taiwan, the Philippines, Hong Kong, Singapore and China	2.56Tbps
2002	KJCN		Japan and ROK	2.88Tbps
2013	SJC	South-East Asia Japan Cable	Japan (Chiba for KDDI) and Singapore Cables under construction: China (Chaozhou), Hong Kong, the Philippines, Brunei and Thailand	28Tbps
Asia- Indian Ocean – Europe				
1997	FEA	FLAG Euro-Asia	The UK, Spain, Italy, Egypt, Jordan, UAE, Saudi Arabia, India, Malaysia, Thailand, Hong Kong, China, ROK and Japan	10Gbps
1999	SEA-ME-WE3	South-East Asia - Middle East - Western Europe	Japan (Okinawa) , ROK, China, Taiwan, Macao, the Philippines, Thailand, Brunei, Vietnam, Singapore, Malaysia, India, Indonesia, Myanmar, Australia, Sri Lank, Pakistan, Oman, UAE, Djibouti, Turkey, Saudi Arabia, Egypt, Cyprus, Greece, Italy, Morocco, Portugal, France, the UK, Belgium and Germany	40Gbps~ (Capacity varies pending on zones)

Source: Based on the 2007 Whitepaper on Telecommunications, p.55, Ministry of Internal Affairs and Communications and “Submarine Cable Networks”

Table 2.1.5-2 Trends in Electric Power Generation and
Maximum Power of Electric Power Companies(Part 1)

End of FY	Type	Okinawa		Hokkaido		Tohoku		Tokyo		Chubu	
		Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit:	Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit:	Output Unit: 1000kW	Maximum power Unit:
2005	Hydraulic	0		1,226		2,416		8,993		5,220	
	Geotherma	0		50		224		3		0	
	Thermal	1,926		4,065		10,696		35,533		22,369	
	Nuclear	0		1,158		3,274		17,308		4,997	
	Wind	0		0		0		1		0	
	PV	0		0		0		0		0	
Total	1,926	1,493	6,499	5,462	16,609	15,200	61,837	60,118	32,586	26,680	
2006	Hydraulic	0		1,231		2,414		8,993		5,220	
	Geotherma	0		50		224		3		0	
	Thermal	1,924		4,065		11,230		35,530		22,369	
	Nuclear	0		1,158		3,274		17,308		4,884	
	Wind	0		0		0		1		0	
	PV	0		0		0		0		0	
Total	1,924	1,524	6,505	5,461	17,141	14,761	61,835	58,058	32,473	26,967	
2007	Hydraulic	0		1,231		2,417		8,985		5,218	
	Geotherma	0		50		224		3		0	
	Thermal	1,925		4,065		10,883		36,176		22,369	
	Nuclear	0		1,158		3,274		17,308		4,884	
	Wind	0		0		0		1		0	
	PV	0		0		0		0		0	
Total	1,925	1,530	6,505	5,657	16,798	15,045	62,473	61,471	32,471	27,970	
2008	Hydraulic	0		1,231		2,422		8,986		5,219	
	Geotherma	0		50		224		3		0	
	Thermal	1,925				10,880		37,683		23,904	
	Nuclear	0		1,158		3,274		17,308		3,504	
	Wind	0		0		0		1		0	
	PV	0		0		0		0		0	
Total	1,925	1,485	6,505	5,558	16,800	14,738	63,981	60,891	32,626	28,214	
2009	Hydraulic	0		1,232		2,422		8,987		5,219	
	Geotherma	0		50		224		3		0	
	Thermal	1,924		4,065		10,630		38,189		23,904	
	Nuclear	0		2,070		3,274		17,308		3,504	
	Wind	0		0		0		1		6	
	PV	0		0		0		0		0	
Total	1,924	1,543	7,418	5,686	16,550	14,516	64,487	54,496	32,632	24,327	
2010	Hydraulic	0		1,234		2,423		8,981		5,219	
	Geotherma	0		50		224		3		0	
	Thermal	1,919		4,065		11,286		38,696		23,969	
	Nuclear	0		2,070		3,274		17,308		3,617	
	Wind	0		0		0		1		22	
	PV	0		0		0		0		1	
Total	1,919	1,480	7,419	5,788	17,206	15,572	64,988	59,988	32,828	27,093	

Source: "Statistics for 60 Years in Electric Power Industry", the Federation of
Electric Power Companies of Japan

Table 2.1.5-3 Trends in Electric Power Generation and
Maximum Power of Electric Power Companies (Part 2)

End of FY	Type	Hokuriku		Kansai		Chugoku		Shikoku		Kyushu	
		Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit: 1000kW	Output Unit: 1000kW	Maximum power Unit:
2005	Hydraulic	1,816		8,186		2,894		1,143		2,378	
	Geotherma	0		0		0		0		208	
	Thermal	4,400		17,807		8,026		3,696		11,563	
	Nuclear	1,898		9,768		1,280		2,022		5,258	
	Wind	0		0		0		0		3	
	PV	0		0		0		0		0	
	Total	8,114	5,486	35,761	30,870	12,200	11,500	6,862	5,542	19,409	16,489
2006	Hydraulic	1,816		8,189		2,905		1,141		2,378	
	Geotherma	0		0		0		0		208	
	Thermal	4,400		16,907		8,016		3,696		11,571	
	Nuclear	1,898		9,768		1,280		2,022		5,258	
	Wind	0		0		0		0		3	
	PV	0		0		0		0		0	
	Total	8,114	5,488	34,864	30,530	12,201	11,919	6,859	5,809	19,417	17,541
2007	Hydraulic	1,816		8,189		2,905		1,141		2,677	
	Geotherma	0		0		0		0		2,075	
	Thermal	4,400		16,407		7,641		3,501		11,571	
	Nuclear	1,898		9,768		1,280		2,022		5,258	
	Wind	0		0		0		0		3	
	PV	0		0		0		0		0	
	Total	8,114	5,580	34,364	30,665	11,826	12,285	6,665	5,931	19,716	17,622
2008	Hydraulic	1,816		8,190		2,905		1,141		2,977	
	Geotherma	0		0		0		0		208	
	Thermal	4,400		15,907		7,801		3,501		11,577	
	Nuclear	1,746		9,768		1,280		2,022		5,258	
	Wind	0		0		0		0		3	
	PV	0		0		0		0		0	
	Total	7,962	5,691	33,865	30,835	11,986	12,012	6,665	5,988	20,023	17,714
2009	Hydraulic	1,817		8,196		2,905		1,141		2,979	
	Geotherma	0		0		0		0		208	
	Thermal	4,400		16,357		7,801		3,501		11,577	
	Nuclear	1,746		9,768		1,280		2,022		5,258	
	Wind	0		0		0		0		3	
	PV	0		0		0		0		0	
	Total	7,963	5,159	34,321	28,178	11,986	10,714	6,665	5,422	20,025	16,653
2010	Hydraulic	1,904		8,196		2,906		1,141		3,279	
	Geotherma	0		0		0		0		210	
	Thermal	4,400		16,907		7,801		3,797		11,577	
	Nuclear	1,746		9,768		1,280		2,022		5,258	
	Wind	5		0		0		0		3	
	PV	1		6		0		2		3	
	Total	8,057	5,732	34,877	30,950	11,986	12,009	6,963	5,966	20,330	17,498

Source: "Statistics for 60 Years in Electric Power Industry", the Federation of
Electric Power Companies of Japan

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Table 2.1.5-4 Trends in Maximum Power Supply of Electric Power Companies

End of FY	Okinawa Electric Power Co.			Hokkaido Electric Power Co.			Tohoku Electric Power Co.			Tokyo Electric Power Co.		
	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply
2005	1,925.9	1,493.0	77.5%	6,499.4	5,462.0	84.0%	16,608.7	15,200.0	91.5%	61,837.3	60,118.0	97.2%
2006	1,924.1	1,524.0	79.2%	6,504.6	5,461.0	84.0%	17,141.5	14,761.0	86.1%	61,834.7	58,058.0	93.9%
2007	1,925.4	1,530.0	79.5%	6,504.6	5,657.0	87.0%	16,798.4	15,045.0	89.6%	62,472.9	61,471.0	98.4%
2008	1,924.7	1,485.0	77.2%	6,504.6	5,558.0	85.4%	16,799.7	14,738.0	87.7%	63,981.1	60,891.0	95.2%
2009	1,923.9	1,543.0	80.2%	7,417.6	5,686.0	76.7%	16,549.9	14,516.0	87.7%	64,487.0	54,496.0	84.5%
2010	1,919.4	1,480.0	77.1%	7,419.2	5,788.0	78.0%	17,206.4	15,572.0	90.5%	64,988.5	59,988.0	92.3%

End of FY	Chubu Electric Power Co.			Hokuriku Electric Power Co.			Kansai Electric Power Co.			Chugoku Electric Power Co.		
	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply
2005	32,586.1	26,680.0	81.9%	8,113.9	5,486.0	67.6%	35,760.7	30,870.0	86.3%	12,199.8	11,500.0	94.3%
2006	32,473.2	26,967.0	83.0%	8,113.9	5,488.0	67.6%	34,864.1	30,530.0	87.6%	12,200.9	11,919.0	97.7%
2007	32,471.1	27,970.0	86.1%	8,114.4	5,580.0	68.8%	34,364.1	30,665.0	89.2%	11,825.9	12,285.0	103.9%
2008	32,626.5	28,214.0	86.5%	7,962.4	5,691.0	71.5%	33,864.7	30,835.0	91.1%	11,985.9	12,012.0	100.2%
2009	32,632.5	24,327.0	74.5%	7,963.0	5,159.0	64.8%	34,320.8	28,178.0	82.1%	11,986.0	10,714.0	89.4%
2010	32,828.3	27,093.0	82.5%	8,057.0	5,732.0	71.1%	34,877.1	30,950.0	88.7%	11,986.3	12,009.0	100.2%

End of FY	Shikoku Electric Power Co.			Kyushu Electric Power Co.		
	Output	Maximum power	Maximum power supply	Output	Maximum power	Maximum power supply
2005	6,862.1	5,542.0	80.8%	19,409.2	16,489.0	85.0%
2006	6,859.2	5,809.0	84.7%	19,417.5	17,541.0	90.3%
2007	6,664.6	5,931.0	89.0%	19,716.5	17,622.0	89.4%
2008	6,664.7	5,988.0	89.8%	20,023.2	17,714.0	88.5%
2009	6,665.0	5,422.0	81.4%	20,024.8	16,653.0	83.2%
2010	6,962.9	5,966.0	85.7%	20,330.3	17,498.0	86.1%

Source: "Statistics for 60 Years in Electric Power Industry", the Federation of Electric Power Companies of Japan

2.1.6 Programs (including policy finance) and Implementation Status of ICT Industry Promotion in Okinawa Prefecture

(1) Flow of ICT Industry Promotion Plans to Date

Table 2.1.6-1 shows the relation between the “Okinawa Promotion Plan and the ICT-related Industry Promotion Plan”. Based on the promotion plans and basic policies of the national government, the prefectural government formulates its own basic promotion plans, through which it formulates elemental implementation plans for individual industries.

In the ICT industry, Okinawa prefecture launched the “Multimedia Island Concept” in 1998. And the national government first launched the “Okinawa Promotion Plan” in 2002, based on which the government of Okinawa prefecture formulated the prefectural version of the “Okinawa Promotion Plan”. Then, based on these prefectural two plans, “Multimedia Island Concept” and “Okinawa Promotion Plan”, Okinawa prefecture formulated “Okinawa ICT Industry Promotion Plan” for the period between 2002 and 2011. This was followed by the second and third “Okinawa ICT Industry Promotion Plans”.

In 2012, the national government formulated the “Basic Policy for Promotion of Okinawa Prefecture”. Again, based on the national government “Basic Policy for Promotion of Okinawa Prefecture” and “Okinawa Promotion Plan”, the prefectural government formulated the “Basic Plan for Okinawa 21st Century Vision” in 2012 for 10 years from 2012 to 2021. This was also based on the “Okinawa 21st Century Vision” that envisages the state of the prefecture in 2030. Based on the “Basic Plan for Okinawa 21st Century Vision”, the prefecture is currently working on the “Okinawa Smart Hub Concept: Action Plan I” for a period planned from 2012 to 2014.

Table 2.1.6-1 Relations between the Okinawa Promotion Plan and the ICT Industry-Related Promotion Plan

	19XX		20XX																		
	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	..	21
National Government																					
Okinawa Promotion Plan																					
Basic Policy for Promotion of Okinawa Prefecture					↓										5						
Prefectural Basic Plan																					
Okinawa Promotion Plan																					
Okinawa 21st Century Vision					↓										3						
Basic Plan for Okinawa 21st Century Vision					↓										5						
Implementation Plan for Okinawa 21st Century Vision (1st half)					↓										↓						
Implementation Plan for Okinawa 21st Century Vision (2nd half)					↓															↓	
ICT Industry																					
Okinawa Multimedia Island Concept	9				↓																
Okinawa ICT Industry Promotion Plan (1st Plan)			↓																		
2nd Okinawa ICT Industry Promotion Plan (2nd Plan)					↓			3													
3rd Okinawa ICT Industry Promotion Plan (3rd Plan)										↓											
New Okinawa ICT Industry Promotion Plan (provisional name)															↓						
Okinawa Smart Hub Concept															↓						
Okinawa Smart Hub Concept Action Plan 1															↓						
Okinawa frontier strategic meeting –summary of issues															↓						
On Promotion of ICT-related Industries in Okinawa															↓						

Note: 3: March
 4: April
 5: May
 9: September
 11: November

Column (2)

Urasoe City has just begun to attract ICT businesses

Urasoe City, as a commuter town conveniently located north east of Naha City, has been experiencing an increase in the population. But since it has had difficulty in securing a certain area of land to develop an industrial cluster, it decided to reclaim land on the west coast, which was finally completed in 2012.

While other cities were working hard to attract ICT businesses from within and outside Okinawa Prefecture, Urasoe City had been obliged to refrain from taking full-scale actions because of the land issue. But it is now ready to take advantage of its attractive location (some 7km away from the Naha Airport) and its beautiful natural environment as a coastal resort area.

Apparently, the city has already had strategies to attract ICT businesses.

(2) Programs implemented under the Okinawa ICT Industry Promotion Plan

Table 2.1.6-2 shows the direction of programs, the three priority fields and the progress of the programs at each stage of the “Okinawa ICT Industry Promotion Plans”. All three plans put emphasis on attracting and supporting call centers which had the potential to hire a large number of workers. The second and, more significantly the third, plans expanded coverage to the upper streams of industry, such as in supporting and developing software and systems which had larger production values, and supporting and developing BPO and other fields of industry that featured more complicated structures and had higher value-added.

Table 2.1.6-2 Okinawa Prefecture ICT-Related Industry Promotion Plan:
Policy Direction, Three Major Fields and Policy Developments at Each Stage

Okinawa Prefecture ICT-Related Industry Promotion Plan	Okinawa Prefecture ICT-Related Industry Promotion Plan, Phase 2	Okinawa Prefecture ICT-Related Industry Promotion Plan, Phase 3
Plan Period		
2002-2004	2005-2007	2008-2011
Target (Final Year in Plan Period)		
Number of employees: 12,000 Total production: 197 billion yen	Number of employees: 17,800 Total production: 271.6 billion yen	Number of employees: 33,700 Total production: 390 billion yen
Policy Direction		
Continue to concentrate and promote information services, content creation and software development (three major fields expected to grow in the future) and set up ICT-related measures by 1) concentrating and promoting ICT-related industries 2) developing and securing human resources and encouraging research and development 3) promoting a ICT infrastructure	Information services, content creation and software development remain as the three major fields.	Information services, content creation and software development remain as the three major fields, and the core project focuses on those fields as well as ongoing improvement plans for Okinawa IT Shinryo Park.
Three Major Fields		
Information Services		
1) Continue to attract call centers to Okinawa, particularly to the Information & Communications Industry Development Zones 2) Continue to attract data centers, clerical processing centers and other business 3) Support measures for lowering communication costs between Okinawa and mainland Japan 4) Take advantage of support measures such as subsidies for employing Okinawan youths	1) Developing and securing human resources for call centers 2) Lower increasing communications costs 3) Secure and improve office buildings and other business facilities 4) Create environments to globalize call centers 5) Formulate global IX 6) Concentrate data centers 7) Research and study the use of ASP services	1) Continue concentration based on BPO businesses 2) Promote the concentration and advancement of call centers 3) Promote the concentration and advancement of data centers 4) Create ASP and SaaS business
Content Creation		
1) Attract Japanese and non-Japanese corporations 2) Support the receiving of work orders from outside the prefecture, and support Okinawan creators and startup businesses 3) Develop and secure human resources for this field and create venture corporations 4) Promote a production environment that contributes to the growth of business within the prefecture 5) Promote digital archives 6) Encourage connections that take advantage of the functions of existing facilities all over the	1) Develop and secure human resources for content creation 2) Create demand for the creation of ubiquitous content in line with the u-Japan concept 3) Promote the circulation of digital content 4) Create environments that would attract human resources from around the world	1) Support the building of a digital content library center 2) Encourage the development of mobile content that integrates ASP and SaaS 3) Promote the growth of game development and the content creation businesses

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Okinawa Prefecture ICT-Related Industry Promotion Plan	Okinawa Prefecture ICT-Related Industry Promotion Plan, Phase 2	Okinawa Prefecture ICT-Related Industry Promotion Plan, Phase 3
prefecture		
Software Development		
1) Support promotion activities set on acquiring markets outside the prefecture 2) Promote the development of public applications for e-governments and e-municipalities 3) Encourage the concentration of advanced applications by promoting the development of applications for telemedicine, distance education, etc.	1) Develop and secure human resources for software development 2) Expand concentration in the firmware market 3) Expand new software businesses 4) Expand and increase the software market in major urban areas 5) Strengthen the business infrastructure of corporations within the prefecture	1) Revitalize offshore (near-shore) software development 2) Create software development business that will create markets 3) Revitalize OSS development businesses 4) Launch software development-related businesses that offer better added value 5) Concentrate embedded software development businesses
Policy Developments		
Facility improvement		
1) Improve facilities that support ICT-related industries 2) Improve ICT infrastructure	1) Improve ICT-related industry land and facilities 2) Improve ICT infrastructure	1) Improve ICT-related industry land and facilities 2) Improve ICT infrastructure
Human resources development		
1) Develop and secure human resources for ICT-related industries	1) Develop and secure human resources	1) Develop and secure human resources
Telecommunications cost reduction		
1) Reduce communications costs	1) (Reduce through improvement of ICT infrastructure)	1) (Reduce through improvement of ICT infrastructure)
Software development support		
1) (Make efforts in three major fields)	1) (Make efforts in three major fields)	1) (Make efforts in three major fields)
Content creation support		
1) Concentrate content and advanced applications from inside and outside Japan	1) (Make efforts in three major fields)	1) (Make efforts in three major fields)
Promotion Activities		
1) Take advantage of the systems for Information and Communications Industry Development Zones and Special Information and Communications Industry Zones 2) Build a unified system to attract and support corporations 3) Promote research and development in ICT fields	1) Take advantage of the systems for Information and Communications Industry Development Zones and Special Information and Communications Industry Zones 2) Build a unified system to attract corporations and revitalize corporations within the prefecture 3) Promote concentration and research and development in ICT-related industries	1) Take advantage of the systems for Information and Communications Industry Development Zones and Special Information and Communications Industry Zones 2) Build a unified system to attract corporations and revitalize corporations within the prefecture 3) Promote concentration and research and development in ICT-related industries

Source: *New Okinawa Prefecture ICT Industry Promotion Plan (provisional name): Planning Survey Report, March 2012, New Okinawa Prefecture Information and Communications Industry Promotion Plan (provisional name) Planning Survey Collective*

(3) Policy Details

As stated in the outline of development in the Phase 2 plan, there is a strong movement for creating jobs and increasing total production in order to expand and advance the information services industry. Furthermore there is movement towards further concentration in the content and software industries in order to continue to develop ICT-related industries in Okinawa Prefecture. The movement aims to take advantage of Okinawa's geographic advantages to become an international ICT hub for the Asian/Pacific Island region and further concentrate, expand and develop ICT-related industries. This movement continued into the Phase 3 plan, which aims to strengthen the Okinawa brand through the formation of an international ICT hub, a gathering place for ICT industries. It also aims to revitalize and boost the global competitiveness of ICT industries in Japan by alleviating the risk of concentrating everything in Tokyo. This approach aims to create jobs and increase total production.

This section *presents* details of each of the three major fields and six policy fields from the Okinawa ICT Industry Promotion Plan, Phase 3 (March 2008), the final phase of the plan outlined in (2).

Three Major Fields

i) Information Services

Policy	Details
1. Promote BPO business center concentration	<ul style="list-style-type: none"> ▪ Encouraging BPO service providers to relocate to Okinawa and expand operations and encourage corporate groups from outside Okinawa to establish BPO business centers there, promoting BPO business center concentration. ▪ The aim is to expand high-value-added BPO services that enable corporations to provide comprehensive outsourcing services, everything from strategic consulting to SI and operations. ▪ Accelerate movement from outside the prefecture to integrated BPO centers that can function as headquarters.
2. Promote call center concentration and advancement	<ul style="list-style-type: none"> ▪ Continue to actively attract call centers based on the continuingly strong demand for relocating call centers to Okinawa Prefecture. ▪ Attract advanced call centers (technical centers and customer service centers that require technical knowledge, etc.) and support the advancement of existing call centers in the prefecture.
3. Promote data center concentration and diversification	<ul style="list-style-type: none"> ▪ Aims to promote further concentration of data centers to build on the many advantages of concentrating in Okinawa Prefecture. ▪ Promote the diversification of backup centers for disaster recovery, shared-use data centers for small and medium-sized enterprises, data centers that support ASP and SaaS businesses

Policy	Details
	and data centers integrated with BPO that support the expansion of Japanese corporations into East Asia.
4. Develop ASP/SaaS businesses	<ul style="list-style-type: none"> Support the relocation and development of APSP and SaaS service providers based on the advantages of having a concentration of data centers and ICT infrastructure, etc.

ii) Software Development

Policy	Details
1. Revitalize offshore (near-shore) software development	<ul style="list-style-type: none"> Amidst declining satisfaction with offshore development locations outside Japan, aim to concentrate offshore (near-shore) software (including systems) development bases applying the advantageous place with the high quality and cost competitiveness of Okinawa Prefecture. Build a system by which business and software development works originating from outside Okinawa are shared and a core organization system to manage software development work outsourced throughout Asia from Japan (Okinawa Offshore Core Center). Support the establishment of the Okinawa mutual ICT business development base in Tokyo, the human resources development and the standardization of systems development processes, research and development, and the development of strategic plans to expand operations.
2. Create software development businesses that create markets	<ul style="list-style-type: none"> Collaborate with universities in Okinawa to support the development of entrepreneurs and ICT leaders in Okinawa since 2007, who are coming from managers of pioneering businesses. Aims to improve the ability to use unique technology to explore markets outside the prefecture, earning outsourced work from the mainland, which has been a challenge in the software industry in Okinawa Prefecture. Coordinate with the ITOP project and other efforts already underway to promote the creation of software development businesses that create markets by improving capabilities and stir up the entrepreneurial spirits of engineers and students in Okinawa.
3. Revitalize OSS development businesses	<ul style="list-style-type: none"> The movement away from system development based on specifications held by specific, major vendors and toward using open-source software based on open standards for core operations is gaining momentum. It is easier for small and medium-sized vendors to proactively incorporate open e-governance standards into their operations, thus this policy

Policy	Details
	will spread the word on efforts made by Okinawan corporations to move towards OSS, which could spark a revolution in business expansion and the nature of the business they undertake, while also promoting added value from the prefecture's software industry.
4. Launch software development-related businesses that offer better added value	<ul style="list-style-type: none"> ▪ Create a foundation on which software-related industries can expand operations to a higher degree by promoting the launch of test centers, design centers, interoperability centers and other new business concepts that should concentrate at Okinawa IT Shinryo Park. ▪ Use this foundation to encourage the advancement in the operations of corporations within the prefecture and attract software corporations from outside the prefecture to come to Okinawa and expand and offer better added value.
5. Concentrate embedded software development businesses	<ul style="list-style-type: none"> ▪ Corporations from inside and outside Okinawa Prefecture are working together to develop young engineers, and this policy aims to develop human resources by sending engineers to Tokyo to work on embedded software development projects. ▪ This policy supports this movement, led by the private sector, by taking advantage of ICT core human resources development projects and promotes the concentration of embedded software development work through the development of highly skilled engineers.

iii)Content

Policy	Details
1. Support the building of a digital content library center	<ul style="list-style-type: none"> ▪ An Okinawa GIS Center serving the dual functions of an Okinawa map center project and GIS data creation center is being considered for the Okinawa IT Shinryo Park. The GIS Center will be the core facility in an effort to build a system for sharing, reusing and circulating map data held in industrial, academic and government circles in Okinawa Prefecture. ▪ Industries and municipalities will use the comprehensive maps of Okinawa created through this system to assist corporations operate more efficiently and improve services to citizens. ▪ Spatial data engineers will develop through various types of work at the GIS Center, which will lead to the creation of a new content industry.
2. Encourage the development of mobile	<ul style="list-style-type: none"> ▪ ASP and SaaS services come to be applied to

Policy	Details
content that integrates ASP and SaaS	widespread mobile phone and smartphone, however, the shortage of content is the major issue. This policy will take advantage of the strengths of the data center concentration in Okinawa to develop a new content industry by promoting mobile content development businesses that expand and provide ASP and SaaS services.
3. Promote the growth of game development and content creation businesses	<ul style="list-style-type: none"> • The top earners of outsourced game software development work have relocated to Okinawa, and corporations in Okinawa have expanded their services. This expansion has mainly been in sales operations and content creation that incorporates characteristics of Okinawa into virtual worlds within virtual games that allow users to create their own 3D content. This policy supports the inclusion of Okinawan corporations, creators and musicians in these processes, and this should spur more growth as they provide content and services originating from Okinawa. • Develop human resources who can connect with these types of corporations and flourish in the game industry while promoting the expansion of game development and content creation in Okinawa.

Six Policy Fields

i) Facility Improvement

1. Improving ICT-related industry relocation facilities

Main Policy	Details
IT Shinryo Park improvement	To concentrate and promote ICT industries, make IT Shinryo Park a hub for advanced software development and other new ICT industries and improve its function as a bridge to Asia and as a place for advanced human resources development.
Prefectural Government Goals	
<p>(1) The prefecture aims to create 8,000 new jobs by improving IT Shinryo Park.</p> <p>(2) The prefecture will focus on having ICT-related industries in Okinawa provide better added value and improve the Okinawa brand by forming more concentrated industry clusters.</p> <p>(3) The prefecture will try to develop human resources in ICT to counter the serious dearth of them in rest of Japan by providing a place for the development and testing of cutting edge technology and business models.</p> <p>(4) There are not enough properties and buildings to satisfy the increasing demand from corporations who want to establish or relocate call centers and data centers to Okinawa. The prefecture will market Okinawa IT Shinryo Park as an example of what is possible and call upon the energy of the private sector to encourage the establishment of offices, data centers and other buildings for ICT corporations in Information and Communications Industry Development Zones</p> <p>(5) Many people are unhappy with the lack of available information about real estate in Okinawa. The prefectural and municipal governments and related organizations will work together to build a system through which they can consolidate the management of information. The consolidated information will list buildings that ICT-related corporations can relocate to or</p>	

occupy and will ensure quick and accurate responses to inquiries from corporations inside and outside Okinawa.

2. Improving ICT infrastructure

Main Policy	Details
Telecommunications cost reduction support project	Provide high-quality, high-capacity telecommunication lines between Okinawa and mainland Japan to ICT-related corporations that use them.
Building Okinawa GIX	Build GIX and promote concentration of ICT industries with central information functions.
Prefectural Government Goals	
(1) Experimentation at GIX began in December 2007. The prefecture aims to subsidize telecommunications costs between Okinawa and Hong Kong for two years and put GIX to practical use on a commercial basis beginning in 2010.	

ii) Human Resources Development

1. Developing and securing human resources

Main Policy	Details
Information industry core human resources development support project	Support the development of project managers, consultant SE and other core human resources who will take charge of advanced operations and will be entrusted with sustainably developing information industries in Okinawa.
Prefectural Government Goals	
(1) The prefecture will create systems for long-term human resources development (not only for short-term) and continue efforts to improve motivation (as well as capabilities).	
(2) The prefecture will further strengthen the advanced human resources development programs already underway like IT professional human resources development courses (ITOP) and advanced/practical IT industry human resources development projects (APITT), in order to make the industry more independent.	
(3) The prefecture will provide support for corporate training and OJT and promote associations between ICT-related corporations and universities in Okinawa. This will build systems that can churn out huge numbers of the types of people who are currently in demand in industry (industry-ready employees, etc.).	
(4) IT Shinryo Park is expected to be indispensable in increasing the exchange of human resources with other Asian countries. The prefecture will build an Asian OJT center and encourage network building between Okinawan and other Asian universities, as well as between research institutions and corporations, in order to secure top-class human resources from other Asian countries.	
(5) The prefecture will have industries inside and outside Okinawa lead the way in considering the establishment of ICT colleges and other higher learning institutions that can produce industry-ready graduates with practical skills.	
(6) To develop human resources over the long term, the prefecture will continue IT junior development workshops aimed at elementary and middle school students which will strive to foster an awareness of the significance of ICT education in the region, and develop human resources through school education.	
(7) To promote the creation of spin-off ventures from existing corporations and ventures from universities and research institutions, the prefecture will support entrepreneur development programs through cooperation with Okinawan universities and managers of pioneering businesses. In advanced cases where someone is ready to start a new business, the prefecture will use financing systems from the Okinawa Development Finance Corporation and connections with industry support organizations to offer full support for production activities.	
(8) There is not a high enough concentration of human resources in Okinawa Prefecture. To	

<p>secure human resources, through the promotion of UI- turn which employees return (U) or move (I) from metropolitan areas to Okinawa, the prefecture will work together with industries to hold events and fairs to promote working outside of major metropolitan areas.</p> <p>(9) The prefecture will create an environment that promotes UI-turn which employees outside Okinawa come to Okinawa to work and promote the establishment of appropriate living spaces for highly skilled UI-turn workers by working together with private firms which seek to hire UI-turn people.</p> <p>(10) The prefectural and municipal governments, along with industries, will work together to consider holding regular call center forums and promote the further advancement of call center functions to share accurate information about call center operations and raise the public's awareness of them.</p>

iii) Telecommunications Cost Reduction

Main Policy	Details
Telecommunications cost reduction support project	Provide high-quality, high-capacity telecommunication lines between Okinawa and mainland Japan to ICT-related corporations that use them.
Prefectural Government Goals	
(1) The prefecture will use the Okinawa Prefecture information industry highway to continue to support the reduction of telecommunications costs on the far-reaching ICT network to Tokyo and other places. It will encourage BPO, data centers and ASP/SaaS service corporations to relocate to Okinawa. Corporations in Okinawa have made fervent demands for telecommunications cost reduction support.	

iv) Software Development Support

(Work done within the three major fields)

v) Content Creation Support

(Work done within the three major fields)

vi) Promotion Activities

- Using the Information and Communications Related Industry Development Zone System and Special Information and Communications Related Industry Zone System

System	System Details
The Information and Communications Related Industry Development Zone System	<p>(1) Eligible lines of business ICT industries and work that involves ICT technology</p> <p>(2) Eligible municipalities 24 municipalities: Naha City, Uruma City, Ginowan City, Miyakojima City, Ishigaki City, Urasoe City, Nago City, Itoman City, Okinawa City, Motobu Town, Yomitan Village, Kadena Town, Chatan Town, Kitanakagusuku Village, Nakagusuku Village, Nishihara Town, Tomigusuku Village, Yaese Town, Yonabaru Town, Haeburu Town, Ginoza Village, Nanjo City, Onna Village, Kin Town</p> <p>(3) System Details</p> <ul style="list-style-type: none"> • Investment tax credits on corporate taxes • Exemptions from business taxes, real estate acquisition taxes, property taxes • Exclusion from special landholding taxes

	<ul style="list-style-type: none"> ▪ Preferential treatment for business office taxes (Naha City)
The Special Information and Communications Related Industry Development Zone System	<p>(1) Eligible lines of business Data centers, ISP, IX</p> <p>(2) Eligible areas Two zones, four municipalities: Nago/Ginoza Zone: Nago City, Ginoza Village Naha/Urasoe Zone: Naha City, Urasoe City</p> <p>(3) System Details 35% income deduction for certified corporations that engage in specific ICT operations within designated zones.</p>
Prefectural Government Goals	
<p>(1) The prefecture will use tax breaks and other systems to concentrate and promote ICT-related industries.</p> <p>(2) In the special information and communications related industry development zone in particular, the prefecture will use a corporate income tax deduction system to entice data centers, Internet service providers (ISP) and Internet exchange points (IX) with central information functions to be relocate to Okinawa in order to spur the concentration of ICT-related industries.</p>	

2. Driving integrated promotion activities for both corporations outside Okinawa and those in Okinawan

Main Policy	Details
ICT industry promotion activities for both corporations outside Okinawa and those in Okinawa	<p>Promote various projects to attract corporations from outside Okinawa and at the same time to revitalize Okinawan corporations:</p> <ul style="list-style-type: none"> ▪ Hold briefings on appeal efforts and present at events inside and outside Okinawa ▪ Hold forums and other events ▪ Create and distribute pamphlets ▪ Improve homepages and share information on the Internet
Prefectural Government Goals	
<p>(1) The prefecture will increase the concentration of corporations by ramping up efforts to attract corporations seeking to relocate their headquarters from outside the prefecture.</p> <p>(2) The prefecture will promote the relocation of headquarters to Okinawa by developing promotional strategies that make the strongest possible appeal such as the use of tax breaks and creating other advantages for relocating their headquarters (including partial relocation)</p> <p>(3) The prefecture will promote capital investment by spreading the word about tax breaks and strive to revitalize and advance operations of corporations in Okinawa by further supporting sales expansion in Tokyo and providing project opportunities.</p> <p>(4) It is not uncommon for corporations to have top-flight technology and business ideas but lack the capital or sales networks to capitalize on them. The prefecture will use financing systems from the Okinawa Development Finance Corporation and connections with industry support organizations to further support the production activities of small and medium-sized enterprises within the prefecture. It will also support venture enterprises and revitalize small and medium-sized software corporations.</p>	

3. Promoting concentration of ICT-related industries and research and development in the industries

Main Policy	Details
Digital archive project	Launch a digital archive of Okinawa's history, nature, traditional culture and other cultural assets on the Internet.
Prefectural Government Goals	
<p>(1) The prefecture will create a digital archive full of information about Okinawa's distinct climate, traditional culture and history in order to save and pass down a modern cultural</p>	

asset and to share the charm of Okinawa with the world, promoting tourism, education and culture in Okinawa Prefecture.

Column 3

Children Struggle to Imagine Working in ICT

Many corporations said in interviews that they believed the ICT industry would continue to advance and that now was the time to ramp up human resources development in the corporate world. Educational institutions, on the other hand, indicated the distressing notion that children and students are not taking to science and mathematics and have difficulty imagining ICT work. This could lead to huge problems in the future if work in the ICT industry continues to appear unappealing and be difficult to understand. To combat this trend, the Nago Development Authority (NDA) is working with corporations that have been attracted to Okinawa to hold computer clinics run by volunteers and engage in other low-profile efforts to reach out to local children and citizens. With the help of the Japan Science and Technology Agency (JST), Okinawa National College of Technology is operating facilities in such a way that locals can experience the joy of science. In either case, some people are trying their best to consider the future for local children.

(4) Results of Work on Policy

Regarding the results of work on policy, we will examine the software development field and facility improvements.

(Software Development Field)

This section presents two examples of efforts to revitalize offshore (near-shore) software development, create software development businesses that expand markets, and revitalize OSS development businesses.

An issue in software development in Okinawa is that total production is low because many corporations are set up to receive subcontracted work. Another challenge is to improve competitiveness by improving technical abilities and lowering development costs. This indicates the importance of efforts to become involved in upper processing and revitalize near-shore development and OSS businesses.

Okinawa Software Center Co., Ltd. was established in 2008 to increase involvement in upper processing and revitalize near-shore development. The center got its start with help from ICT-related

industry groups in Okinawa and corporations from inside and outside Okinawa.

The Ryukyu Soft Business Support Center was established as part of the Information Industry Association of Okinawa in 2011 to revitalize Open Source Software (OSS) businesses by leading a movement away from receiving outsourced works to a business model based on in-house products and services.

Below are descriptions of these two efforts.

1. Okinawa Software Center Co., Ltd. (OSC)

Established	October 2008 *Established as Frontier Okinawa 21 in October 2002
History	Launched via public-private cooperation with support from ICT-related industry groups in Okinawa, along with corporations inside and outside Okinawa, as an effort to concentrate software development capabilities. Functions as a massive base for software development in Okinawa IT Shinryo Park and features near-shore (domestic offshore) development.
Business Style	OSC receives orders for software development work from outside Okinawa and shares in development with subcontracting corporations in Okinawa. It will continue operating as a near-shore development industry cluster.
Capital	253.5 million yen
Shareholders	45 companies (ICT-related industry groups in Okinawa and corporations inside and outside Okinawa)
Business Description	<ul style="list-style-type: none"> •Software development, maintenance operation and consulting work outsourced from outside Okinawa Prefecture •Human resources development and engineer staffing for ICT projects outsourced from outside Okinawa Prefecture •Research and development and other software development efforts

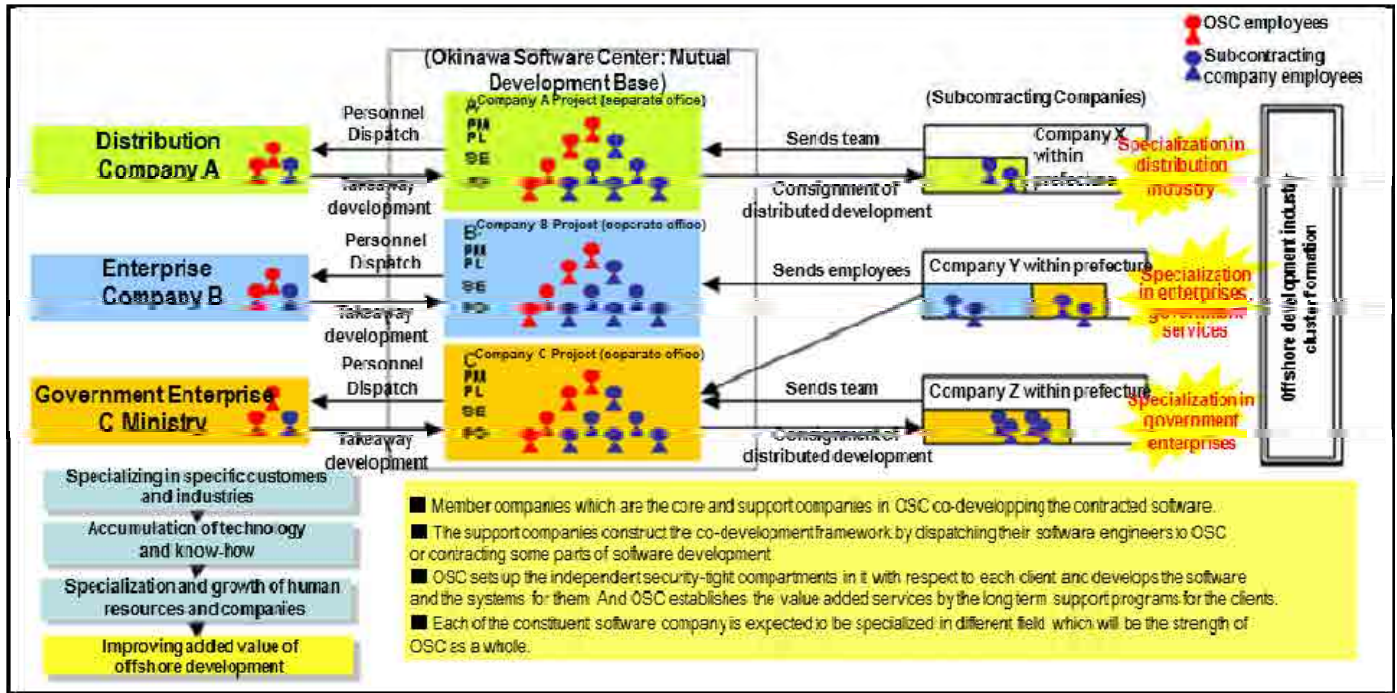


Figure 2.1.6-1 Forming a Mutual Development Base that Concentrates the Development Capacity of Corporations in Okinawa Prefecture

Source: Okinawa Software Center Co., Ltd. homepage

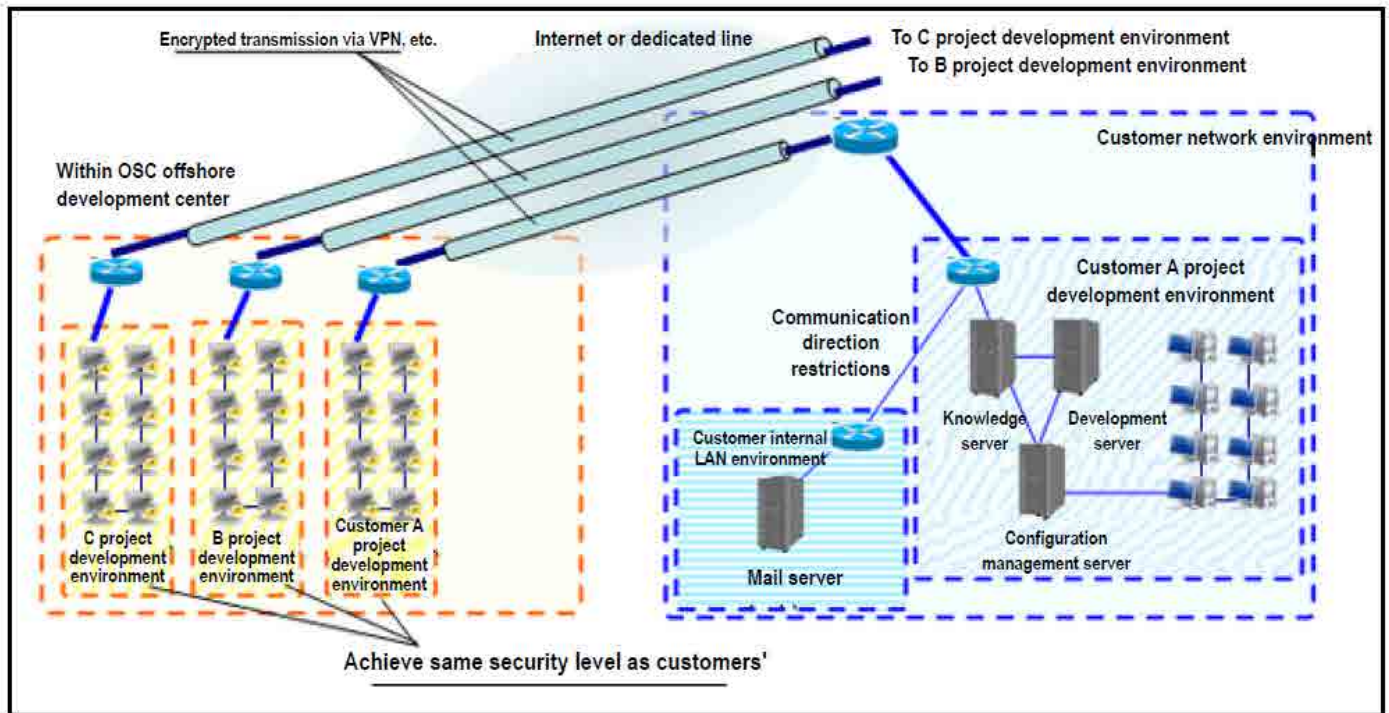


Figure 2.1.6-2 Remote Development Network Environment

Source: Okinawa Software Center Co., Ltd. homepage

Column 4

Software Development: Break the subcontracting business style

Most software development corporations in Okinawa Prefecture are small-scale, and a majority of them receive work outsourced from big software development companies in Tokyo, Osaka and other metropolitan areas.

Thus, low profitability is a business challenge. Small businesses are all in the same boat, so if they can take advantage of each of their strengths, join together to form a virtual software development company and compete well with mainland Japanese companies, they can create a shift toward upper process work. This will lead to better profitability and the revitalization of the Okinawa software industry.

For this reason, bringing jobs to Okinawa is a must. Ways will be found for systems and services as well. Of course, some jobs require development at the customers' places of business, but in general, the jobs have to come to Okinawa.

Okinawa Software Center Co., Ltd. (OSC) was founded on these concepts.

OSC is currently made up of 45 member corporations and is expanding to focus on earning more work from markets outside Okinawa, so it will focus on building stronger ties among its member corporations. Okinawa Prefecture will make basic investments and offer support from the sidelines.

2. Ryukyu Soft Business Support Center

Established	September 2011
History	ICT industries in the countryside occupy the lower levels of the software development outsourcing pyramid, and Okinawa is no exception. Okinawa's ICT industries struggle with low earnings stemming from low prices, inconsistent workflow, and a lack of means to invest in technical development and engineer training. To counter these problems, the industries need to break from their reliance on outsourced work and move toward a more independent business model. However, to do that, they need to improve their competitiveness and technical capacity based on the strength of highly original and distinct products and services as well as create an environment that enables approaches to the upper levels. It is cheaper to use open-source software (OSS), in which source code is publicly available at no charge, to develop products than it is to develop them from scratch. The Ryukyu Soft Business Support Center was established to help Okinawan ICT corporations use OSS to create products.
Description	The Ryukyu Soft Business Support Center established standard OSS development techniques as a way to support ICT businesses. The center creates manuals to outline procedures and the methodology for turning OSS into a viable commercial tool: research in promising fields; comparing functionality and

	<p>evaluating the marketability of OSS as a tool; accurately checking functionality, reliability, usability, serviceability and the ability to commission; and procedures for evaluating OSS as a tool to spur along globalization and localization as need be. At the same time, the center also maintains a support system environment that allows these procedures to be implemented smoothly and provides a framework under which Okinawan ICT corporations can easily depend on the support system.</p>
<p>Services</p>	<ul style="list-style-type: none"> •The center creates manuals for the following OSS evaluation procedures to outline procedures and methodology for turning OSS into a viable commercial tool: <ol style="list-style-type: none"> 1. Research (marketing) in promising fields 2. Comparing functionality and evaluating (screening) the marketability of OSS as a tool 3. Accurately checking (evaluating/verifying) functionality, reliability, usability, serviceability and the ability to commission 4. Procedures (globalization and localization) for spurring along globalization and localization as need be •The center provides a support system environment so that these procedures are implemented smoothly.

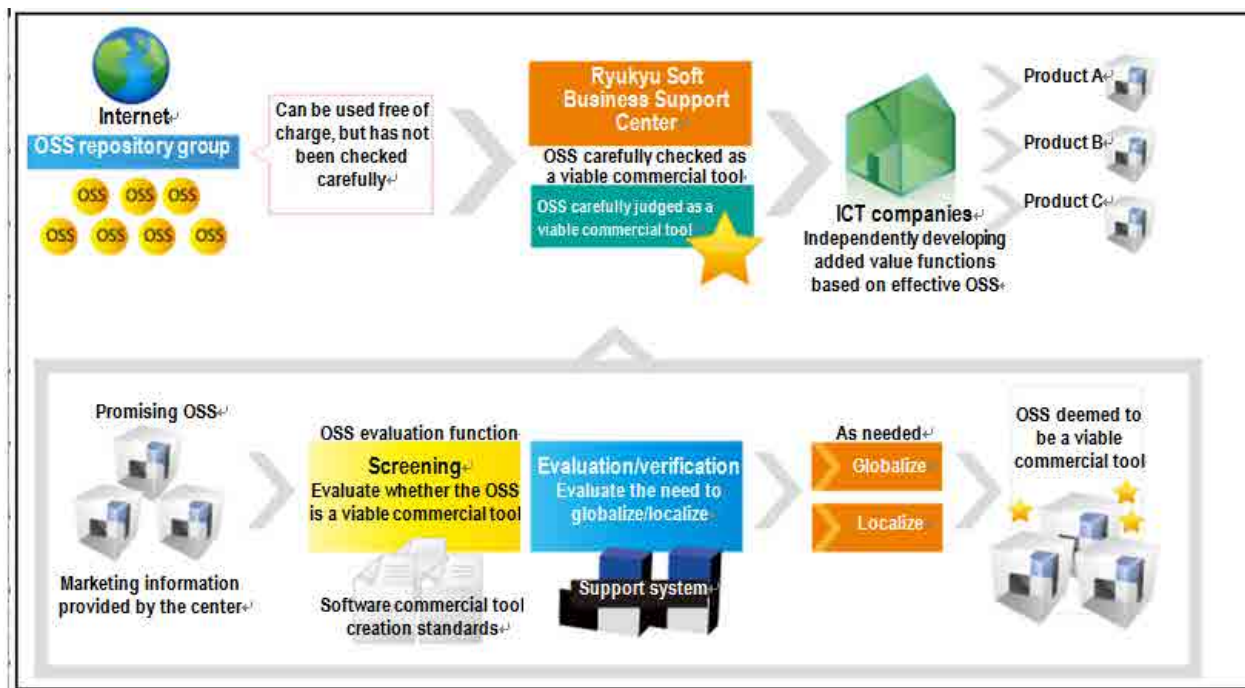


Figure 2.1.6-3 Flow of OSS Circulation

Source: Ryukyu Soft Business Support Center homepage

(Facility Improvement)

Examples of facility improvement work include incubation facilities, Okinawa IT Shinryo Park (came into use in 2009) and the “Future International City of Finance and IT Concept” (created in 2007).

1. Incubation facilities

Many new companies in the main municipalities in Okinawa Prefecture are using provisions such

as the incubation facilities and subsidies for housing fees provided in those municipalities. These incubation facilities will continue to be available, but the subsidies will come to an end after a fixed period of time has passed. Table 2.1.6-3 shows incubation facilities established in the main municipalities of Okinawa Prefecture.

Table 2.1.6-3 Incubation Facilities in Each Okinawa Prefecture Municipality

Location	Name	Operator
Naha City	Naha Business Incubate Office	Commerce, Industry, Agriculture & Fisheries Div., Naha City
	Okinawa Industry Promotion Center Ltd.	Okinawa Industry Promotion Center Ltd.
Urasoe City	Urasoe Industry Promotion Center/Yuinomachi	Commerce and Industry Section, Urasoe City
Tomigusuku City	Tomigusuku City IT Industry Promotion Center	Commerce, Industry and Tourism Div., Planning Dept., Tomigusuku City
Ginowan City	Ginowan Bayside Information Center (G-Wave)	Commerce and Industry Promotion Div., Ginowan City
Chatan Town	Mihama Media Station	Economic Promotion Div., Chatan-Cho
Okinawa City	Okinawa City Telework Center Okinawa City IT Work Plaza Okinawa City Mobile Work Plaza	Employment Promotion Office, Okinawa City
Kadena-Cho	Kadena-Cho Multimedia Center Kadena-Cho Call Center	Information Promotion Div., Kadena-Cho
Uruma City	Ichui Gushikawa Jinbunkan Butenkan, Ishikawa Region Development Center Uruma City IT Business Support Center	Industrial Site and Employment Promotion Division, Uruma City
	IT Shinryo Park <ul style="list-style-type: none"> ▪ Core Function Support Center Core Function Support Facility, Bldg. A Core Function Support Facility, Bldg. B ▪ Corporation Location Promotion Center ▪ Asia IT Training Center ▪ ICT Equipment Testing Facility 	Okinawa Prefecture Designated manager: Okinawa Daiken Co., Ltd.
Ginoza Village	Ginoza Village Server Farm Ginoza Village Server Farm No. 2	Planning Div., Ginoza Village
Nago City	Future International City of Finance and IT <ul style="list-style-type: none"> ▪ Nago Multimedia Center ▪ Mirai No.1 ▪ Mirai No.2 ▪ Mirai No.3 	Special Financial Business and ICT Industry Zone Promotion Office, Nago City Designated manager: NDA
	Nago Industry Support Center	Commerce, Industry and Tourism Div., Nago City
Miyakojima City	Miyakojima IT Industry Center	Tourism, Commerce and Industry

Location	Name	Operator
		Div., Miyakojima City
Ishigaki City	Ishigaki IT Business Support Center	Information Promotion Div., Planning Dept., Ishigaki City

Source: *Excerpt from Information and Communications Industry Business Establishment Guide, 2013-2014, Okinawa Prefecture*

2. Okinawa IT Shinryo Park

Okinawa IT Shinryo Park is located on the northern side of reclaimed land in Nakagusuku Bay New Port Area in Uruma City and is made up of Core Function Support Facilities, the Corporation Location Promotion Center, the Asia IT Training Center, the ICT Equipment Testing Facility and the Corporation Concentration Facility.

The table below shows how many companies occupy each facility.

Table 2.1.6-4 Okinawa IT Shinryo Park Facility Occupancy

Facility	Occupancy
Core Function Support Facility, Bldg. A	2 companies
Core Function Support Facility, Bldg. B	7 companies
Corporation Location Promotion Center	1 company
Corporation Concentration Facility	1 company
Asia IT Training Center	3 companies
ICT Equipment Testing Facility	3 companies

Source: *Okinawa IT Shinryo Park homepage*

Figure 2.1.6-4 is an overview of Okinawa IT Shinryo Park, Figure 2.1.6-5 shows aspirations for the park, Figure 2.1.6-6 shows images of the park and Figure 2.1.6-7 shows new concentrations into an ICT industry hub.

Okinawa IT Shinryo Park

Okinawa IT Shinryo Park is a large project that aims to create a massive Okinawan hub for Japanese and non-Japanese ICT-related industries.

Three Core Principles

- (1) Promote ICT industries in Okinawa Prefecture
- (2) Revitalize ICT industries in Japan and improve their competitiveness on a global scale
- (3) Lead the way in creating employment opportunities in Okinawa Prefecture

Five Concepts

- (1) Hub for new Japanese ICT industries (advanced software development, etc.)
- (2) Serve as an ICT bridge between Japan and the rest of Asia
- (3) Provide test beds for Japanese ICT industries
- (4) Create and stockpile a highly skilled ICT workforce
- (5) Provide a leading resort and ICT employment environment that makes Japan the model for the future

Figure 2.1.6-4 Overview of Okinawa IT Shinryo Park

Source: "On ICT Industry in Okinawa Prefecture" published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government"

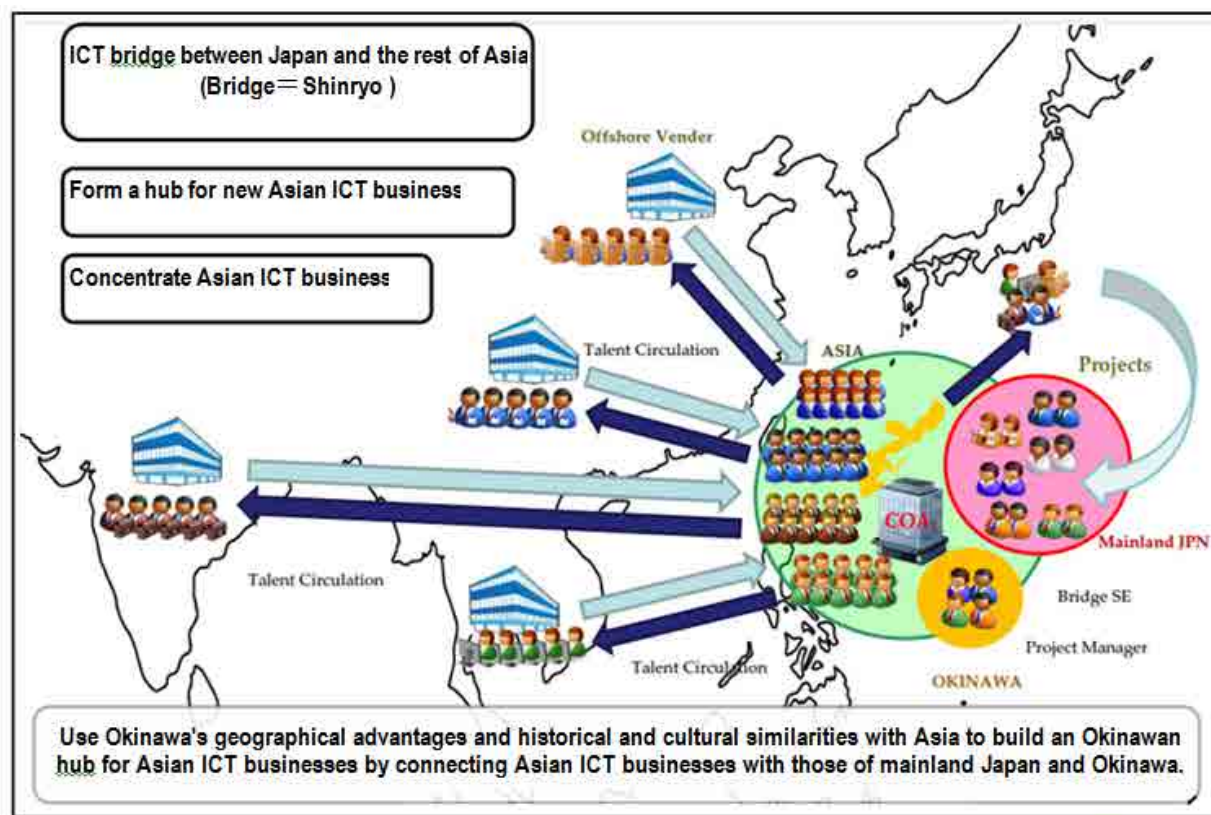


Figure 2.1.6-5 Aspirations for Okinawa IT Shinryo Park

Source: "On ICT Industry in Okinawa Prefecture" published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government" Prefecture Commerce, Industry and Labor Department; May 24, 2013



Figure 2.1.6-6 Images

Source: "On ICT Industry in Okinawa Prefecture" published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government"



Figure 2.1.6-7 New Concentration into an ICT Industry Hub

Source: "On ICT Industry in Okinawa Prefecture" published on May 24, 2013, by IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government"

3. Future International City of Finance and IT Concept

Under the Okinawa Promotion and Development Special Treatment Act enacted in April 2002 as the basis laws, Nago City was designated as a Special Financial Operation Zone ("Special Financial Zone") in July of that year and then as a Special Information and Communications Industry Zone (Special Information and Communications Zone) in September in order to create new industries. After receiving these designations, the city developed the Future International City of Finance and IT Concept in March 2007 to add to previous policies and strive to make special zones full of distinct characteristics not available anywhere else so that they could continue to promote corporate relocation and flourish as a finance and ICT hub. The city has continued to carry out projects based on this new concept ever since.

The basic policy of the Nago Future International City of Finance and IT concept is to create a space and environment where people with interest in finance and IT from all over the world can come and live with joy, comfort and satisfaction so that they can create new long lasting businesses. The four core concepts are as follows:

- Concepts**
1. Consistently continue to encourage corporate relocation and community building to build a concentration of finance and IT industries.
 2. Continue consistent human resources development that touches people of all ages.
 3. Promote the effective dissemination of information between people, corporations and communities.
 4. Enhance appeals for corporate relocation and support systems and reach 2,500 employees in finance and IT by the end of 2018.

Figure 2.1.6-8 shows the development of the Nago Future International City of Finance and IT. The development is taking place in three stages, and it is currently in the second stage (the growth stage). Work to encourage businesses to take root and expand is continuing, and projects from the infrastructure improvement, human resources development and the publication of information are coming together to form a comprehensive, synergistic policy system.

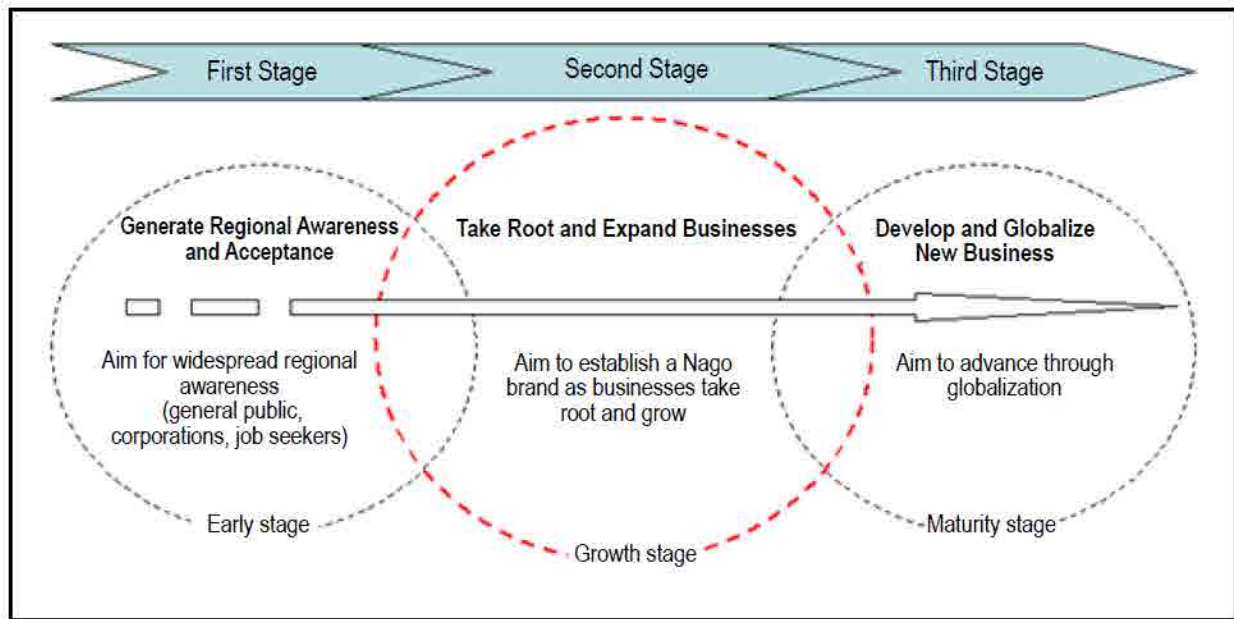


Figure 2.1.6-8 Expansion of Nago Future International City of Finance and IT

Source: *Nago City Office homepage*

Figure 2.1.6-9 is a vision for Nago future international city of finance and IT.



Figure 2.1.6-9 Vision for Nago Future International City of Finance and IT

Source: *Information and Communications Industry Business Establishment Guide, 2013-2014*

(5) Other support policies

Starting from 2 years ago, organizations such as JICA and JETRO began providing overseas expansion support programs for small and medium-sized enterprises. These programs include “overseas development assistance by small and medium-sized enterprises through the utilization of ODA (Ministry of Foreign Affairs/JICA)” and “individual support services provided by experts for expansion into emerging countries (JETRO)”. These programs are functioning more and more effectively and ICT related medium-sized enterprises in Okinawa are making active use of these programs. With the valuable experience and know how they have developed through these programs, it is expected that they will continue to tackle the challenge of advancing into Pacific Ocean countries with similar environments.

2.1.7 Results from Okinawa Prefecture ICT Industries

The “Okinawa ICT Industry Promotion Plan” was carried out in three phases over 10 years from 2002 to 2011. Plans from three major fields and six policy fields were put into action over each period. The project cost during Phase 1 was 14.92 billion yen, 10.27 billion yen during Phase 2 and 17.13 billion yen during Phase 3. Table 2.1.7-1 is a breakdown of project costs for each of the six policy fields during each phase.

Table 2.1.7-1 Project Costs for Each Phase and Policy Field

Unit: 1 million yen

Policy Field	Phase 1 2002-2004	Phase 2 2005-2007	Phase 3 2008-2011	Total
	Total	Total	Total	
Facility improvement	10,060	6,322	11,550	27,939
Human resources development	827	1,161	2,229	4,217
Telecommunications cost reduction	1,135	1,296	1,235	3,666
Software development support	278	1,174	1,839	3,291
Content creation support	1,760	144	61	1,965
Promotion Activities	859	176	217	1,252
Total	14,919	10,273	17,131	42,323

Source: *New Okinawa ICT Industry Promotion Plan (provisional name) Planning Survey Report, March 2012*

Figure 2.1.7-1 shows the actual totals and results (ICT industry growth produced in the three major fields and six policy fields) of project costs invested. Table 2.1.7-2 shows target and actual performance from each phase of the plan.

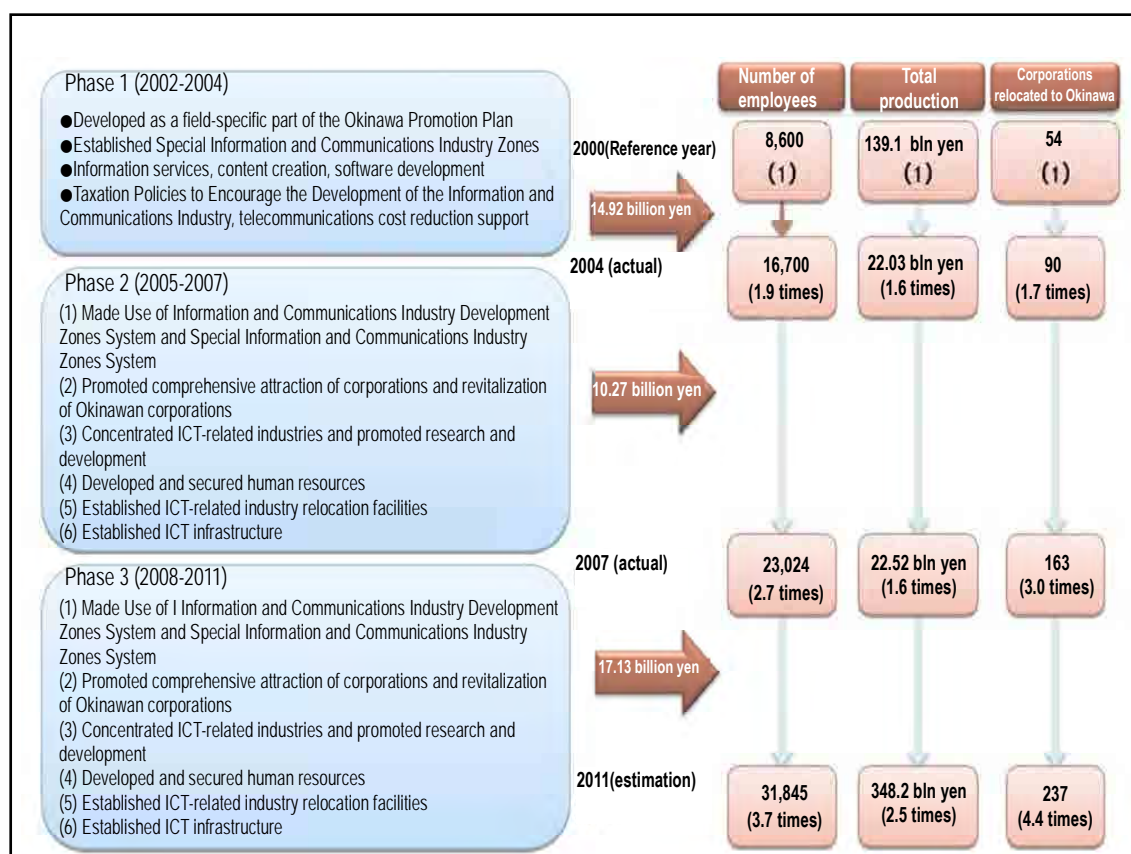


Figure 2.1.7-1 Results from Okinawa ICT Industry Promotion Plan, Phase 1 through Phase 3

Source: *New Okinawa Prefecture ICT Industry Promotion Plan (provisional name): Planning Survey, Report, March 2012*

Table 2.1.7-2 Target and actual performance for Each Phase

Category	Phase 1		Phase 2		Phase 3	
	Target	Actual	Target	Actual	Target	Actual
Number of employees	12,000	16,700	17,800	23,024	33,700	31,845
Total production (100 mil yen)	1,970	2,203	2,716	2,252	3,900	3,482
Corporations attracted		90		163		237

The actual number of employees far exceeded target values in Phases 1 and 2, by 40% and 30% respectively, but fell 5% short of the target value in Phase 3. Total production exceeded the target value by 12% in Phase 1 but fell 17% short in Phase 2 and 11% short in Phase 3.

The actual number of employees in 2011 (the end of Phase 3) was 31,845, which is 3.7 times the 8,600 employees in 2000, the reference year prior to the start of the plan. Total production in 2011 was 348.2 billion yen, 2.5 times the total production of 139.1 billion yen in 2000. The number of corporations that relocated to Okinawa was 237 by 2011, 4.4 times the 54 that had relocated by 2000. These are high-level results over the 12 years studied.

(Trends for the Second Half of the Plan)

The number of corporations that relocated to Okinawa Prefecture by 2012 thanks to support policies and attraction efforts was 263, and they employed 23,741 people. Table 2.1.7-3 shows trends in the numbers of ICT-related corporations relocating to Okinawa and their numbers of employees. The numbers differed depending on the line of business, but the total number of corporations and employees increased each year; the efforts have clearly produced results. “The 55th Statistical Yearbook of Okinawa Prefecture (2012 edition)” supports what is shown on Table 2.1.7-4. 2.9% of the entire workforce of all industries belonged to ICT-related industries in 2009, 3.2% in 2010 and 3.6% in 2011. Though the number of employees in the entire workforce decreased from 2010 to 2011, the percentage of employees in ICT-related industries increased over that same period.

Table 2.1.7-3 Numbers of ICT-Related Corporations and Employees Relocating to Okinawa

Category/Type	2008	2009	2010	2011	2012
Number of corporations (annual total)	194	202	216	237	263
Information services	50	53	57	45	61
Call centers	56	57	65	69	79
Content	18	20	20	21	22
Software development	61	62	62	71	79
Other	9	10	12	31	22
Number of employees (annual total)	16,317	18,075	20,212	21,758	23,741

Source: *Excerpt from Information and Communications Industry Business Establishment Guide, 2013-2014, Okinawa Prefecture*

Table 2.1.7-4 Workforce Comparison: All Industries vs ICT-Related Industries

Unit: 1,000 people

Category	2009	2010	2011
Total number of employees in all industries	617	622	619
Number of employees in ICT-related industries	18	20	22
Percentage	2.9%	3.2%	3.6%

(Results in Nago City)

Table 2.1.7-5 shows trends in ICT-related industries that relocated to Nago City and their numbers of employees. Nago City has a Future International City of Finance and IT and is designated as only Special Financial Operation Zone in the prefecture. Meanwhile, NDA, specified nonprofit corporation, was established to lead efforts to attract corporations to Okinawa and has partnered with the city to implement detailed policies to attract corporations. The number of corporations relocating to Nago City is not growing rapidly, but the number of employees is growing steadily. NDA personnel explain that this is due to the fact that, while incubation facilities are full to the brim which limits the number of corporations that can relocate to the city, they purposely attract corporations with the potential to expand their workforces. NDA expects to clear up the problem of full incubation facilities by building Mirai No.4 (to be completed in 2013) and other facilities within the Future International City of Finance and IT.

Table 2.1.7-5 Annual Total of ICT-Related Corporations and Employees Relocating to Nago

Category/Type	2008	2009	2010	2011	2012
Number of corporations	27	27	27	31	32
Number of employees	860	935	975	909	969

Source: *Excerpt from Business Location Guide, Nago City*

Column (5)

Unique Ways of Attracting Corporations to Nago City

At 90 minutes from the airport, Nago City is remote. Home to 60,000 people, one-fifth the population of Naha City, it cannot provide as large a workforce as other cities. Therefore, the city cannot go out and try to attract large corporations to relocate within its borders; it has to take a different approach.

To put it simply, Nago City tries to hang onto the corporations it attracts. NDA, the organization in charge of managing relocation facilities, communicates daily with corporations that have relocated to delicately sense the issues those corporations face. NDA goes the extra mile with its consulting services, introducing new policies, providing information gleaned from similar businesses, and even introducing business partners in an effort to help solve those corporations' problems. Nago City appears to be exceptional at holding onto the businesses it attracts. The city uses its strong ties with NDA to act as a big brother to these corporations.

2.1.8 Remaining Challenges and New Policies for the Development of Okinawa ICT Industries

(1) Challenges

According to the “New Okinawa ICT Industry Promotion Plan (provisional name) Planning Survey Report“(March 2012, New Okinawa ICT Industry Promotion Plan [provisional name] Planning Survey Collective), the result of the implementation of the “Okinawa ICT Industry Promotion Plan” has brought forth the outcome and the following new challenges. These challenges are shown together with the challenges for policy promotion ascertained through hearing surveys in Table 2.1.8-1

Table 2.1.8-1 ICT Industry Policy Challenges

Category	Challenges
Challenges with corporations relocating to Okinawa	<p>(1) Most corporations relocating to Okinawa from outside the prefecture cite the advantages of lower project costs (for example lower labor costs, younger workforce and cheaper office rent) as a decisive reason for moving. They say they must reduce costs to cope with declining business revenue.</p> <p>(2) Low on the list of reasons are the lower costs of living and other attractive benefits of the Okinawa lifestyle, the higher availability of flights, and the preferential treatment and other tax exemptions under the policy. We need to create new ways to attract corporations to Okinawa.</p>

	(3) Several issues have been raised including the securing of parking spaces at corporate buildings and facilities; securing public transportation systems and other infrastructure issues; dealing with issues in securing properties with the proper scale, facilities for operations, private offices and other facilities etc.. We need to think critically about how to build communities to promote the development of public transportation systems and private properties so that corporations will relocate to Okinawa.
Challenges with advancing corporations from Okinawa	(1) Few corporations have indicated increases in upper processing work, and the current situation is that they are getting subcontracted rather than receiving work from the position of outsourcer or prime contractor. (2) Few corporations have indicated progression in their ties to other industries within the prefecture, meaning it will be a challenge to raise standards and advance industries within the prefecture through ties with other industries.
Challenges with human resources	(1) As in the past, there are the issues of developing and securing technically qualified human resources and human resources with fundamental business skills. However, the industry is making a strong call to develop and secure producers who can come up with business ideas and bring them to life. (2) The industry needs management personnel who will actively push out into markets throughout the rest of Japan and the world to satisfy new market and technical demand. Also required is high-level management personnel who can practically manage its continuity.
Challenges with policy promotion	(1) Not many corporations are taking advantage of preferential tax scaling, and some have said that information on support measures and the procedure to take advantage of them are difficult to understand.

Table 2.1.8-2 shows the project cost and total production per employee for each phase of the plan. According to the table, the project cost per employee was a lofty 890,000 yen in Phase 1, but it was reduced to almost half, around 500,000 yen per employee in Phases 2 and 3. Though there was a high return on investment, the total production per employee stayed at around 10 million yen per employee throughout all three phases. The challenge is to become involved in fields that can produce higher total production values.

Table 2.1.8-2 Total Production and Project Cost per Employee during Each Phase

Item	Unit	Phase 1	Phase 2	Phase 3
Project cost	100 million yen	149.2	102.7	171.3
Total production	100 million yen	2,203	2,252	3,482
Number of employees	1 person	16,700	23,024	31,845
Total production per employee	10,000 yen	1,319	978	1,093
Project cost per employee	10,000 yen	89	45	54

Source: *Source: New Okinawa ICT Industry Promotion Plan (provisional name): Planning Survey, Report, March 2012*

The number of corporations, employees and total production figures in 2012 are also included in the report, and ICT industries are split up into call centers, information services, content creation,

software development, ICT infrastructure and other fields. Table 2.1.8-3 shows the comparison between corporations which have expanded into Okinawa and corporations from Okinawa in total number of firms, employees and production volume for each field.

Table 2.1.8-3 Total Production per Employee for Each Field

Field	Corporations Relocated to Okinawa			Corporations From Okinawa		
	Total Production (100 mil yen)	Employees (head)	Total Production (per capita) (10,000 yen)	Total Production (100 mil yen)	Employees (head)	Total Production (per capita) (10,000 yen)
Call centers	757	17,925	422	13	349	372
Information services	170	4,206	404	20	430	465
Content creation	18	420	429	71	782	908
Software development	592	2,610	2,268	415	3,789	1,095
ICT infrastructure	871	273	31,905	525	632	8,307
Other	30	429	699	0	0	0

Source: *Source: Calculated from New Okinawa ICT Industry Promotion Plan (provisional name): Planning Survey, Report, March 2012*

Content creation corporations already in Okinawa showed higher total production than those from outside Okinawa, but software development corporations from outside Okinawa boasted total production of 22.68 million yen, more than double that of Okinawan corporations (10.95 million yen). In ICT infrastructure, outside corporations had a total production of nearly 320 million yen compared to 83 million from Okinawan corporations. It is a quarter of production in outside corporations.

Surveys of ICT-related corporations conducted for the “New Okinawa Information and Communications Industry Promotion Plan (provisional name) Planning Survey Report” (March 2012) indicated a low level of preferential treatment in terms of tax exemptions under the policy. Our surveys of ICT-related corporations also revealed that the tax exemptions carry too many restrictions and are hard to take advantage of. A challenge is the gap between the nature of the policy and the real needs.

(2) New Policies

Efforts to develop new policies to overcome these issues are underway. This section focuses on various support systems from the Information and Communications Industry Business Establishment Guide, 2013-2014 published by Okinawa Prefecture.

1) Human Resources Development

(Policy Overview)

In the initial and middle stages of “The Okinawa ICT Industry Promotion Plan”, human resources development support was focused on developing personnel for call centers on the practical front. On the technical front, it sought to develop a large group of highly skilled ICT personnel, some of whom could also become instructors in ICT-related fields. Currently, however, the focus has shifted to developing BPO personnel on the practical front and, on the technical front, developing core ICT

industry personnel that they can take part in upper processing in the highly productive and profitable field of systems development as well as IT advanced professional human resources development courses. Table 2.1.8-4 shows human resources development support measures.

Table 2.1.8-4 Human Resources Development Support Measures

Support Measure	
BPO human resources development and securing program	
Overview	Promote employment with BPO corporations and strive to improve the employment situation in Okinawa Prefecture through public awareness and on-the-job training opportunities in the prefecture's BPO industry.
Prefectural Institution in Charge	Employment Policy Division, Department of Commerce, Industry & Labor
Administrative Organization	FROM Okinawa Initiative/ BPO Human Resources Development and Securing Project Consortium
IT advanced professional human resources development courses (iTAP)	
Overview	Develop core ICT personnel in industries inside Okinawa, who has sophistication and expertise.
Prefectural Institution in Charge	IT Industry Promotion Division, Department of Commerce, Industry & Labor
Administrative Organization	Information Industry Association of Okinawa/IT Advanced Professional (iTAP) Office
Okinawa Prefecture growth industries human resources development support program in growth industries	
Overview	Support the partial cost which is used to send employees to leading corporations outside Okinawa in order to make them learn advanced, specialized skills and techniques. Employees are hired by the corporations recently relocated to Okinawa, which create job opportunities, attract business to Okinawa and encourage new hires to stay in their jobs, and also, their workforces are added to in order to expand operations and create jobs.
Prefectural Institution in Charge	IT Industry Promotion Division, Department of Commerce, Industry & Labor
Administrative Organization	Industry Promotion Section, Okinawa Industry Promotion Public Corporation

Source: *Excerpt from "Information and Communications Industry Business Establishment Guide, 2013-2014, Okinawa Prefecture"*

2) Promotion Activities

(Policy Overview)

i) Special Zones and Tax Breaks

There are three types of Information and Communications related zones and special zones in Okinawa Prefecture. Five municipalities contain Special Information and Communications Industry Zones, 24 municipalities contain Designated Information and Communications Industry Development Zones, and one city contains Special Financial Operation Zones. Each features Taxation Policies to Encourage the Development of the Information and Communications Industry, Tax Measures for Promoting Special Zone for Financial Business and other types of tax breaks. Table 2.1.8-5 is an overview of these zones and special zones.

Table 2.1.8-5 Overview of Special Zones/Zones Established in Okinawa Prefecture

Special Zone/Zone Name and Overview
Special Information and Communications Industry Zones
(Purpose) <ul style="list-style-type: none"> Preferential tax scaling will occur within the Special Information and Communications Industry Zones ICT-related industries to encourage concentration of specific ICT operations that will drive the concentration of ICT-related industries.
(Period) <ul style="list-style-type: none"> April 1, 2012 to March 31, 2017 (five years)
Designated Municipalities Naha City, Urasoe City, Uruma City, Nago City, Ginoza Village
Support measures available in special zone/zone Taxation Policies to Encourage the Development of the Information and Communications Industry <ul style="list-style-type: none"> The equivalent of 40% of corporate income from designated IC operations earned within special zones are deductible for the first 10 years of the corporation's existence (or, corporations may opt for investment tax credits in relation to ICT industry promotion zones)
Designated Information and Communications Industry Development Zones
(Purpose) <ul style="list-style-type: none"> To encourage the development of ICT-related industries, ICT corporations investing capital within the development zones are entitled to investment tax credits and either exemptions or preferential tax scaling of local taxes.
(Period) <ul style="list-style-type: none"> April 1, 2012 to March 31, 2017 (five years)
Designated Municipalities Naha City, Uruma City, Ginowan City, Miyakojima City, Ishigaki City, Urasoe City, Nago City, Itoman City, Okinawa City, Motobu Town, Yomitan Village, Kadena Town, Chatan Town, Kitanakagusuku Village, Nakagusuku Village, Nishihara Town, Tomigusuku Village, Yaese Town, Yonabaru Town, Haeburu Town, Ginoza Village, Nanjo City, Onna Village, Kin Town
Support measures available in special zone/zone Taxation Policies to Encourage the Development of the Information and Communications Industry <ul style="list-style-type: none"> National taxes (corporate taxes) Prefectural taxes (business taxes, real estate acquisition taxes) Reduced municipal taxes (property taxes, business office taxes) below a certain threshold
Special Financial Operation Zones
(Purpose) <ul style="list-style-type: none"> The special financial operation zone system was first created under the Okinawa Promotion and Development Special Treatment Act enacted in April 2002. Under this system, financial corporations operating within special zones can receive preferential treatment if they satisfy a certain number of requirements.
Designated Municipalities Nago City
Support measures available in special zone/zone Tax Measures for Promoting Special Zone for Financial Business <ul style="list-style-type: none"> National taxes (corporate taxes: income credits, investment tax credits) Prefecture taxes (business taxes, real estate acquisition taxes) Reduced municipal taxes (property taxes) below a certain threshold

Source: Excerpt from "Information and Communications Industry Business Establishment Guide, 2013-2014, Okinawa Prefecture"

ii) Subsidy Systems

An Information and Communications Cost reduction support program for which all of Okinawa Prefecture is eligible is being implemented as an ICT-related subsidy system. The subsidy seeks to keep the telecommunications costs paid by corporations below those of market rates paid in the Tokyo Metropolis through paying for part of the cost of telecommunications between Okinawa and mainland Japan. This enables corporations that relocate to Okinawa to pay essentially the same telecommunications costs as they would pay in Tokyo to do their work. It also closes the geographical gap between Okinawan corporations with ties to ICT industries and mainland Japan and enables them to compete under the same conditions. The heart of this policy is the effort to promote the relocation of corporations to Okinawa, increase employment opportunities, and promote and revitalize Okinawan industries.

A regional employment development subsidy (subsidies to promote the employment of young Okinawans, subsidies to develop regional employment opportunities) has been prepared, and, like the other subsidies, all of Okinawa is eligible.

iii) Financing System

There is a financing system for small and medium-sized enterprises, and all industries are eligible. Naha City, Ginowan City, Okinawa City, Uruma City, Kadena Town, Urasoe City and Itoman City have each established and currently implement subsidy systems.

2.1.9 Hierarchical Structure of ICT Industries

(1) Hierarchical Structure of ICT Industries

Generally speaking, ICT industries can be understood in a bottom-to-top layered structure as shown in Figure 2.1.9-1. The bottom is the “Infrastructure Layer”, which consists of the submarine cables and other basic infrastructure and industries that operate these infrastructures. The second is the “Direct-Use Layer”, which consists of industries that directly use ICT infrastructure facilities. The third is the “Service Layer”, which consists of industries that use the first two layers to provide various services based on ICT. The fourth is the “Application layer”, which consists of industries that use the three previous layers and ICT to provide applications. Finally, the Human Resources Development layer provides personnel fit for jobs across all layers.

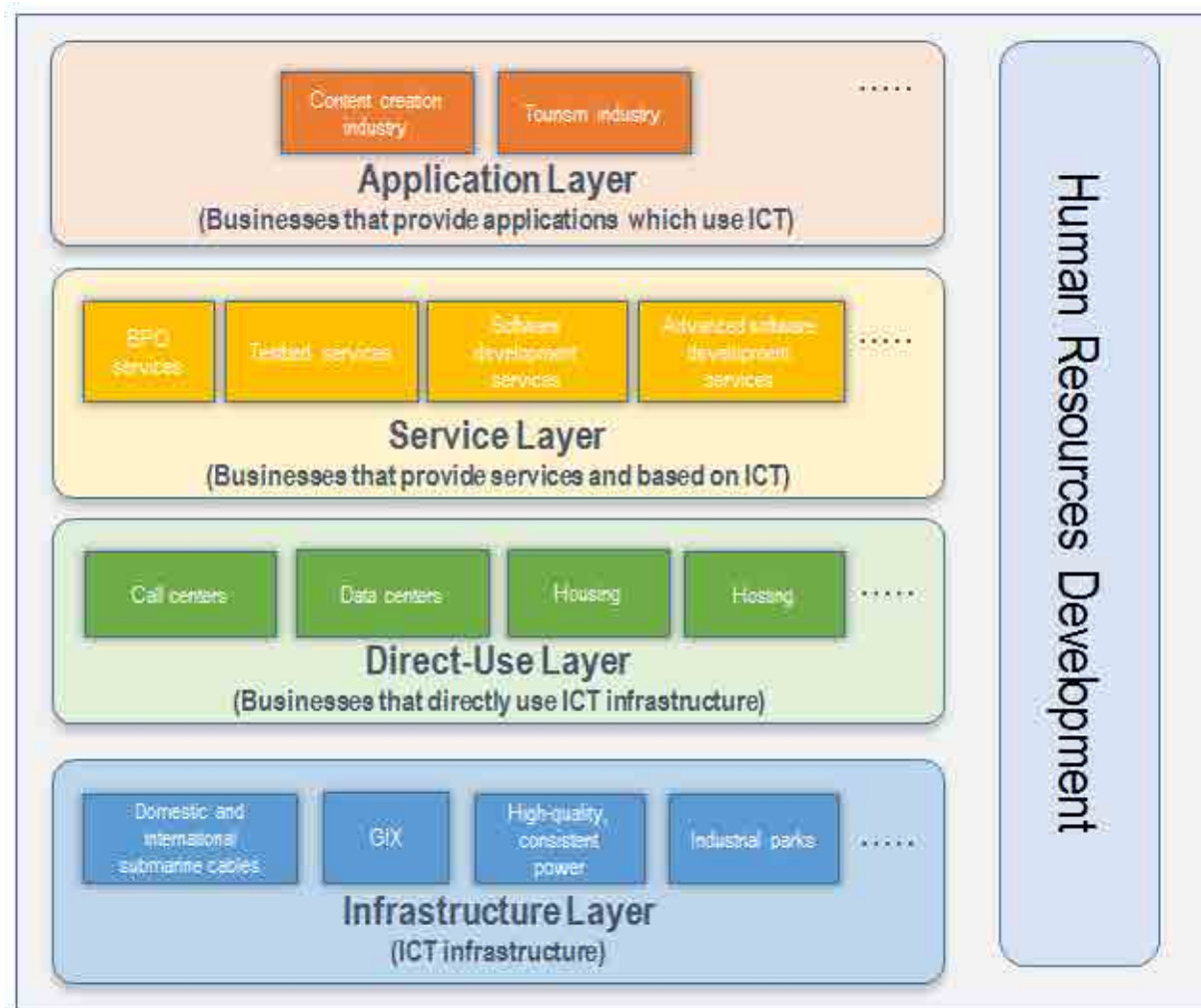


Figure 2.1.9-1 Hierarchical Structure of a Typical ICT Industry

In general, and along with the passage of time, the ICT industry expands upward from the Infrastructure Layer, the bottom, up through to the Direct-Use Layer, Service Layer and Application Layer. Expansion happens within Layer, too, as in the case of the Direct-Use Layer beginning from housing and hosting, data centers and moving toward cloud data centers, becoming virtualized and more strongly integrated with networks, and finally combining with Services. In other words, development and expansion in terms of time moves from the lower layers toward the upper, and, within layers, from the categories on the left toward those on the right, becoming more technically advanced. Categorizing ICT industries into layers and organizing and analyzing them in this way allows us to see how they are progressing and have the directions in which their development and expansion will move in the near future.

(2) Hierarchical Structure of ICT Industries in Okinawa Prefecture

In Table 2.1.9-1, relevant organizations, corporations and educational institutions that we visited during Phase 1 field surveys in Okinawa Prefecture have been placed over layers.

In Table 2.1.9-2, we have placed corporations we surveyed during the Phase 1 field surveys

(Okinawa) into layers reflecting the passage of time. The shaded green areas on the table represent corporations located in Nago City's Future International City of Finance and IT. The shaded green area in the Application Layer is for corporations in the Nago City Multimedia Building (in use since 1999), the shaded green in the Infrastructure Layer is for corporations in the Nago City Mirai No. 2 (2004). The brown shaded area represents corporations located in Okinawa IT Shinryo Park (in use since 2009) in Uruma City.

On the figure, the **E** shows the year the company was established, and the **A** shows the time that company ventured into Okinawa. Companies founded prior to 1993 feature the **O** in 1993, and the years they were established are listed to the left of the figure. The sample size is small, but some tendencies can be noted. The Nago City Multimedia Building is an incubation facility that has been in use longer than the others, since 1999, but a cluster of corporations in the Application Layer which use ICT began to form there in the middle stages of the Okinawa ICT Industry Promotion Plan. Another interesting trend is the concentration of groups of corporations in Service Layer which is based on ICT in the relatively new Okinawa IT Shinryo Park. Again, the sample size is small, but there is a visible trend in which attracted corporations have been expanded from Infrastructure and Direct-Use Layers to Service and Application Layers.

It is worth noting that a project for the cloud data center slated to open in 2014 has begun. As a related project, the project to promote the formation of a cloud hub began in 2012, and is composed of an Okinawa-style cloud infrastructure building project, a cloud shared infrastructure system building support project and a groundbreaking models development support project like cloud services. The project will build a new cloud data center in Kanekadan, Uruma City and build large cloud data centers that connect with other major data centers in Okinawa Prefecture through the telecommunications infrastructure. As technology develops, data centers are expanding into new territory, and data centers that initially stood alone are expanding into the next phase of data centers.

Call centers, on the other hand, are already recognized as ICT industries within the prefecture, and call center corporations that have expanded to Nago City Mirai No. 2 and Uruma City have focused on the relative ease in securing a workforce and lowering fixed costs, and this can be viewed as a progression to the next phase.

Plotting these two trends on a matrix shows two developments in attracting ICT industries to Okinawa. The first is further development and expansion into upper layers, and the second is horizontal expansion on the lower layer in which technological innovation breeds higher functionality.

Table 2.1.9-1 Layer Classifications of Okinawa Prefecture Survey Participants

Application (IT Users)		Education Institutions
Translation services for the hearing impaired	Iseec Japan Ltd.	
EC for products produced in Okinawa	EC Division, Droog Inc.	
Graphic novel content creation for mobile phones/smartphones	Tida-Works Inc.	
Marketing	Mediaflag Okinawa Inc.	
Service (IT Source)		
Education	Fujitsu Learning Media Okinawa Ltd.	
Evaluation/research	Okinawa Open Laboratory	
CAD design	Okinawa Design Center, Unitec Inc.	
Advanced software development	Okinawa Software Center Inc.	
Advanced software development	OCC Inc.	
FX support	Okinawa Branch, Gaitame.com Co., Ltd.	
BPO	Okinawa Center, HR One Corp.	
Direct Use		
Call center Data center	Qualysite Technologies Inc.	
Call center	Uruma Contact Center in Okinawa, Aicam Inc.	
Data center	First Riding Technology Inc.	
Data center	TSYS Okinawa Data Center	
Infrastructure		
Network operation	Okinawa Cross Head Co., Ltd.	
Network operation	GIX Okinawa Co., Ltd	
Special zone	Okinawa IT Shinryo Park	
Government Agencies		
<ul style="list-style-type: none"> • Okinawa Office of Telecommunications, MIC, Information and Communication Division • Regional Economy Division, Economy, Trade and Industry Department Okinawa General Bureau, Government of Japan • Information Policy Division, Department of Planning/ IT Industry Promotion Division, Department of Commerce, Industry & Labor, Okinawa Prefectural Government • Information Industry Associations of Okinawa • Commerce and Industry Section of Civil Affairs Division, Urasoe City Government • Industrial Site and Employment Promotion Division, Department of Economy, Uruma City • Nago Development Authority (NDA) 		

Table 2.1.9-2 Hierarchical Structure of ICT Industries in Okinawa Prefecture

	199X								200X									201X			
	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
Promotion Plan																					
Okinawa Prefecture ICT Industry Promotion Plan																					
Smart Hub Concept Action Plan I																					
Application Layer (ICT Users)																					
Marketing																					
Mediaflag Okinawa Inc.																					
Translation services for the hearing impaired																					
Isec Japan Ltd.																					
Graphic novel content creation for mobile																					
Tida-Works Inc.																					
EC for products produced in Okinawa																					
EC Division, Droog Inc.																					
Service Layer (ICT Source)																					
Evaluation/research																					
Okinawa Open Laboratory																					
BPO																					
Okinawa Center, HR One Corp.																					
Education (e-learning)																					
Fujitsu Learning Media Okinawa Ltd.																					
CAD design																					
Okinawa Design Center, Unitec																					
O:1985																					
Advanced software development																					
Okinawa Software Center Inc.																					
Advanced software development																					
OCC Inc.																					
O:1966																					
FX support																					
Okinawa Branch, Gaitame.com																					
Direct Use Layer																					
Call center																					
Contact Center in Okinawa, Aicam Inc.																					
Call center/data center																					
Qualysite Technologies Inc.																					
Data center																					
TSYS Okinawa Data Center																					
Data center																					
First Riding Technology Inc.																					
Infrastructure Layer																					
Network operation																					
GIX Okinawa Co., Ltd																					
Special zone																					
Okinawa IT Shinryo Park																					
Network operation																					
Okinawa Cross Head																					
O:1992																					

(Note) E = Year of Establishment, A = Year of Advancing into parks etc. in Okinawa. However, companies that were established before 1993 will be denoted by a O in the 1993 column with their year of establishment written to the left of this.

2.2 Collection Survey in Fiji

2.2.1 Outline of Survey

Secondary Surveys was conducted in Fiji from October 28, 2013 to November 1, 2013 and from November 11–29, 2013 following the first domestic survey in Okinawa. The Survey sought to gather information through means such as interviews with relevant agencies in Fiji (e.g. the government, private corporations in the sector and other aid agencies) and through collecting related documents.

Table 2.2.1-1 shows the information we gathered and verified from agencies we interviewed and visited.

Table 2.2.1-1 Visit / information gathering destinations, survey items and information collected in Fiji

Visit and information gathering destinations in Fiji	Survey Items	Specific Examples of Information Gathered
SPC, USP	a. Strategies, organizations (SPC, USP) and budget related to the ICT sector in the Oceania region	<ul style="list-style-type: none"> • USP Strategic Plan 2013-2018 • ICT Center Project Plans • The current status of ICT personnel training and future development • The current status of Statham IT Park and future development
PIFS	b. Strategies, organizations (PIFS) and budget of the information and communications sector in the Oceania region	<ul style="list-style-type: none"> • ICT information on the Pacific Plan Review 2013 • Hearing on the Review of Pacific Regional Digital Strategy
Ministry of Industry and Trade Investment Fiji Department of Communications Telecommunications Authority of Fiji PITA ICT Association PiRRC USP PacCERT ATH FINTEL TFL Vodafone Digicel Kidanet Connect ITC-DC Mindpearl ANZ Software Factory Standss	c. Socioeconomic trends (e.g. population, industry)	<ul style="list-style-type: none"> • Population/GNI/GDP growth rate/ratio of overseas assistance/primary industries, etc.
	d. Position within the ICT industry	<ul style="list-style-type: none"> • Priority policies and regulation easing strategies (comparison with other industries)
	e. Policies, organizations and budget related to the ICT industry	<ul style="list-style-type: none"> • Industry promotion strategies and system (e.g. special zones /parks) • Telecommunications policies • Progress of e-government, etc.
	f. The maintenance status of the ICT infrastructure	<ul style="list-style-type: none"> • Primary trunk network (existing network/broadband development plan) • Access network (sound/Internet) • Status of the certification system for ICT devices, and future development (introduction of Testbed)
	g. Status and issues of the ICT industry	<ul style="list-style-type: none"> • Fixed-telephone, cell phone and Internet diffusion rate and status of the competition • Status of the introduction of

Data Collection Survey on Okinawa-type Vitalization of Information and
Telecommunication Industry in the Pacific Region

Visit and information gathering destinations in Fiji	Survey Items	Specific Examples of Information Gathered
Datec Go2Solutions Greymouse		<ul style="list-style-type: none"> universal access • Status of call-center projects and future expansion • Status of data-center projects and future expansion • Status of software development projects and future expansion • Status of the contents industry and future expansion
	h. The current situation of ICT personnel training and future expansion (additional)	• Needs at the nationwide level and of industry
ADB AusAID	i. Aid from other donors within the ICT industry	• Plan to maintain submarine optical cables, etc.

The list of visit destinations is shown in Table 2.2.1-2, and the layer classifications of the survey destinations in Fiji are shown in Table 2.2.1-3. Additionally, the schedule for surveys performed at these destinations is provided at the end of the report (schedule 2).

Table 2.2.1-2 List of Survey Destinations in Fiji

No.	Layer	Visit Destinations / Access	Summary
F-1	Government Agency	Ministry of Industry and Trade 9 Goodenough Street, Naibati House, Suva TEL:679-330-5411 www.mit.gov.fj	Fiji's trade and commerce, attracting corporations and investment
F-2	Government Agency	Investment Fiji 6 th Floor, Civic Tower, Victoria Parade, Suva TEL:679-331-5988 www.investmentfiji.org.fj	Fiji's trade and commerce, attracting corporations and investment
F-3	Government Agency	Department of Communications 3 rd Floor, Suvavou House, Suva TEL:679-330-8600 www.info.gov.fj/Comm.htm	Fiji's ICT strategies
F-4	Government Agency	Telecommunications Authority of Fiji (TAF) 76 Gordon Street, Suva TEL:679-936-1609 www.taf.org.fj	ICT-related regulation authority
F-5	Public Office	Pacific Computer Emergency Response Team (PacCERT) Level 4, Building A, Japan Pacific ICT Centre, USP, Laucala Campus, Suva TEL:679-323-1971 www.PacCERT.org	Oceanian organization that handles computer security
F-6	Public Office	PITA Level 4, Building A, Japan Pacific ICT Centre, USP, Laucala Campus, Suva TEL:679-3311-638 www.pita.com.fj	Pacific Islands Telecommunications Association
F-7	Public Office	Pacific ICT Regulatory Resource Center (PiRRC) Level 4, Japan –Pacific ICT Center, USP, Laucala Campus, Suva TEL:679-323-1941 www.pirrc.org	Pacific ICT Regulatory Resource Center
F-8	Public Office	Asian Development Bank (ADB) Level 5 Ra Mrama Building, 91 Gordon Street, Suva TEL:679-331-8101 www.adb.org/spsa	Asian Development Bank

Data Collection Survey on Okinawa-type Vitalization of Information and
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No.	Layer	Visit Destinations / Access	Summary
F-9	Public Office	Australian AID (AusAID) P.O.Box 214, Suva TEL:679-338-8275 http://aid.dfat.gov.au	Australian Development Assistance Agency
F-10	HR Development	The University Of The South Pacific (USP) (DVC, FSTE, ITS, ICTC) Laulala Campus, Suva TEL:679-323-2269 www.uspac.fj	Main campus of the higher education institution made up of 12 Pacific Island Nations
F-11	Infrastructure	Amalgamated Telecom Holdings Limited (ATH) Level 2, Harbour Front, Rodwell Road, Suva TEL:679-330-8700 www.ath.com.fj	Telecommunications holdings company
F-12	Infrastructure	Fiji International Telecommunications Limited (FINTEL) Mercury House, 158 Victoria Parade, Suva TEL:679-330-0065 http://www.fintel.com.fj	International communications and data communication
F-13	Infrastructure	Telecom Fiji Limited (TFL) Ganilau House, Suva TEL:679-321-0461 www.tfl.com.fj	Landlines
F-14	Infrastructure	Vodafone Fiji Limited 168 Princes Road, Tamavua, Suva TEL:679-331-2000 www.vodafone.com.fj	Cell phone and Internet service
F-15	Infrastructure	Digicel (Fiji) Limited Kadavu House, 414 Victoria Parade, Suva TEL:679-331-0200 http://www.digicelfiji.com	Cell phones
F-16	Infrastructure	Connect Internet Service (Fiji) Limited 1 Carpenters St, Raiwai, Suva TEL:679-330-0100 www.connect.com.fj	Internet service
F-17	Direct-Use	Mindpearl Lot 6, Kalabu Tax Free Zone, Valelevu, Nashinu TEL:679-334-6202 www.mindpearl.com	Call center
F-18	Direct-Use	Information Technology & Computing Services (ITCS) Pacific Technologies Limited (PTL) Domain Road, Suva TEL:679-338-3750 www.itc.gov.fj	Data center
F-19	Service	Software Factory Bldg 201, USP ICT Park, Statham Campus, Vtuwaqa, Suva TEL:679-323-1103 www.softfactory.com.fj	Software development
F-20	Service	Standss (South Pacific) Limited TEL:679-330-4554 www.standss.com.fj	Software development
F-21	Service	Datec (Fiji) Limited 68 Gordon Street, Suva TEL:679-331-4411 www.datec.com.fj	Software development
F-22	Service	ANZ in Fiji banking segments Building 5, Kalabu Tax Free Zone, Daniva Road, Valelevu TEL:679-322-3802 www.anz.com/Fiji	Banking, back office operations
F-23	Service	Greymouse TEL:679-310-0130 www.greymousefiji.com	BPO
F-24	Service	Go2Solutions www.go2sol.com	BPO

Table 2.2.1-3 Layer Classifications of Survey Destinations in Fiji

Layer	Category	Visit Destinations	
Application Layer (ICT User)	Financial ICT industry		
	Tourism industry		
	Contents industry		
Service Layer (ICT Source)	Education/training services		
	R&D, Testbed services		
	Design services		
	Advanced software development services		
	Software development services	Software Factory Datec	Standss
	BPO services	ANZ in Fiji banking segments	Greymouse
		Go2Solutions	
Direct-Use Layer	Call center	Mindpearl	
	Data center	ITCS/PTL	
	Housing		
	Hosting		
Infrastructure Layer	ISP	Connect	
	GIX, Carrier	Vodafone	Digicel
		ATH	FINTEL
		TFL	
	Submarine cables		
	Power		
Industrial park			
Government/Public Office		Ministry of Industry and Trade	Department of Communications
		Investment Fiji	TAF
		ADB	AusAID
HR Development		USP(DVC, FSTS, ICTC)	
Other		PITA	PiRRC
		USP(ITS)	USP(PacCERT)

2.2.2 Socioeconomic Trends

(1) Population

According to *World Population Prospects, The 2012 Revision* issued by the United Nations in 2013, the population of Fiji is about 881,000 people. Table 2.2.2-1 shows the latest estimates of the population.

Table 2.2.2-1 Fiji Population

Item	Data (thousands of people)
Total	881
Males	449
Females	432

Source: *World Population Prospects: The 2012 Revision* (United Nations)

Moreover, when comparing the ratio different generations occupy in the entire population, as shown in Table 2.2.2-2, people aged 15 to 59 make up 62.5%.

Table 2.2.2-2 Fiji Population by Generation (2013)

Age Range	Percentage
0–14	28.9%
15–59	62.5%
60 and older	8.7%
80 and older	0.6%

Source: *World Population Prospects: The 2012 Revision* (United Nations)

(2) Location

Figure 2.2.2-1 shows the location of Fiji.



Source: *Fiji Film Home Page*

Figure 2.2.2-1 Location of Fiji

Fiji is located east of Australia and north of New Zealand. The capital of Suva is located at 18°10'S, 178°27'E. Fiji's two largest islands are Viti Levu (10,429 km²) and Vanua Levu (5,556 km²), and its total of 330 islands have a land area of 18,720 km² (Ministry of Foreign Affairs data).

Fiji is divided into four administrative divisions (Central, Western, Eastern and Northern), and each division is further divided into provinces. There are a total of 14 provinces.

(3) GDP

According to World Bank data, Fiji's 2012 GDP was 3,908 million USD (Japan's was 5,959,718 million USD), and its GDP per capita was 4,467.10 USD (Japan's was 46,720.36 USD).

(4) Primary Industries

According to the government of Fiji, sugar and textile products have long been Fiji's main exports, but the current top five exports are fish, water, clothing, timber and gold. Its tourism industry has grown in recent years, and the production value of the tourism industry in 2011 exceeded the total value of the top five exports.

2.2.3 General Industrial Policy and the Position within the ICT Industry

(1) ICT Policy in Fiji

In 2008, the government of Fiji issued Telecommunications Promulgation 2008. This promulgation strives to strengthen the telecommunications industry by enacting policies that move away from a monopoly and towards market liberalization. The telecommunications administration has established both policies and regulations toward that end. The Department of Communication is the agency in charge of telecommunications promulgation, and the Telecommunications Authority of Fiji (TAF) has been put in charge of regulatory functions.

ICT policy is covered in the Fiji National Policy Final Draft, which was released on August 30, 2012. TAF said in an interview that the policy is still under review and has not yet been enacted.

Fiji's National ICT Policy consists of the National ICT Policy Final Draft and the Strategic Action Plan for 2013–2015 Final Draft, a three-year action plan for the policy.

The National ICT Policy Final Draft puts forth seven key goals as shown on Table 2.2.3-1 below.

Table 2.2.3-1 Seven Key Goals from the National ICT Policy Final Draft

1. Provide a telecommunications environment that all citizens can afford and access.
2. Cultivate ICT personnel and expand opportunities for HR development through ICT
3. Improve economic growth and strive for sustainable development through ICT
4. Use ICT to provide better public services and governance
5. Reform policy and improve the legislative framework to create a regulated ICT environment
6. Create outsourcing opportunities and maintain supervisory functions over them to develop ICT industry capabilities that can contribute to the government and industry
7. Create opportunities for Fijians to exhibit their entrepreneurial spirit through e-commerce

Source: *Fiji National ICT Policy Final Draft, August 30, 2012*

The Strategic Action Plan for 2013–2015 Final Draft lays out two to eight action items for each key goal. The plan has a total of 40 action items.

(2) Universal Service

Section 48 of Telecommunications Promulgation 2008 sets forth the following services in an effort to achieve universal service:

- Telephone services that use fixed-telephones, mobile or other technologies
- Public telephone and shared phone services
- Internet services
- Other services specified by Cabinet ministers under proposals from administrative bureaus

Source: *Telecommunications Promulgation 2008*

The promulgation guarantees that users in designated areas will be able to use these services at fair, reasonable costs.

Section 49 of the promulgation defines the designation of areas, and TAF has announced the areas based on Section 49. There are 39 areas from nine provinces, but TAF said in an interview that, as of November 2013, efforts to bring universal services to 16 areas in five provinces had already begun.

Table 2.2.3-2 shows designated universal service areas and the areas in which efforts have already begun (marked in yellow).

Table 2.2.3-2 Designated Universal Service Areas

Province	Areas
BA	Bukuya, Nanoko, Draiba, Navala, Navai, Nadrau, Davota, Waya Island
Bua	Wainunu, Kubulau
Cakaudrove	Udu Pt, Cikobia Island, Tawake, Koroalau, Sagani, Natewa, Parts of Taveuni (Navakaweu and Salialevu)
Lau Group	Ono, Totoya, Nayau, Matuku, Tuvuca, Kabara, Namuka-i-lau
Macuata	Namuka, Dogotuki, Kia Island
Nadroga/Navosa	Keiyasi, Nalebaleba, Nadevu, Vtubalavu, Nawairabe
Naitasiri	Nabukaluka, Naivucini, Matainasau
Namosi	Namuamua, Saliadrau, Wainimakutu
Ra	Barotu, Nalawa

Source: Declaration of Universal Service Areas, Ministry of Communications (April 2013)

2.2.4 Organizations and Systems related to Development of the ICT Industry

Figure 2.2.4-1 shows Organizations and Systems related to Development of the ICT Industry in Fiji. The Department of Communication proposes telecommunications policy, the Telecommunications Authority of Fiji regulates telecommunications and broadcasts, Investment Fiji assists in investing and business attraction, and the Fiji Revenue & Customs Authority assists in tax and customs duty collection and business attraction.

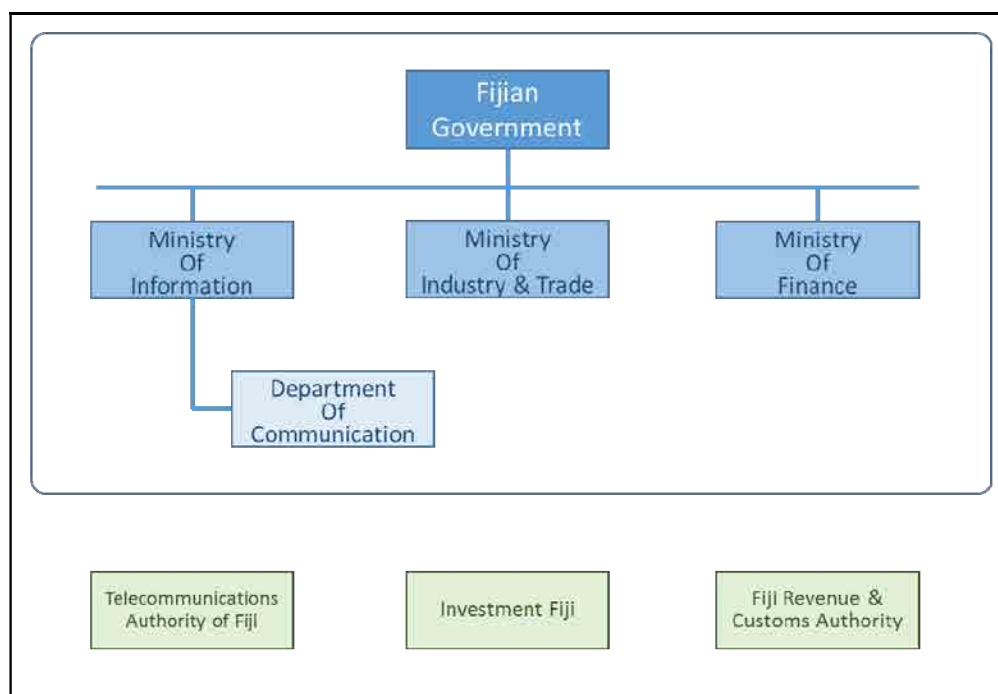


Figure 2.2.4-1 Organizations and Systems related to Development of the ICT Industry within the Fijian government

2.2.5 The maintenance status of the ICT infrastructure

(1) Telecommunications Liberalization in Fiji

Amalgamated Telecom Holdings Limited (ATH) is a public corporation established during public sector reform in 1998 and controls Telecom Fiji Limited (TFL), which began in domestic communications, Fiji International Telecommunications Limited (FINTEL), which began in international communications, and Vodafone, which is in the mobile sector. The liberalization of the telecommunications market in Fiji began with the government's 2007 deed of settlement with ATH and its three subsidiaries, and market competition began with the mobile telecommunications sector. Digicel Fiji Limited (Digicel) was approved for a license and commenced operations in October 2008.

FINTEL was established in 1989 and, in the 25-year period from its inception until 2014, it has enjoyed a monopoly as the international communications gateway operator. However, in June 2009, the government approved the use of telecommunications businesses other than FINTEL for providing international telecommunications and serving as international communications gateway providers for call services and data communication in order to promote further liberalization and more market competition. This resulted in a portion of international communication fees (which had been acting as an impediment) to drop to approximately one fifth of their previous level.

Table 2.2.5-1 shows the international communications networks held by telecommunications businesses and how they are being used.

Table 2.2.5-1 Proprietorship and Usage of
Telecommunications Businesses International Communications Networks

	International Communications Networks		Usage of Networks	
	Satellite Communications	Submarine Cable	Satellite Communications	Submarine Cable
FINTEL	○	○	• Self	• Self
TFL	○	○	• Self • FINTEL • Other providers	• Southern Cross*
Vodafone	×	×	• TFL • FINTEL • Other providers	• FINTEL
Digicel	○	×	• Self • FINTEL • Other providers	• FINTEL
Unwired	×	×	• FINTEL • Other providers	• FINTEL
(Note)	○ : Possesses × : Does not Possess		*TFL procures its submarine cable bandwidth directly from Southern Cross Cable Network (SCCN) and pays a separate submarine cable landing point fee to FINTEL.	

Source: *Liberalization of Telecommunication Sector In Fiji/Mr. Vinit Chand (TFL)*

(2) Domestic Carriers and ISPs

The number of domestic carriers and Internet service providers (ISPs) has steadily increased since the market was liberalized. Currently, there are four domestic carriers and five ISPs. Table 2.2.5-2 shows the major carriers and ISPs in Fiji.

Table 2.2.5-2 Major Carriers and ISPs

Type	Operator	Notes
Telecommunications business	FINTEL	Government-affiliated public corporation
	TFL	Government-affiliated public corporation
	Vodafone	Government-affiliated public corporation
	Digicel	Private corporation
	Inkk Mobile	Uses Vodafone for its network
ISP	Connect	TFL subsidiary
	Kidonet	FINTEL subsidiary
	Unwired	Private corporation

(3) Penetration

ADSL was introduced to Fiji in 2005. As a nation composed of many islands, domestic telecommunications consist of cable, terrestrial microwave and satellite communications.

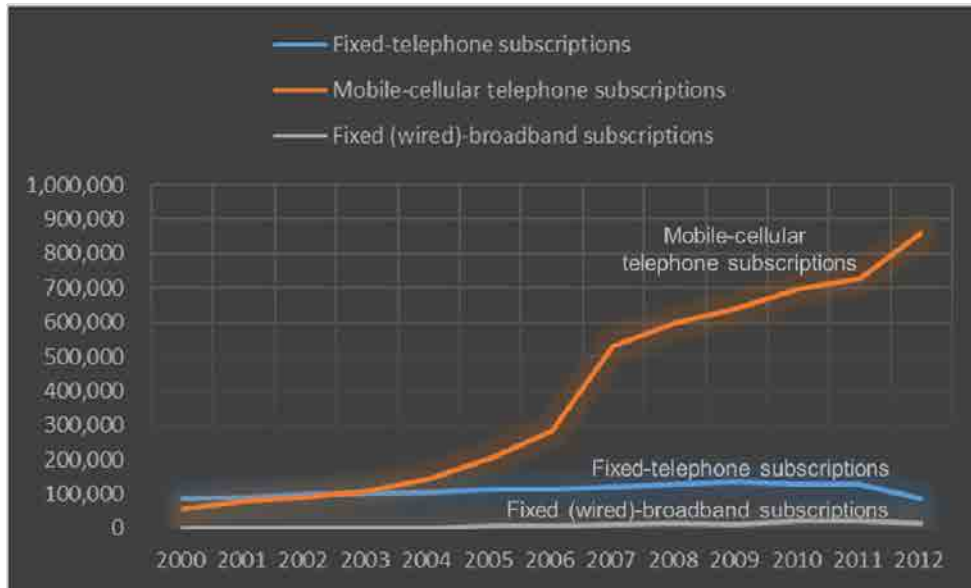
Table 2.2.5-3 shows trends in subscriptions to fixed-telephone and mobile-cellular services in Fiji, and Figure 2.2.5-1 is a graph of the data from Table 2.2.5-3. While the number of mobile subscribers has grown significantly since 2006, the number of fixed-telephone subscribers is heading down from its peak in 2009.

Table 2.2.5-3 Fixed-telephone and Mobile-Cellular Service Subscriptions

Category	2000	2001	2002	2003	2004	2005	2006
Fixed-telephone subscriptions	86,400	92,222	97,515	102,023	105,000	112,493	115,000
Mobile-cellular telephone subscriptions	55,057	80,933	89,900	109,882	142,190	205,000	284,661
Fixed (wired)-broadband subscriptions	0	0	0	0	0	7,000	8,500
Category	2007	2008	2009	2010	2011	2012	
Fixed-telephone subscriptions	121,845	129,100	136,782	129,845	129,845	88,417	
Mobile-cellular telephone subscriptions	530,048	600,000	640,000	697,920	727,000	858,809	
Fixed (wired)-broadband subscriptions	11,500	13,031	12,830	23,250	23,250	13,516	

Source: ICT Statistics/ITU

Fixed-telephone broadband subscriptions have steadily increased since the introduction of ADSL in 2005.

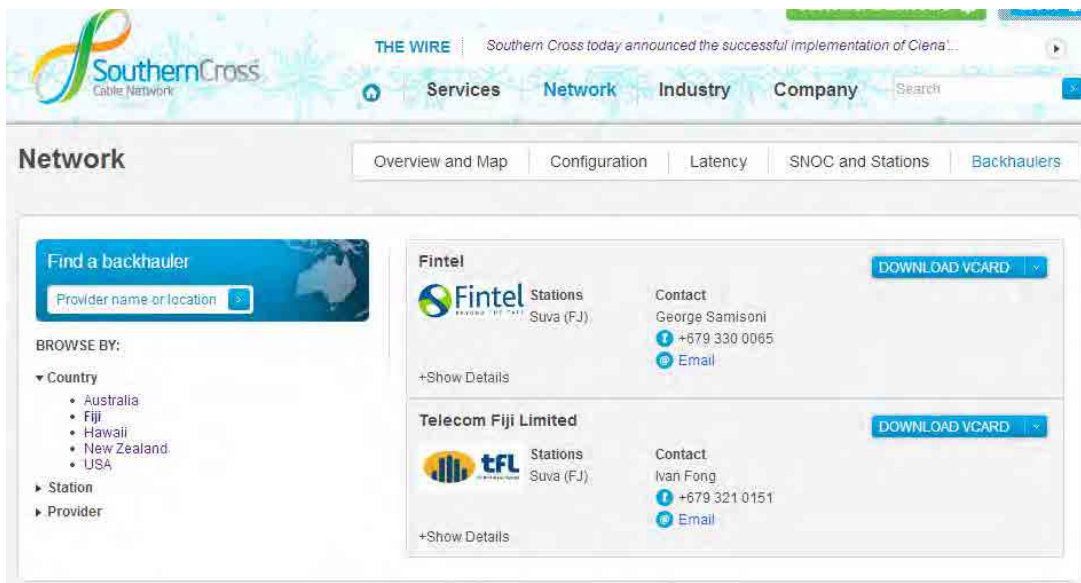


Source: ICT Statistics/ITU

Figure 2.2.5-1 Fixed-telephone and Mobile-Cellular Service Subscriptions

(4) Submarine Cable Maintenance Status

Fiji was connected to submarine cable Southern Cross Cable Network (SCCN) in 2001, which provided them with a high-capacity, high-quality connection to Australia, New Zealand and the United States. Before the market was liberalized, FINTEL was the sole backhauler (provider of connections between submarine cables and domestic access lines); since 2009, FINTEL and TFL are the backhaulers. Figure 2.2.5-2 shows SCCN backhaulers in Fiji.



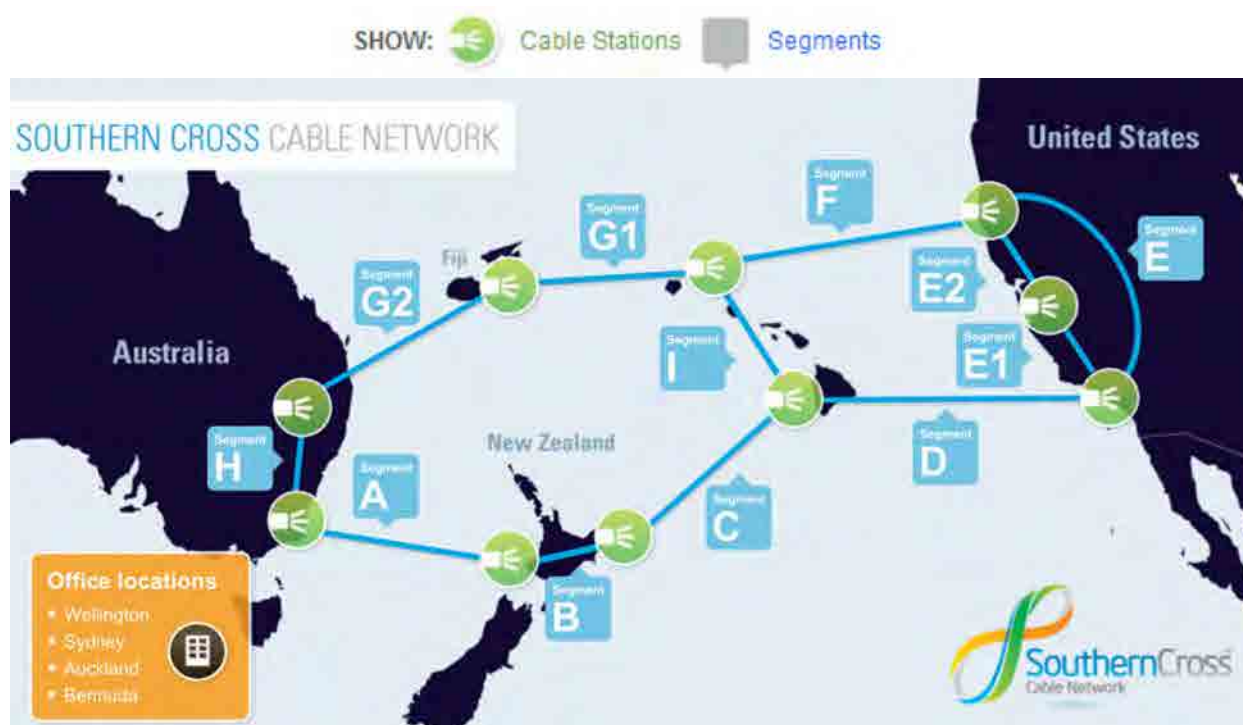
Source: Southern Cross Cable Network Home Page

Figure 2.2.5-2 SSCN Backhaulers in Fiji

As shown in Figure 2.2.5-3, SCCN is a ring network of submarine cables between Australia, New Zealand, Fiji, Hawaii and the United States. Its capacity was increased to 100 Gbps in June 2013.

SCCN has landing points in nine locations in five countries, and it has two landing points in all those countries except Fiji, which increases its reliability.

Fiji was the first Pacific Island Nation to connect to SCCN and could eventually serve as a hub. Through hearings with FINTEL, the sole backhaul provider which operates the landing point, it was found that Fiji, as the only country connected to SCCN that does not have two landing points, is not taking full advantage of the high reliability that the SCCN's loop configuration offers. FINTEL believes that adding another landing point is a challenge Fiji will have to face in order to become a hub for other Pacific Island Nations.



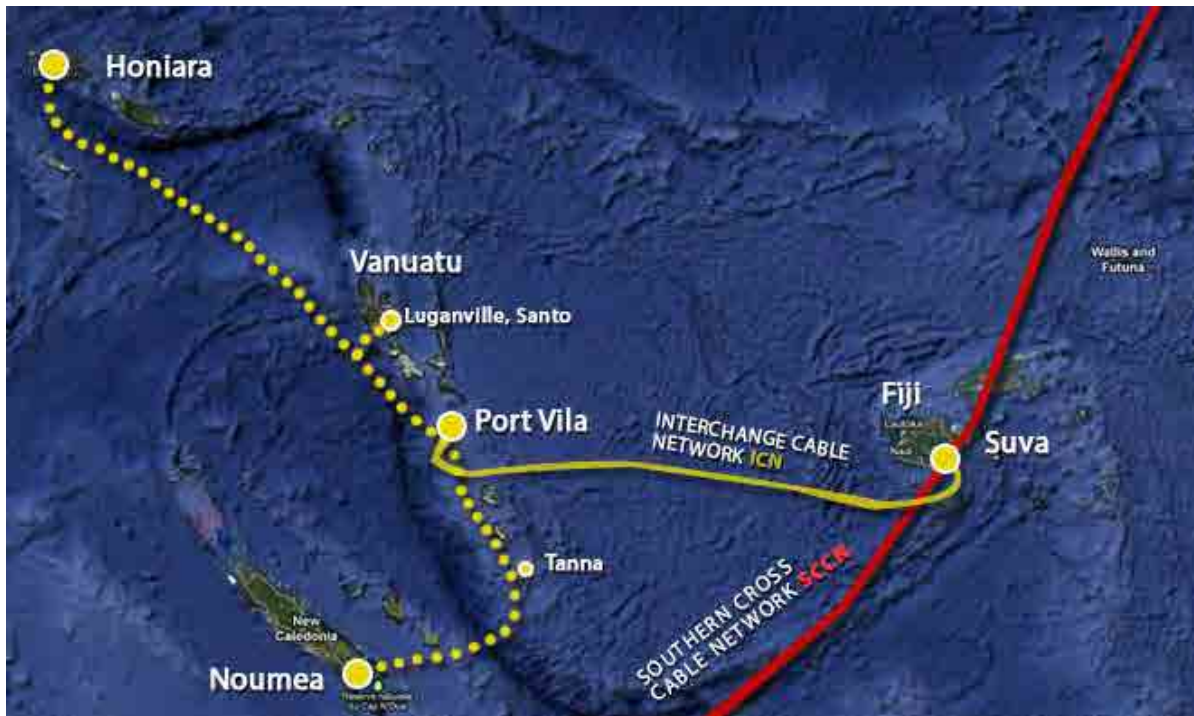
Source: Southern Cross Cable Network Home Page

Figure 2.2.5-3 SCCN Cable Loop

Additionally, the laying of a new submarine cable between Fiji and Vanuatu began on the Fiji side on November 10, 2013 and reached land at Port Vila in Vanuatu on November 25. The total length of the cable is 1,230 km. Plans call for the cable to begin service at 20 Gbps in January 2014 and also call for the laying of a second cable bound for Noumea, New Caledonia from Port Vila.

Figure 2.2.5-4 is a map of the cable between Fiji and Vanuatu.

The completion of this route to Vanuatu and the existing route to Tonga create a fork in the SCCN at Fiji; Fiji is already a hub. In addition, ADB said they are considering connecting to Samoa via submarine cable. Three routes from Fiji, Tonga and Hawaii have been proposed. The route from Hawaii is unlikely to win because it is the longest, so if the connection to SCCN comes from Fiji or Tonga, it will increase Fiji's importance as a communications hub.



Source: *Interchange Home Page*

Figure 2.2.5-4 Map of the Cable Between Fiji and Vanuatu

2.2.6 Programs and Implementation Status of ICT Industry Promotion

The Fijian government's trade and investment promotion agency, Investment Fiji, was established in 1980 based on Article 11 of the Economic Development Board Act. Investment Fiji provides industrial and business education that touches on the export of products and services and offers various services that encourage investment. In so doing, Investment Fiji strives to create employment opportunities, increase economic activity, acquire foreign currency for the benefit of the Fijian economy and help improve the standard of living and eradicate poverty in Fiji.

In *Sector Profile 2013*, Investment Fiji introduced the features and allure of each of the agriculture, fishery, forestry, energy, film, ICT and tourism industries in order to promote investment and attract businesses to Fiji. Below are some of the main reasons to invest in Fiji offered by Investment Fiji.

Reasons to Invest in Fiji
1. As a telecommunications and transport hub of the island nations in the South Pacific Ocean, Fiji is a center of commerce between island nations of the South Pacific, Asia, North America and Europe
2. A trade and incentive package that includes tariff concessions, investment allowances, tax breaks and tax free zones
3. Low corporate tax rates of 20% to 28%
4. A low corporate tax rate of 17% applies to overseas corporations that are established in or relocate their headquarters to Fiji
5. A low corporate tax rate of 18.5% applies to corporations that invest in at least 40% of a

- Fijian corporation and list that corporation on the South Pacific Stock Exchange (SPSE)
6. Convenience of a high-quality international telecommunications environment featuring optical fiber and satellite communication and other advanced telecommunications infrastructure
 7. Convenience of fully developed power, water, airport, seaport and other infrastructure
 8. Convenience of industrial plots and commercial buildings at reasonable cost
 9. Fully developed, integrated financial services provided by financial institutions
 10. Well educated workforce with a literacy rate of 93.7%
 11. Convenience of health and medical facilities including private hospitals and medical centers

Source: *Sector Profile 2013, Investment Fiji*

Investment Fiji defines seven operations that make up an ICT industry. Fiji possesses them all and strives to attract foreign businesses with its abundant, English-speaking workforce, low operating costs, prime location and ease of doing business due to its position as an Oceanian hub, availability of services, and the advantages of policy and legislation that benefits corporations and consumers.

ICT Operations

- Call center operations
- Mail management operations
- Data/receipt processing operations
- Hosting/housing operations
- Software development operations
- Audio visual operations
- Disaster recovery and management operations

Source: *Sector Profile 2013, Investment Fiji*

The government has designated USP Statham ICT Park and ATH Technology Park as industrial parks for ICT operations. USP Statham ICT Park is connected to the carrier, FINTEL's Fiji hub via optical lines through the USP hub (communication base station) while ATH Technology Park, which is adjacent to FINTEL, is connected to the international submarine cable Southern Cross Submarine Cable (SCDN). Both parks offer capacity for advanced international telecommunications.

In addition, the Kalabu ICT Economic Development Zone is located about 10 km northeast of the capital of Suva. It was established in 1997 through grant aid from the European Union, and it was designated a special tax free zone in 1991 and is called the Kalabu Tax Free Zone (TFZ). The zone features industrial and commercial plots and is equipped with communications, power, water and waste disposal infrastructure. The zone includes a management building and integrated services and will contribute to the welfare of everyone who works within it. Figure 2.2.6-1 is a view of the Kalabu TFZ.

Kalabu Special Tax Free Zone



Kalabu from the capital of Suva



Source: Google

Figure 2.2.6-1 Kalabu ICT Economic Development Zone

Table 2.2.6-1 shows incentives set up for the Kalabu ICT Economic Development Zone.

Table 2.2.6-1 Outline of Incentives for the Kalabu ICT Economic Development Zone

Designated area characteristics	<ul style="list-style-type: none"> • Organized into divisions of 5,000 square feet each • Connected to TFL (domestic carrier) Nasinu Switching Station through the fiber optic cable network loop
Tax break conditions and details	<ol style="list-style-type: none"> 1. ICT businesses established between January 1, 2007 and December 31, 2016 that operate in the Kalabu TFZ: <ul style="list-style-type: none"> • Income tax exemption: 10 years <p>Standards</p> <ul style="list-style-type: none"> • Employ at least 50 people and report income for at least six months of the year; and • Export 60% of total services generated by business operations 2. ICT businesses established outside the Kalabu TFZ that acquired business licenses between January 1, 2008 and December 31, 2010: <ul style="list-style-type: none"> • Income tax exemption: 10 years <p>Standards</p> <ul style="list-style-type: none"> • Employ at least 50 people and report income for at least six months of the year; and • Export 60% of total services generated by business operations 3. New businesses that acquired business licenses on or after January 1, 2009: <ul style="list-style-type: none"> • Income tax exemption: 13 years <p>Standards</p> <ul style="list-style-type: none"> • New business that applies for a business license and pays the annual 1,000 USD license fees • Investors who meet the following criteria: <ul style="list-style-type: none"> – If their business employs at least 50 people or reports income at least six months of the year; and – If 50% of the services their business provides is exported

Import tax break	<ul style="list-style-type: none"> ICT/BPO businesses approved for establishment on or after January 1, 2009 are exempt from import taxes on computers, computer parts and accessories, facilities, machinery and equipment and special-order furniture while they establish their businesses and while they are advancing their business
Additional tax breaks for the ICT industry	<ol style="list-style-type: none"> New ICT businesses and businesses that registered as ICT businesses between January 1, 2006 and December 31, 2012, and that employ at least 50 people, and that invested prior to December 31 are exempt from income taxes. Additional incentives to encourage the establishment of the following businesses: <ul style="list-style-type: none"> 80% income tax exemption for ICT businesses that employ at least 101 people 60% income tax exemption for ICT businesses that employ 60 to 100 people 40% income tax exemption for ICT businesses that employ 10 to 59 people ICT/BPO businesses approved for establishment on or after January 1, 2009 are exempt from import taxes on computers, computer parts and accessories, facilities, machinery and equipment and special-order furniture while they establish their businesses and while they are advancing their business

Source: *Sector Profile 2013, Investment Fiji*

In addition, the Revenue and Customs Authority led the effort to prepare Fiji Tax and Customs Incentives and introduced policies for tax breaks to encourage investment and attract businesses to Fiji. The hotel, audio visual, agriculture, ICT and manufacturing industries are eligible for these tax breaks, and additional tax free regions (TFR) have been established in the northern and eastern regions. Table 2.2.6-2 outlines the two TFRs.

Table 2.2.6-2 Tax Free Regions (TFR)

Northern Region

Eligible businesses	Newly established businesses that conduct trade, operations or manufacturing in designated TFRs
Tax free target regions	<ul style="list-style-type: none"> Vanua Levu Including Taveuni, Rabi, Kioa and other islands according to the government's administrative targets in the northern region. Rotuma, Kadavu, Levuka, Lomaiviti, Lau
Tax break details	1. The following tax exemptions apply to the incomes of approved new

	<p>businesses established between January 1, 2010 and December 31, 2014:</p> <ul style="list-style-type: none"> • Capital investment total between 250,000 to 1 million USD: 5 years • Capital investment total between 1 and 2 million USD: 7 years • Capital investment total greater than 2 million USD: 13 years <p>2. The following tax exemption applies to the incomes of approved new businesses established on or after January 1, 2015:</p> <ul style="list-style-type: none"> • Capital investment total greater than 2 million USD: 13 years
Import tax break	<ul style="list-style-type: none"> • Companies that establish businesses in TFRs are exempt from import taxes on raw materials, machinery and equipment (including parts and materials) related to establishing the businesses for a 12-month period beginning on the approval date
Other preferential treatment in TFRs	<ul style="list-style-type: none"> • An additional five-year income tax exemption applies to businesses approved for business licenses whose land owned within TFRs accounts for at least 25% of assets • An additional seven-year income tax exemption applies to businesses approved for business licenses whose land ownership is at least 25% Fijian.

Viti Levu Eastern Region (the region from Korovou to Tavua)

Eligible businesses	Business entities that start new agricultural or dairy operations in Korovou, Rakiraki or Tavua and who apply to the Ministry of Finance for the new business licenses.
Tax free target regions	<ul style="list-style-type: none"> • Viti Levu Eastern Region (Korovou, Rakiraki, Tavua)
Eligibility criteria	<ul style="list-style-type: none"> • Business entities that start new agricultural or dairy operations • Businesses with initial investment totals of at least 1 million USD in or after January 2013
Tax break details	<ol style="list-style-type: none"> 1. 13-year tax exemption on the income of new business in agricultural operations 2. 20-year tax exemption on the income of new business in dairy operations
Import tax break	<ul style="list-style-type: none"> • Companies that establish businesses in TFRs are exempt from import taxes on raw materials, machinery and equipment (including parts and materials) related to establishing the businesses for a 12-month period beginning on the approval date

Source: 2013 Incentives Brochure Fiji Tax and Customs Incentives, Fiji Revenue and Customs Authority

ICT industry tax breaks are being applied to provide new ICT-related businesses that operate under certain conditions with 13-year exemptions on business income. Table 2.2.6-3 is an outline of tax breaks for the ICT industry.

Table 2.2.6-3 Outline of Tax Breaks for the ICT Industry

Eligibility criteria and granting of tax exemptions	<ul style="list-style-type: none"> • New businesses that applied for business licenses, acquired them on or after January 1, 2009 and paid the 1,000 USD license fees • Investors who meet the following criteria <ul style="list-style-type: none"> -If their business employs at least 50 people or reports income at least six months of the year; and if 50% of the services their business provides is exported
Tax break details	<ul style="list-style-type: none"> • 13-year income tax exemption from the license date on new business income
Import tax break	<ul style="list-style-type: none"> • ICT/BPO businesses approved for establishment on or after January 1, 2009 are exempt from import taxes on computers, computer parts and accessories, facilities, machinery and equipment and special-order furniture while they establish their businesses and while they are advancing their business

Source: 2013 Incentives Brochure Fiji Tax and Customs Incentives, Fiji Revenue and Customs Authority

2.2.7 Results in the ICT Industry

The government's strategies for attracting ICT industry businesses appear to have yielded results in attracting businesses to the Kalabu ICT Economic Development Zone and to ICT-related industry parks. The strategies attracted traditional call center, BPO and software development businesses and created jobs and service exports as intended. In addition, some businesses in the ICT industry choose not to venture into the special tax zone set up by the government or ICT-related industry parks. Their choice not to locate themselves in that zone and those parks marks them as independent businesses. While small in scale, they are developing new, expertise-oriented call center and software operations.

Below are the results of strategies viewed from three aspects: Kalabu ICT Economic Development Zone business attraction, ICT-related industry park business attraction, and independent businesses in ICT-related industries.

(1) Kalabu ICT Economic Development Zone Business Attraction

Mindpearl, a company that operates call centers, and ANZ Pacific Operations, a company in the banking industry, have ventured into the Kalabu ICT Economic Development Zone as businesses involved in ICT.

Mindpearl operates call centers in Barcelona, Spain; Brisbane, Australia; Cape Town, South Africa; and Suva, Fiji. Mindpearl was established in 1999 when the call center for Swiss International Airlines became independent. Mindpearl ventured into Fiji for the low cost of labor, high-quality and diverse workforce, Fijian hospitality and tax breaks. The company holds Fijians in high regard for their advanced English skills. The nearly 500 employees split into three huge booths and provide call center services for airline companies.

The call centers are accessed mainly from outside Fiji, and they export their information services. The company has also produced results in terms of job creation.

Figure 2.2.7-1 is a view of Mindpearl.



Figure 2.2.7-1 View of Mindpearl

ANZ Pacific Operations functions as an Oceania region back office center for ANZ, a bank that has spread throughout the world. It set up a call center in Suva in 2002 and ventured into the Kalabu ICT Economic Development Zone as an Oceania region back office center in 2005. The company has around 270 employees, nearly all of whom are in charge of back office work. Most of the information they handle is data, and since the company is involved in banking, it named the flexibility of the communication band and the reliability of the power and other infrastructure as reasons for venturing into the Kalabu ICT Economic Development Zone. The company is also taking advantage of the tax breaks the special zone provides.

Figure 2.2.7-2 is a view of ANZ Pacific Operations.



Figure 2.2.7-2 View of ANZ Operations

Both companies provide services to countries other than Fiji and are ICT service export businesses that respond to foreign demand. Since they provide services overseas, a strong international telecommunications network is vital, and they are taking full advantage of the high-quality workforce and low operating costs offered in the zone. From the point of view of the Fijian government, the call center and back office operations are huge job creators and, since they are export-oriented ICT service providers, are contributors toward acquiring foreign currency, so these two businesses are examples of successful business attraction policy.

It is worth noting that, while eight companies have ventured into the 20 or so divisions in the Kalabu ICT Economic Development Zone, only two of them are in the ICT industry. Attracting more businesses in ICT-related industries is a pressing concern since the number is currently so small.

(2) ICT-Related Industry Park Business Attraction

USP Statham ICT Park is located next to the Laucala Campus, USP's main campus. Software Factory Ltd., Fern Software Ltd., Link Technology and The Digital Group Ltd. Fiji Office have moved to the park. Of these four software development companies, only Software Factory is a Fijian company. Fern Software Ltd. is a British company, Link Technology is Australian and The Digital Group Ltd. Fiji Office is from the United States; all three have opened branch offices in Fiji.

Figure 2.2.7-3 is a view of USP Statham ICT Park.

Many software development companies in Fiji focus on the domestic market in Fiji or in the Oceania region. Companies from Australia, New Zealand, the United States and other advanced nations are also operating in the Fiji and Oceania region markets. Those companies handle both package software development and consulting software development assigned based on user specifications; Fijian software development companies specialize in one or the other. There are also a fairly large number of small companies with narrower target product fields, such as accounting systems, banking service systems, payroll service systems and education systems.

Software development companies from outside Fiji have been attracted to USP Statham ICT Park as well as other industrial parks. This means that the government's ICT industry support strategies have produced results to some degree.



View of Statham ICT Park



USP and Statham ICT Park (Google)

Figure 2.2.7-3 View of USP Statham ICT Park

(3) Independent Businesses in ICT-Related Industries

Many ICT-related businesses are located and engage in operations outside of the Kalabu ICT Economic Development Zone and industrial parks. There are many software development companies in Fiji, but few of them are Fijian companies; most are branch offices of companies from Australia, New Zealand, the United States and other advanced nations.

Standss (South Pacific) Limited is one of a small number of Fijian package software developers and is located in central Suva. The company develops and sells package software and has successfully provided some of its products to thousands of users.

Many network-related BPO companies are starting up in the BPO field. Go2 Solutions provides customer service and handles support department BPO for foreign communications equipment manufacturers, and Greymouse operates user companies' networks and handles support services and other BPO. Neither has been in business long, and the average age of their employees is young, around 25.

One Fijian company has been doing business continually in ICT fields for nearly 30 years. Datec (Fiji) Ltd. was founded in 1985 as a mainframe agency and now provides comprehensive ICT services including software development, ICT-related equipment sales and network-related services.

It is particularly notable that, while there are many examples of foreign companies venturing into the Fiji and Oceania region markets, Fijian companies that provide new, high value added BPO services, though small, are being established.

2.2.8 Education and HR Development in Fiji

Fiji has two institutions of higher education: The University of the South Pacific (USP) and The Fiji National University, a school formed in 2010 by the merger of seven colleges.

In addition, vocational schools administered by the Ministry of Education are providing training and helping unemployed youths acquire technical skills.

Table 2.2.8-1 Higher Education Institutions in Fiji

No	Name	Note
1	The University of the South Pacific	
2	The Fiji National University	Formed by the merger of seven colleges in 2010 -1 College of Advanced Education -2 College of Agriculture (Koronivia campus) -3 Institute of Technology (Samabula campus, Suva) -4 Lautoka Teachers College (Lautoka campus) -5 School of Medicine (Suva) -6 School of Nursing (Suva) -7 Training and Productivity Authority
3	Vocational school	Administered by the Ministry of Education. Vocational training for unemployed youths.

Source: Commonwealth Education Online

2.2.9 Challenges for IC Industry Growth

As outlined in 2.2.6 Programs (including policy finance) and Implementation Status of ICT Industry Promotion, ICT industry growth in Fiji aims to acquire foreign currency by responding to foreign demand and to create and expand domestic employment opportunities. Numerical figures for those aims have not been publicized, but industrial parks and the TFZ have been established and tax breaks put into place as measures to achieve the targets.

Those policies have resulted in the attraction of companies (foreign and domestic) to industrial parks and the TFZ to some degree, which in turn has resulted in the creation and expansion of employment opportunities.

However, several challenges remain for ICT industry policies in Fiji. Below are challenges in terms of industrial parks and the TFZ, the domestic ICT industry and HR development.

1. Industrial parks and the TFZ

(1) Few companies have been attracted to industrial parks and the TFZ.

Only one BPO company and one call center company have ventured into the TFZ, and that has not resulted in a significant increase in employment opportunities. The government has named BPO and call center companies as targets for ICT industry business attraction but has not produced sufficient results. One reason companies venture into foreign countries is to increase profits, so they venture strategically into regions with low operating costs, an abundant and talented workforce and organized social infrastructure compared to global standards so that they can produce the best results.

The corporate tax rate in Fiji is 20%, which is relatively low compared to other countries in the Oceania region; the rate in Australia and Papua New Guinea is 30% and 28% in New Zealand. Fiji also offers a high-quality telecommunications environment with its submarine cable connection completed in 2001. Also, the market liberalization is driving down communications costs. FINTEL and TFL provide telecommunications services through the submarine cable, and the market is competitive despite FINTEL's monopoly over the submarine cable landing point, so the cost of international lines continues to decrease.

Work to educate foreign BPO and call center industries and raise their awareness about Fiji is critical toward encouraging them to invest and venture into Fiji.

2. The domestic ICT industry

(1) The ICT industry contains few Fijian companies

Many foreign companies in the software development, call center and BPO industries are venturing into Fiji, but Fijian companies are not growing in any of those industries. Fijian companies need to expand into foreign markets because the domestic market is small, so access to and business experience with foreign markets and customers is vital, but their capability toward those ends is lacking.

Go2 Solutions, a growing network-related BPO business, made an internal requirement to secure engineers with advanced technical skills and looked to major foreign telecommunications equipment companies to gain access to markets. Their experience in maintenance services has helped them win BPO business in network-related support and services from those companies.

Entrepreneurs need to be cultivated and a complete financing system for business loans needs to be created to encourage the founding of businesses in these new ICT service fields. It is critical to have access to international markets and to create an environment that encourages entrepreneurialism for highly skilled, core people in the domestic ICT industry.

(2) Telecommunications businesses see many young workers relocate overseas

Many young engineers build up around three years of experience in Fiji and then depart for Australia, New Zealand and beyond in search of better compensation. Nearly all telecommunications businesses in Fiji have observed this phenomenon.

Compensation is much more than a salary. The cost of living, the housing situation, and the environment in which workers are to live and enjoy life are also critical elements. Fiji needs to create an attractive environment to entice Fijians who have left to return and skilled foreigners to relocate.

3. HR development

(1) The small number of educational institutions

The software industry often bemoans the lack of highly skilled engineers. There is a mismatches of quality and quantity in university education.

In terms of quality, there are cases where engineers have only basic education and cases where the education system is supplying the industry with the qualified developers it needs, but not enough. The lack of quantity is caused in part by a problem with employment opportunities. Students in ICT disciplines flock toward network-related studies because of better employment opportunities; few of them choose software-related studies. Students need to go to Australia or New Zealand because there are few universities and technical schools in Fiji, and, again because of employment, they do not return to Fiji after graduating.

The education available at USP has also not yet met the industry's demands for personnel for ICT-related work. (Note: A new JICA Technical Cooperation Project with USP under way at the time of this survey will produce its first graduates from the two bachelor's degree programs in software development and networks in 2014)

(2) The small number of business opportunities

Since there are few ICT-related companies and few business opportunities with domestic companies, there are few opportunities for on-the-job training or to improve

technical skills and gain experience. The unattractive combination of high skills required, low wages and few employment opportunities affects students' choice of study at university, which is the first stage of their training as workers.

2.2.10 Hierarchical Structure of the ICT Industries

Table 2.2.10-1 shows the hierarchical structure of the ICT industries in Fiji with the Survey Team's Fijian survey destinations plotted in their layers in terms of time. On the figure, the **E** shows the year the company was established, and the **A** shows the time that company ventured into the TFZ. Companies founded prior to 1993 feature the **O** in 1993, and the years they were established are listed to the left of the figure.

One noteworthy milestone in Fiji's ICT industry is the connection to the Southern Cross Cable Network (SCCN), an international submarine cable, in 2001 and its commencement of operation. This significantly improved the communication quality and bandwidth between Fiji and Australia, New Zealand and the United States. Another noteworthy milestone is the liberalization of the telecommunications market from 2007 to 2009. Mobile telecommunications company Digicel Fiji Limited relocated and began operating in 2008, and Inkkmobile began offering services prior to Digicel Fiji Limited in 2007. Inkkmobile does not have its own network; it uses Vodafone's network. In addition, FINTEL's monopoly over the international gateway ended in 2009, and TFL joined FINTEL in providing international lines through the submarine cable, which lowered the cost of the international lines. The period marked the beginning of a competitive market with multiple providers of mobile and international services.

Looking at the layers with time points plotted based on these changes to the telecommunications environment in Fiji, it is clear that, among call centers (an ICT industry that uses telecommunications), international call center business Mindpearl ventured into Fiji under ideal conditions. Furthermore, companies beginning to provide BPO services were appearing prior to the liberalization period from 2007 to 2009, and they are expanding into new BPO operations focused on network services rather than back office services.

Companies in the software industry, another sector of the ICT industry, were establishing themselves even earlier than those in the call center and BPO industries since software companies do not have as many uses for telecommunications as do those in the call center and BPO industries. Software Factory and foreign-held Fern Software Limited (UK), Link Technology (Australia) and The Digital Group Ltd. Fiji Office (USA) are plotted in the figure and are doing business in USP Statham ICT Park.

In the 10 years following the 2001 completion of the international submarine cable, the Infrastructure Layer became liberalized and the market became competitive, and companies in the Direct-Use Layer and Service Layer (ICT Source) were established and began operating. At the current point in time, companies in the Application Layer (ICT User) have not yet appeared.

2.3 Collection Survey in Tonga

2.3.1 Outline of Survey

Secondary Surveys was conducted in Tonga from October 21–25, 2013 following the first domestic survey in Okinawa. The Survey sought to gather information through means such as interviews with relevant agencies in Tonga (e.g. the government, private corporations in the sector and other aid agencies) and through collecting related documents.

Table 2.3.1-1 shows the information we gathered and verified from agencies we interviewed and visited.

Table 2.3.1-1 Visit / information gathering destinations, survey items and information collected in Tonga

Visit and information gathering destinations in Tonga	Survey Items	Specific Examples of Information Gathered
Tonga • Ministry of Information and Communications • Ministry of Public Enterprises • USP • Tupou Tertiary Institute • Tonga Institute of Science/School of Tourism and Hospitality • TCC • Tonga Cable Ltd. • Digicel, etc. • ProComm Services	a. Socioeconomic trends (e.g. population, industry)	• Population/GNI/GDP growth rate/ratio of overseas assistance/primary industries, etc.
	b. Position within the ICT industry	• Priority policies and regulation easing strategies (comparison with other industries)
	c. Policies, organizations and budget related to the ICT industry	• Industry promotion strategies and system (e.g. special districts/parks) • Telecommunications policies • Progress of e-government, etc.
	d. The maintenance status of the ICT infrastructure, and details of submarine cable maintenance	• Primary trunk network (existing network/broadband development plan) • Access network (sound/Internet)
	e. Status and issues of the ICT industry	• Fixed-telephone, cell phone and Internet diffusion rate and status of the competition • Status of the introduction of universal access
	f. Development plan after maintaining the submarine cables and prospects	• Tonga Cable Project Plan, etc.
	g. Aid from other donors within the ICT industry	• Plan to maintain submarine optical cables, etc.
	h. The current status of ICT personnel training and future expansion (additional)	• Needs at the nationwide level and of industry

The list of visit destinations is shown in Table 2.3.1-2, and the layer classifications of the survey destinations in Tonga are shown in Table 2.3.1-3. Additionally, the schedule for surveys performed at these destinations is provided at the end of the report (schedule 3)..

Table 2.3.1-2 List of Survey Destinations in Tonga

No	Layer	Visit Destinations / Access	Summary
T-1	Government Agency	Ministry of Information and Communications P.O. Box 1380, Nuku'alofa TEL:676-28-170 www.tongaportal.gov.to	Tonga's ICT strategies
T-2	Government Agency	Ministry of Public Enterprises www.tongaportal.gov.to	Economic policy through Tongan public works
T-3	HR Development	USP (The University of the South Pacific) /IOE (Institute of Education) PO Box 278, Nuku'alofa TEL:676-878-1171 www.usp.ac.fj/ioe	Tonga campus of the University of the South Pacific
T-4	HR Development	Tupou Tertiary Institute Fasi-mo e-afi, Lavinia Rd., Nuku'alofa TEL:676-28-890 www.tti.to	Vocational training school
T-5	HR Development	Tonga Institute of Science/School of Tourism and Hospitality	Vocational training school
T-6	Infrastructure	Tonga Communications Corporation Salote Road, Fasi Moe Afi, Nuku'alofa TEL:676-20-012 www.tcc.to	Landline, data communication and Internet service
T-7	Infrastructure	Tonga Cable Limited Vuna Road, Sopu, P.O. Box 33, Nuku'alofa TEL:676-21-616 www.tongacable.to	Submarine cable infrastructure operator
T-8	Infrastructure	Digicel Tonga Limited Fatafehi Road, Nuku'alofa TEL:676-875-1855 www.digiceltonga.com	Cell phone service
T-9	Direct-Use	ProComm Services Level 1 Tungi Colonnade, Nuku'alofa TEL:676-20-600 www.procommtonga.com	Call center

Table 2.3.1-3 Layer Classifications of Survey Destinations in Tonga

Layer	Category	Visit Destinations	
Application Layer (ICT User)	Financial ICT industry		
	Tourism industry		
	Contents industry		
Service Layer (ICT Source)	Education/training services		
	R&D, Testbed services		
	Design services		
	Advanced software development services		
	Software development services		
	BPO services		
Direct-Use Layer	Call center	ProComm Services	
	Data center		
	Housing		
	Hosting		
Infrastructure Layer	ISP		
	GIX, Carrier	Tonga Communications Corporation	
	Submarine cables	Tonga Cable Limited	
	Power		
	Industrial park		
Government/Public Office		Ministry of Information and Communications	Ministry of Public Enterprises
HR Development		USP (The University of the South Pacific)/IOE (Institute of Education)	
		Tupou Tertiary Institute	
		Tonga Institute of Science/School of Tourism and Hospitality	
Other			

2.3.2 Socioeconomic Trends

(1) Population

According to *World Population Prospects, The 2012 Revision* issued by the United Nations in 2013, the population of Tonga is about 105,000 people. Table 2.3.2-1 shows the latest estimates of the population.

Table 2.3.2-1 Tonga Population

Item	Data (thousands of people)
Total	105
Males	53
Females	53

Source: *World Population Prospects; The 2012 Revision* (United Nations)

Moreover, when comparing the ratio different generations occupy in the entire population, as shown in Table 2.3.2-2, people aged 15 to 59 make up 54.8%.

Table 2.3.2-2 Tonga Population by Generation (2013)

Age Range	Percentage
0–14	37.2%
15–59	54.8%
60 and older	8.0%
80 and older	1.4%

Source: *World Population Prospects; The 2012 Revision* (United Nations)

(2) Location

Tonga is located in West Polynesia in the South Pacific and is made up of over 170 islands. It is made up of Tongatapu and 'Eua to the south, the Ha'apai Island group in the center, the Vava'u Island group to the north and the Niua Island group located about 200 km north of Vava'u. The total land area is 740 km².

Figure 2.3.2-1 shows the location of Tonga.



Source: Google

Figure 2.3.2-1 Location of Tonga

(3) GDP

According to World Bank data, Tonga's 2012 GDP was 472 million USD (Japan's was 5,959,718 million USD), and its GDP per capita was 4,493.72 USD (Japan's was 46,720.36 USD).

(4) Primary Industries

Tonga lacks mineral resources and is dependent on agriculture, fishing and money transferred from Tongans residing overseas. According to the Tonga Ministry of Agriculture, Forestry, Fisheries and Food, agriculture accounts for about 30% of the GDP while exports make up 70%. Additionally, about 40% of employed workers are employed in agriculture.

The main agricultural products for export are squash, vanilla, kava, root vegetables (yams, cassava and taro), taro leaves, sandalwood and handicrafts.

Tonga's tourism industry has grown in recent years.

2.3.3 General Industrial Policy and Position in the ICT Industry

At the opening address for the Pacific Islands Chapter of the Internet Society (PICISOC) Annual Conference in September 2013, Tongan Prime Minister Lord Tu'ivakano said, "Connecting to the submarine cable will make an essential contribution to economic prosperity which will enhance the quality of life of Tongan citizens. . . . the government's policy for the ICT sector continues to be driven by the expectation that increased accessibility and connectivity to the network will result in economic growth and social development." He also said in his address that the government was on the verge of determining a broadband investment strategy to increase global interest in investing and development in growing sectors in Tonga and that they had reduced Internet rates per gigabit by 60% and cut fees for dedicated lines by 95%.

Dramatic improvement to the telecommunications service environment thanks to the submarine cable connection has heightened expectations for economic and industrial development and an improved quality of life for Tongan citizens.

At the August 21, 2013 opening ceremony for submarine cable landing point Tonga Cable Limited (TCL), Ministry of Information & Communications CEO Paula P Ma'u offered the following key goal for the submarine cable project: "While it is important to improve Internet accessibility and the quality of other aspects, it is even more important to make sure that Tongan citizens have high-quality accessibility at affordable prices throughout the country." This is essentially saying that the submarine cable would make universal service a reality.

The Ministry of Information & Communication said during the Survey Team's survey that the ministry is very interested in e-government that makes use of the Internet network. The ministry also said that it would establish ICT policy soon, but its homepage has yet to publicize any ICT policy to date.

At this point in time, none of the relevant government ministries have publicized policies related to the growth of ICT-related industries.

2.3.4 Organizations and Systems related to Development of the ICT Industry

Figure 2.3.4-1 shows Organizations and Systems related to Development of the ICT Industry in Tonga. The Ministry of Information & Communications is a leader in activities for moving toward a society where citizens and government are closely connected. It is the main regulatory agency for telecommunications services and reports on the government's policies, programs and activities.

The Ministry of Public Enterprise supervises 15 public companies in an effort to use public resources effectively to create services and wealth. The ministry oversees Tonga Communications Corporation (TCC), a telecommunications business. TCL is a public company in which the government has an 83% stake while TCC holds the remaining 17%.

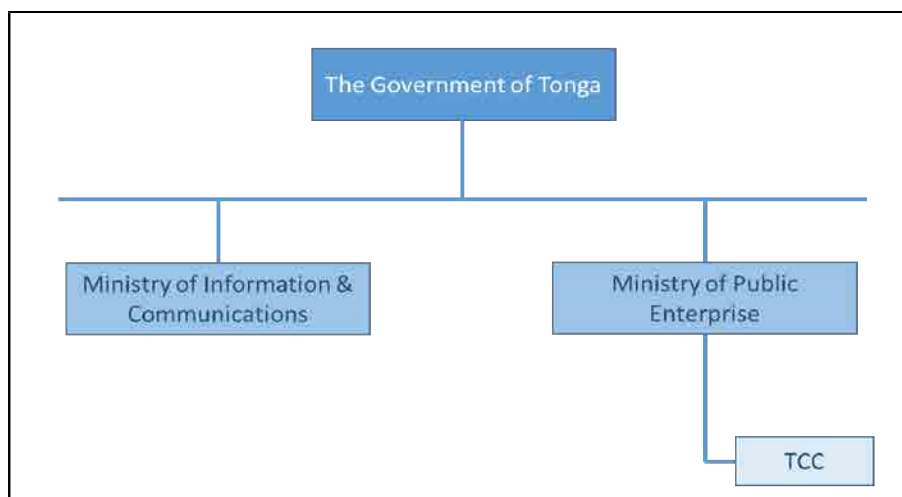


Figure 2.3.4-1 Organizations and Systems related to Development of the ICT Industry within the Tongan Government

2.3.5 The maintenance status of the ICT infrastructure

(1) Telecommunications Liberalization in Tonga

The liberalization of telecommunications in Tonga began in 2002 and produced competition in the telecommunications market. According to *Costs and Benefits of Deregulating Telecommunication Markets in the Pacific*, a joint-research report by ADB and Commonwealth Secretariat, Shoreline Communication Ltd. earned its license in 2002 and entered the mobile telecommunications market under the TonFon brand. The report holds that, as a result, telecommunications costs for all services fell 20% and the numbers of both mobile subscribers and Internet users doubled. Shoreline Communication Ltd. is the parent company of Tonfon Tonga, Tonfon Vava'u, Tonfon Ha'apai and Tonfon Eua and has expanded its telecommunications operations. The report concludes that lowering telecommunications costs and improving services by creating a competitive market through liberalization, even in a small market like Tonga's, causes an increase in subscribers.

In 2007, Digicel acquired TonFon, and Digicel is now the entity that provides services. The Digicel Group provides mobile service to 13 million subscribers in the West Indies, Central America and the Oceania region. The group provides advanced, homogenous services to the market in an effort to keep costs down and, thus, further increase the number of subscribers.

(2) Domestic Carriers and ISPs

There are only two telecommunications businesses in Tonga, and they are also in charge of ISPs.

Table 2.3.5-1 Major Carriers and ISPs

Type	Operator	Notes
Telecommunications business	TTC	Public corporation
	Digicel	Private corporation
International gateway	TCL	Public corporation that operates SCCN landing point

(3) Penetration

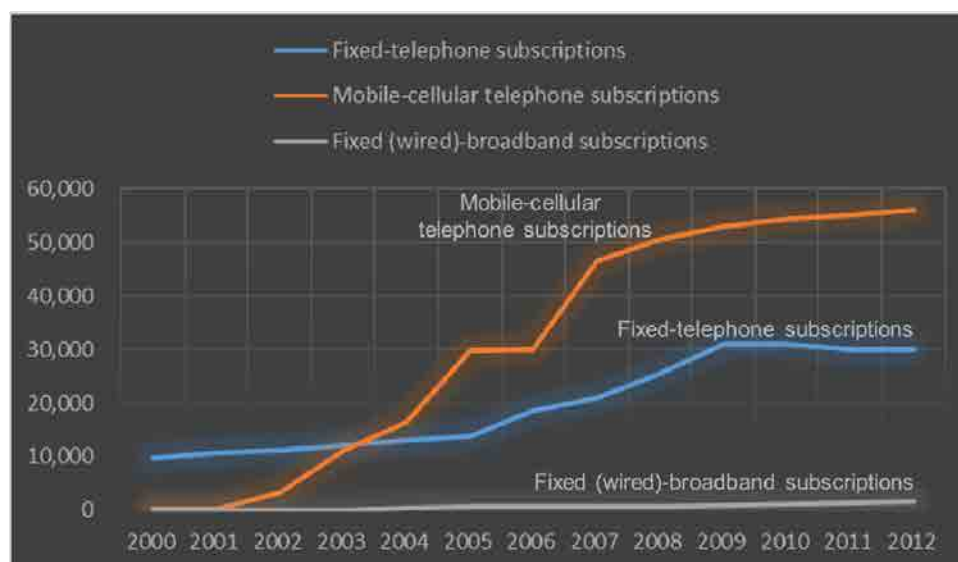
Table 2.3.5-2 shows trends in subscriptions to fixed-telephone and mobile-cellular services in Tonga, and Figure 2.3.5-1 is a graph of the data from Table 2.3.5-2.

The telecommunications market in Tonga was liberalized in 2002, and a competitive market was the result of the move to two mobile-cellular telecommunications companies. Decreasing telecommunications costs and improved service quality since then has caused the number of mobile subscribers to increase significantly. Penetration is close to 60% of the population.

Table 2.3.5-2 Fixed-telephone and Mobile-Cellular Service Subscriptions

Category	2000	2001	2002	2003	2004	2005	2006
Fixed-telephone subscriptions	9,700	10,800	11,201	12,000	13,000	13,746	18,447
Mobile-cellular telephone subscriptions	180	236	3,354	11,200	16,400	29,872	30,051
Fixed (wired)-broadband subscriptions	0	0	11	22	334	645	633
Category	2007	2008	2009	2010	2011	2012	
Fixed-telephone subscriptions	21,034	25,536	31,000	31,000	30,000	30,000	
Mobile-cellular telephone subscriptions	46,525	50,472	53,000	54,300	55,000	56,000	
Fixed (wired)-broadband subscriptions	780	721	1,000	1,100	1,300	1,500	

Source: ICT Statistics/ITU



Source: ICT Statistics/ITU

Figure 2.3.5-1 Fixed-telephone and Mobile-Cellular Service Subscriptions

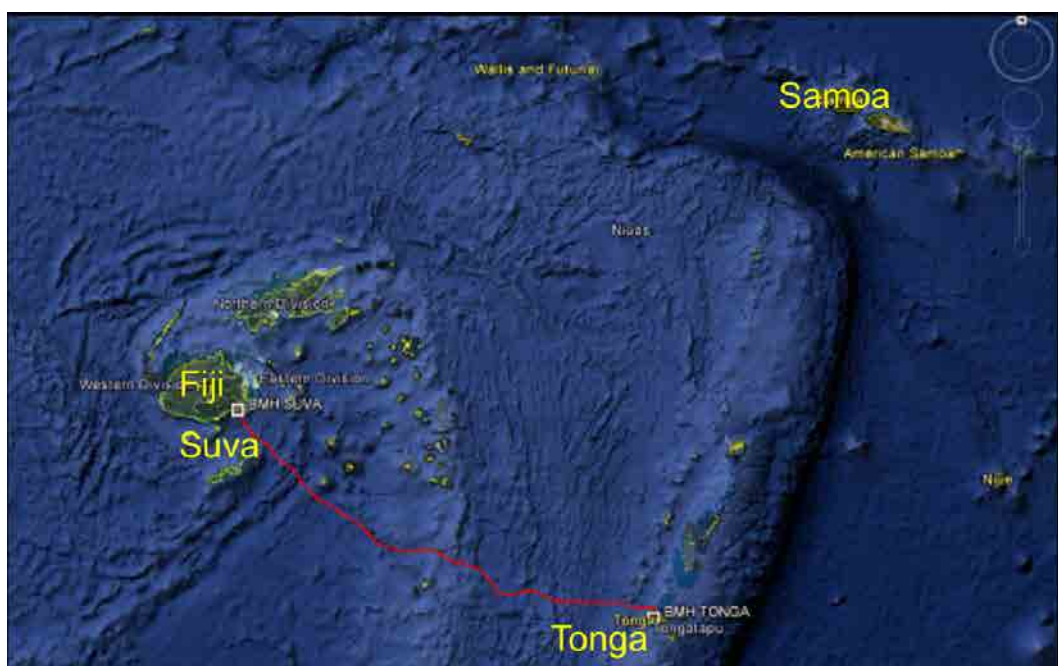
4. Submarine Cable Maintenance Status

Tonga became the first country to be connected to the SCCN through linking with the Fiji station as part of the World Bank, Pacific Regional Connectivity Program. This has enabled high-capacity

and high-quality data communication with Australia, New Zealand and the United States. Domestic carriers then began to connect to the submarine cable. TCC was the first company to provide connection services after SCCN reached Tonga. Then, in October, Digicel Tonga Limited was connected. USP is expected to be connected later.

A submarine cable for domestic telecommunications from Tongatapu to Vava'u and Ha'apai has already received government approval, and bid preparation is under way. The total length of the cable from Tongatapu and Vava'u, including the branch to Ha'apai, will be 380 kilometers.

Figure 2.3.5-2 is a map of the submarine cable between Tonga and Fiji.



Source: TCL

Figure 2.3.5-2 Map of the Submarine Cable Between Tonga and Fiji

2.3.6 Programs and Implementation Status of ICT Industry Promotion

No program related to ICT industry promotion has been established.

2.3.7 Results in the ICT Industry

No specific program related to ICT industry promotion has been established, but private call centers have been launched thanks to the connection to the international submarine cable.

ProComm Services is a call center established in 2013 and is fully funded by a Japanese corporation. It receives business from the United Kingdom, Australia and New Zealand; it responds to foreign demand and exports ICT services. It focuses on the marketing industry and on working as TCC's call center and provides the services of nearly 30 operators 24 hours a day, 365 days a year.

In the case of ProComm Services, the fact that its founder already possessed intermediaries with

investors and the fact that its senior management had experience in running call centers in New Zealand were two important factors for why it was able to successfully launch so quickly. Another factor is the sufficient English ability of young Tongan workers; it was easy to assemble a workforce capable of providing smooth call center services.

2.3.8 Education and HR Development in Tonga

The Tongan education system involves six years of primary school, six years of secondary school, one year at a tertiary institute and then university studies. Students begin attending school at six years of age, and many continue straight on to university after graduating from secondary school. English education begins when students enter primary school.

Students can enter tertiary institutes after graduating from secondary school, but there is a wide range of ages among such students because tertiary institutes are like vocational training schools. For example, a female student after spending a long time at home enters the Tonga Institute of Science/School of Tourism and Hospitality, learning knowledge needed to become employed. There is a nearly even divide between the number of students who proceed to university upon graduating from tertiary institutes and those who join the workforce.

Tupou Tertiary Institute (TTI) is located in the Tongan capital and has a deep connection to New Zealand, employing a vocational training school program from New Zealand. Students attend the institute for one year and then have the option of enrolling in a two-year diploma program. TTI's strength is technical training, and it is a Cisco Academy capable of issuing Cisco Certificates in Tonga.

As for universities, USP has a Tonga Campus. All programs can be taken remotely through the USPNet satellite communication service. The new satellite communication system introduced by a JICA Technical Cooperation Project in 2012 enables students to take courses from the remote islands of Vava'u and Ha'apai, and the number of students has increased significantly. USP will become Tonga's third user of submarine cable SCCN via TCL, and preparations to connect are currently under way. The Information Technology Service (ITS) from the main campus in Fiji will support the connection to SCCN on all aspects from the physical connection to negotiations on the utilization side.

ITS has indicated that it has a plan with the Tongan government to provide an Internet environment at primary and secondary schools so that the Internet service brought to Tonga by the submarine cable can be used in educational settings. Each school will connect to the backbone line prepared by USP. The use of USP's fiber optic network is expected to significantly improve Internet literacy and the usage of information in Tonga.

Including schools not accredited by the government, there are five higher education institutions in Tonga. Table 2.3.8-1 is a list of those schools.

Table 2.3.8-1 Higher Education Institutions in Tonga

No	Name	Note
1	University of the South Pacific, Tonga Centre	Located in 'Atele, about seven km inland from the capital city of Nuku'alofa. Nearly 1,400 students complete their degree course via distance education.
2	Tupou College	
3	Hango Agricultural College	
4	Tonga Institute of Science and Technology	
5	Atenisi Institute	The only private university, not accredited by the Tongan government

Source: *Commonwealth Education Online*



Figure 2.3.8-1 University of the South Pacific Institute of Education

2.3.9 Challenges for IC Industry Growth

The success of ProComm Services is a model for the ICT industry in Tonga to grow and serve as a foundation in industry. As described in 2.3.7 Results in the ICT Industry, ProComm Services was successfully founded and got off to a quick start for four reasons: 1) it had sufficient experience with call center operations; 2) it had access to sell to the global market; 3) it had connections to an investor; and 4) it had no trouble securing an abundance of highly skilled personnel.

Tonga currently lacks administrative policy to support ICT industry growth and under the present conditions it is necessary to begin from this point. If administrative policy support was created it would enable foreign business attraction and domestic business establishment support. Challenges toward achieving this include establishing tax breaks, TFZs and financing systems.

The lack of ICT personnel in Tonga is a major challenge that affects not only the growth of the ICT industry but also the operation of social infrastructure. The Tongan government is very interested in introducing e-government, but it lacks the ICT personnel to support e-government. ICT personnel are not being cultivated because there are few opportunities to for technical skill development in Tonga. This lack of technically skilled workers is problematic in terms of running the country's critical systems as well. Tonga depends on foreigners not only for the systems

themselves but also for the introduction, operation and maintenance aspects. TTI has pointed out the problem with the lack of Tongan engineers to support the country's infrastructure in the course of introducing e-government in the future. As each country continues to expand its ICT industry, the Tongan national backbone will depend more than ever on foreign countries. This will also stunt the growth of the Tongan ICT industry. Thorough technical skills education and its connection to the ICT industry are major challenges in terms of national infrastructure support.

Far-reaching personnel development is a critical element of ICT industry growth. Tonga needs to cultivate ICT engineers and also to focus on vocational training schools to educate workers who will operate call centers and BPO businesses.

2.3.10 Hierarchical Structure of the ICT Industries

Table 2.3.10-1 shows the hierarchical structure of the ICT industries in Tonga with the Survey Team's Tongan survey destinations plotted in their layers in terms of time. On the figure, the **E** shows the year the company was established. For Digicel, the **E** is plotted in the year Shoreline Communication Ltd. was established, and the **P** is plotted in the year Digicel acquired Shoreline Communication Ltd. Companies founded prior to 1993 feature the **O** in 1993, and the years they were established are listed in the column to the left.

Two noteworthy events that have impacted Tonga's ICT industry are the liberalization of the telecommunications market in 2002 and the connection to the Southern Cross Cable Network (SCCN), an international submarine cable and its commencement of operation. Though the Tongan telecommunications market is small, its liberalization lowered domestic telecommunications costs and improved service. This caused the number of subscribers to increase, but the Tongan ICT industry remains focused on the Infrastructure Layer, which focuses on domestic demand, since it does not have an environment that responds to foreign demand. The connection to SCCN will lead the Tongan ICT industry into the Direct-Use Layer, and it will happen in Tonga more quickly than it happened in Fiji.

The size of a country's domestic consumer market has nothing to do with its ICT industry responding to foreign demand. If an environment for such response is maintained, it will function as the foundation for the formation and expansion of an ICT industry, which in turn will lead to activity in the Direct-Use and Service Layers (ICT Source). Industries will appear in the Application Layer (ICT User) in connection to the tourism, agriculture, forestry, fishery and other sectors. For this to happen, domestic demand needs to expand along with foreign demand.

Table 2.3.10-1 Hierarchical Structure of the ICT Industry in Tonga

	199X								200X								201X				
	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
Application Layer (ICT User)																					
Service Layer (ICT Source)																					
Evaluation/research																					
Design services																					
BPO																					
Software development																					
Direct Use Layer																					
Call center																					
ProComm Services																					E
Data center																					
Infrastructure Layer																					
Carrier																					
Digicel																					
Carrier																					
TCC																					O:1988
International gateway																					
TCL (Tonga Cable Ltd.)																					E

Telecommunications market becomes competitive after it becomes free

International submarine cable SCCN begins operating in Tonga

(Note) **E** = Year of Establishment. For Digicel, **E** = the year its predecessor, Shoreline Communication Ltd., was established and **P** = the year of acquisition. Companies that were established before 1993 will be denoted by a **O** in the 1993 column with their year of establishment written to the left of this.

2.4 Collection Survey in Solomon Islands

2.4.1 Outline of Survey

Secondary Surveys was conducted in Solomon Islands from November 5–8, 2013 following the first domestic survey in Okinawa. The Survey sought to gather information through means such as interviews with relevant agencies in Solomon Islands (e.g. the government, private corporations in the sector and other aid agencies) and through collecting related documents.

Table 2.4.1-1 shows the information we gathered and verified from agencies we interviewed and visited.

Table 2.4.1-1 Visit / information gathering destinations, survey items and information collected
in Solomon Islands

Solomon Islands Visit Destinations	Survey Items	Specific Cases of Information Gathered
Solomon Islands Government Communication Unit, Office of the Prime Minister and Cabinet ICT Support Unit, Ministries of Finance & Treasury ADB Pacific Department USP Solomon Islands Campus Solomon Telekom Company Ltd. Solomons Oceanic Cable Company Bemobile Solomon Islands Advanced Technologies Ltd.	a. Socioeconomic trends (e.g. population, industry)	• Population/GNI/GDP growth rate/ratio of overseas assistance/primary industries, etc.
	b. Position within the ICT industry	• Priority policies and regulation easing strategies (comparison with other industries)
	c. Policies, organizations and budget for ICT industry	• Industry promotion strategies and system (e.g. special districts/parks) • Telecommunications policies • Progress of e-government, etc.
	d. The maintenance status of the ICT infrastructure, and details of submarine cable maintenance	• Primary trunk network (existing network/broadband development plan) • Access network (sound/Internet)
	e. Status and issues of the ICT industry	• Fixed-telephone, cell phone and Internet diffusion rate and status of the competition • Status of the introduction of universal access
	f. Socioeconomic trends (e.g. population, industry)	• Population/GNI/GDP growth rate/ratio of overseas assistance/primary industries, etc.
	g. Position within the ICT industry	• Priority policies and regulation easing strategies (comparison with other industries)
	h. Policies, organizations and budget for ICT industry	• Industry promotion strategies and system (e.g. special districts/parks) • Telecommunications policies • Progress of e-government, etc.

The list of visit destinations is shown in Table 2.4.1-2, and the layer classifications of the survey destinations in Solomon Islands are shown in Table 2.4.1-3. Additionally, the schedule for surveys performed at these destinations is provided at the end of the report (schedule 4).

Table 2.4.1-2 List of Survey Destinations in Solomon Islands

No	Layer	Visit Destinations / Access	Summary
S-1	Government Agency	Government Communication Unit, Office of the Prime Minister and Cabinet P.O. Box G1, Honiara TEL:677-28100 www.pmc.gov.sb	Solomon Islands Information & Communications Policy
S-2	Government Agency	ICT Support Unit, Ministries of Finance & Treasury Level 4, Anthony Saru Building, Mendana Avenue, Honiara TEL:627-24580 www.mof.gov.sb/AboutUs/ICT.aspx	ICT services provider for Solomon Islander administrative organs
S-3	Public Office	ADB Pacific Department ADB/WB office, Mud Alley Street, Honiara TEL:677-21444 http://www.adb.org/countries/solomon-islands/ main	Asian Development Bank
S-4	HR Development	USP Solomon Islands Campus PO Box 460, Honiara TEL:677-21307 http://www.usp.ac.fj/index.php?id=3649	Solomon Islands campus of the University of the South Pacific
S-5	Infrastructure	Solomon Telekom Company Ltd. Mendana Avenue Pt Cruz, Honiara TEL:677-21576 www.ourtelekom.com.sb	Landline, data communication and Internet service
S-6	Infrastructure	Solomons Oceanic Cable Company Mendana Avenue Pt Cruz, Honiara TEL:677-749-6099	Submarine cable infrastructure operator corporation
S-7	Infrastructure	Bemobile Solomon Islands P.O Box 2134, Honiara www.bemobile.com.sb	Cell phone service
S-8	Service	Advanced Technologies Ltd. Anthony Saru Building, Ground Floor, Honiara TEL:677-21922	Network systems design services

Table 2.4.1-3 Layer Classifications of Survey Destinations in Solomon Islands

Layer	Category	Visit Destinations	
Application Layer (ICT User)	Financial ICT industry		
	Tourism industry		
	Contents industry		
Service Layer (ICT Source)	Education/training services		
	R&D, Testbed services		
	Design services	Advanced Technologies Ltd	
	Advanced software development services		
	Software development services		
	BPO services		
Direct-Use Layer	Call center		
	Data center		
	Housing		
	Hosting		
Infrastructure Layer	ISP		
	GIX, Carrier	Solomon Telekom Company Ltd.	Bemobile Solomon Islands
	Submarine cables	Solomons Oceanic Cable Company	
	Power		
Government/Public Office	Industrial park		
		Government Communication Unit, Office of the Prime Minister and Cabinet ICT Support Unit, Ministries of Finance & Treasury ADB Pacific Department	
HR Development		USP Solomon Islands Campus	
Other			

2.4.2 Socioeconomic Trends

(1) Population

According to *World Population Prospects, The 2012 Revision* issued by the United Nations in 2013, the population of Solomon Islands is about 561,000 people. Table 2.4.2-1 shows the latest estimates of the population.

Table 2.4.2-1 Solomon Islands Population

Item	Data (thousands of people)
Total	561
Males	285
Females	276

Source: *World Population Prospects; The 2012 Revision* (United Nations)

Moreover, when comparing the ratio different generations occupy in the entire population, as shown in Table 2.4.2-2, people aged 15 to 59 make up 54.7%.

Table 2.4.2-2 Solomon Islands Population by Generation (2013)

Age Range	Percentage
0–14	40.2%
15–59	54.7%
60 and older	5.1%
80 and older	0.5%

Source: *World Population Prospects; The 2012 Revision* (United Nations)

(2) Location

Solomon Islands consists of a total land area of 28,900 km² located east of Papua New Guinea and northwest of Vanuatu, Fiji.

Figure 2.4.2-1 shows the location of Solomon Islands.



Source: Google

Figure 2.4.2-1 Location of Solomon Islands

(3) GDP

According to World Bank data, Solomon Islands' 2012 GDP was 1 billion, 8 million USD (Japan's was 5,959,718 million USD), and its GDP per capita was 1,834.84 USD (Japan's was 46,720.36 USD).

(4) Primary Industries

Timber, fish, copra, cocoa and palm oil are the main exports of Solomon Islands, and the total production value of the fishery, agriculture and forestry industries accounts for about 35% of Solomon Island's GDP. Total agricultural production accounts for about 40% of total exports, and 65% of the population work in the industry.

The tourism industry has grown in recent years and contributed 11% of GDP in 2011.

2.4.3 General Industrial Policy and Position in the ICT Industry

One of the Solomon Islands government's goals put forth in its Medium Term Fiscal Strategy: 2011–2016 issued in August 2011 is to continue structural reform to make Solomon Islands an easy country in which to invest and operate. In 2010, timber exports contributed to the GDP amidst the recovery of the market, and telecommunication business was right alongside construction and trade as factors that accelerated GDP growth.

The Solomon Islands government holds that structural reform creates not only opportunities for economic growth but also employment, new investment, low inflation, balanced wages and a healthy overall economy.

The liberalization of the Solomon Islands telecommunications market in 2009 has increased the range of mobile telecommunications coverage, dramatically improved service and significantly reduced telecommunications costs. As a result, the number of mobile subscribers has increased rapidly. This has expanded domestic demand for telecommunications operations, in turn increasing production volume. However, the fact that the ICT industry is expected to do no more than support other industries is the reason it is not expected to respond to foreign demand for ICT services. Solomon Islands relies on satellite communications for its international telecommunications, which makes it quite expensive. This is why Solomon Islands is expected to migrate to an international submarine cable at the earliest opportunity.

The Government Communication Unit of the Office of The Prime Minister & Cabinet indicated during the Survey Team's survey that awareness of the ICT industry is low because the Solomon Islands are yet to be connected to the submarine cable. However, they went on to say that they expect the ICT industry to create a large market once the cable is complete. The unit said that this is why the government does not have concrete plans for ICT industry policies.

2.4.4 Organizations and Systems related to Development of the ICT Industry

Figure 2.4.4-1 shows Organizations and Systems related to Development of the ICT Industry in Solomon Islands.

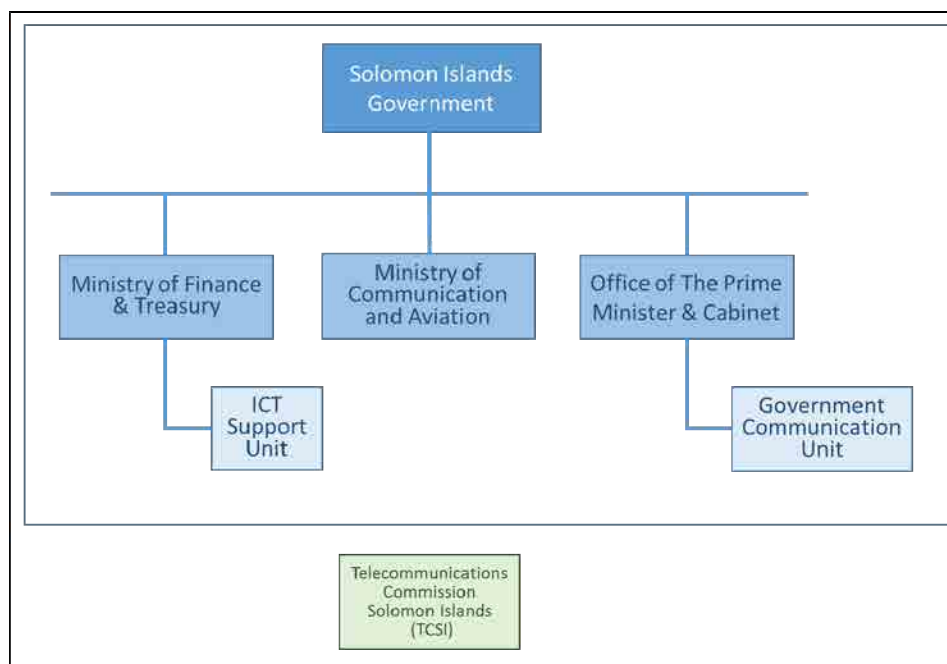


Figure 2.4.4-1 Organizations and Systems related to Development of the ICT Industry within the Solomon Islands Government

The ICT Support Unit in the Ministry of Finance & Treasury helps government-affiliated organizations move toward ICT and provides operational support. The Ministry of Communication and Aviation is in charge of the administration of telecommunications and aviation. The Government Communication Unit of the Office of The Prime Minister & Cabinet researches telecommunications policy, makes proposals to the prime minister and cabinet, promotes policies, proposes plans and does monitoring.

Telecommunications Commission Solomon Islands (TCSI) was established as an independent organization based on the 2009 Telecommunications Act, and it carries out regulatory functions on the economic and technical aspects of telecommunication.

2.4.5 The maintenance status of the ICT infrastructure

(1) Telecommunications Liberalization in Solomon Islands

The Solomon Islands government announced in its Medium Term Fiscal Strategy: 2010–2015 issued in August 2010 that it and Solomon Telekom Company Ltd. (STCL) agreed to end the latter's exclusive license. In response, STCL cut telecommunications fees 50% and announced that its entire mobile communications network would migrate to 3G GSM.

The end of STCL's exclusive license and the liberalization of the telecommunications market allowed Bemobile Solomon Islands (Bemobile) to enter the market in August 2010. In December 2009, Bemobile invested 200 million SBD (about 3 billion JPY) to build a 2.5/3G network, and it provides a wide range of new services. As a result, the number of subscribers increased dramatically from the time the market was liberalized.

TCSI plans to offer a tender for a third mobile communications license in the near future. TCSI is

also using donor support to continue researching submarine cables that enable the provision of bandwidth for data communication at a lower cost than satellite communication, whose costs limit bandwidth and suppress economic growth.

(2) Domestic Carriers and ISPs

STCL and Bemobile are the two Solomon Islands telecommunications companies that provide services. The two-company system began in 2010, and both companies also serve as ISPs. Table 2.4.5-1 shows the major carriers.

Table 2.4.5-1 Major Carriers

Type	Operator	Notes
Telecommunications business	STCL	Fixed-telephone, mobile
	Bemobile	Mobile
International gateway	STCL	Satellite communications
	Solomons Oceanic Cable Company (SOCC)	Submarine cable (not connected yet)

(3) Penetration

Plans for bring a submarine cable connection to Solomon Islands are still at the stage where the route is being investigated, and the plan is slated for completion by 2015. Thus, international lines go through satellite communication.

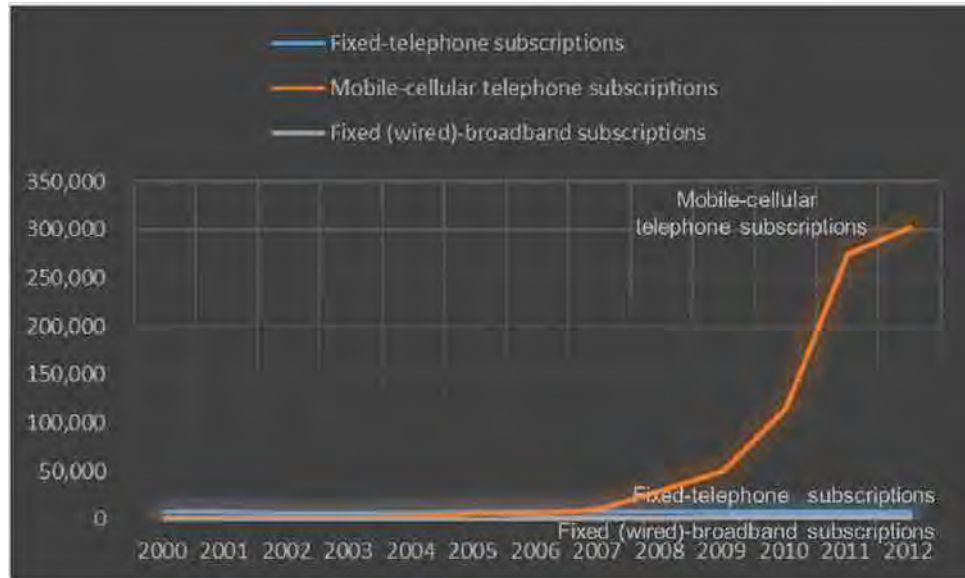
The liberalization of the telecommunications market began in 2009, and Bemobile entered the market in 2010. As a result, telecommunications costs fell and services improved. There is now a varied range of services. Given these developments, the number of mobile subscribers jumped from 50,000 in 2009 to nearly 275,000 in 2011. With nearly 302,000 subscribers in 2012, penetration is close to 60% of the population.

Table 2.4.5-2 shows trends in subscriptions to fixed-telephone and mobile-cellular services in Solomon Islands, and Figure 2.4.5-1 is a graph of the data from Table 2.4.5-2.

Table 2.4.5-2 Fixed-telephone and Mobile-Cellular Service Subscriptions

Category	2000	2001	2002	2003	2004	2005	2006
Fixed-telephone subscriptions	7,689	7,389	6,601	6,238	6,962	7,407	7,600
Mobile-cellular telephone subscriptions	1,151	967	999	1,060	3,000	6,000	7,000
Fixed (wired)-broadband subscriptions	0	0	0	0	200	450	650
Category	2007	2008	2009	2010	2011	2012	
Fixed-telephone subscriptions	7,800	8,000	8,200	8,400	8,391	8,060	
Mobile-cellular telephone subscriptions	10,900	30,000	50,000	115,500	274,872	302,147	
Fixed (wired)-broadband subscriptions	1,000	1,500	2,000	2,522	2,430	2,132	

Source: ICT Statistics/ITU



Source: *ICT Statistics/ITU*

Figure 2.4.5-1 Fixed-telephone and Mobile-Cellular Service Subscriptions

2.4.6 Programs and Implementation Status of ICT Industry Promotion

No program related to ICT industry promotion has been established.

2.4.7 Results in the ICT Industry

No specific program related to ICT industry promotion has been established, and international lines depend on expensive satellite communications because Solomon Islands is not yet connected to an international submarine cable.

Even in such an environment, a company called Advanced Technologies Ltd. has established itself and expanded into one new business after another, responding to domestic ICT demand by providing services from network design to equipment procurement, installation, wiring, and post-operation remote monitoring. Advanced Technologies Ltd. is a local company established in 2009 and funded entirely by Solomon Islanders. It does not carry inventory, but it is known for speedy deliveries. The company has built a system in which it cooperates with foreign suppliers to deliver products two days after they are ordered. It has 24 employees and six engineers, all of whom have graduated from university. Three engineers graduated from USP, two from universities in Papua New Guinea, and one from a university in Australia.

Figure 2.4.7-1 is a view of Advanced Technologies Ltd.



Figure 2.4.7-1 View of Advanced Technologies Ltd.

2.4.8 Education and HR Development in Solomon Islands

According to the Survey Team's survey of USP, the Solomon Islands education system involves six years of primary school from age six, seven years of secondary school and then university studies. Fewer than 10% of all primary school students continue to university. 70 to 80 percent of university students pay their own way; few students use scholarship systems.

3,700 students are enrolled at the USP Solomon Islands Campus, but most of them do distance education through the USPNet satellite communication service. According to the 2013 USP handbook, there are three bachelor courses within the Faculty of Science, Technology and Environment and the subject configuration of each course is as follows

Bachelor course	Subjects
Bachelor of Arts	Computing Science
	Geography
	Information Systems
	Marine Affairs
	Mathematics
	Mathematics with Statistics Emphasis
Bachelor of Commerce	Information Systems
Bachelor of Science	Biology
	Chemistry
	Computing Science
	Earth Science
	Electrical/Electronic Engineering
	Food and Nutritional Sciences
	Geography
	Information Systems
	Mathematics
	Mathematics with Statistics Emphasis
	Physics

The campus has two ICT-related subjects, Computing Science and Information Systems, , and both of Computer Science and Software Development are popular.

Figure 2.4.8-1 shows the USP Solomon Islands Campus.

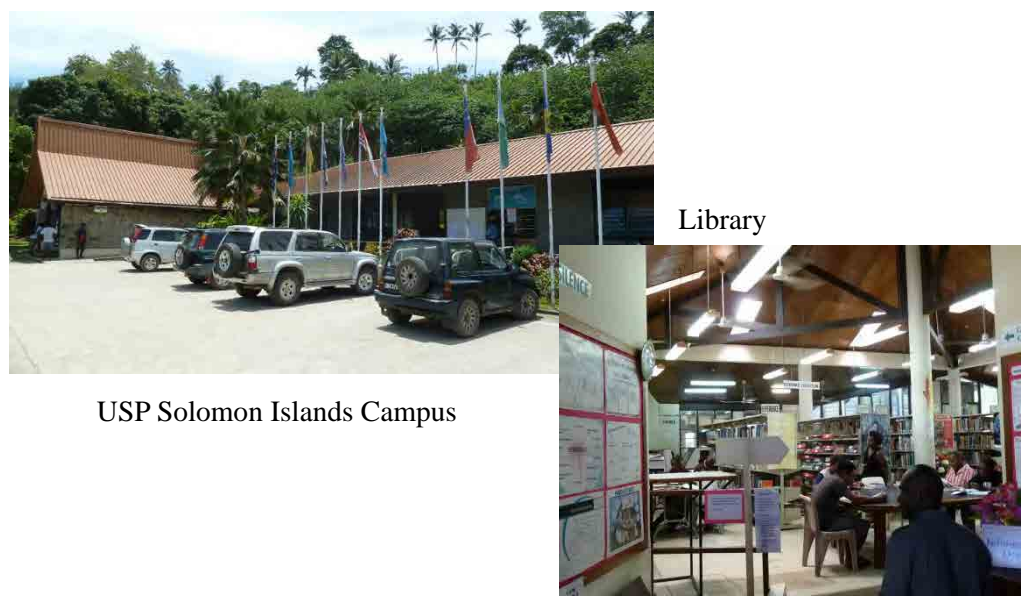


Figure 2.4.8-1 USP Solomon Islands Campus

Many USP graduates move to Australia or elsewhere abroad because there is still not much employment demand in Solomon Islands. The university also has a six-month post-graduation internship program.

There are no vocational training schools in Solomon Islands. There are short-term courses for aspiring engineers in the private sector, but they are not able to issue certificates or other qualifications.

Solomon Islands has two universities, USP and Solomon Islands National University, the country's only national university, and one other college. Table 2.4.8-1 is a list of higher education institutions in Solomon Islands.

Table 2.4.8-1 Higher Education Institutions in Solomon Islands

No	Name	Note
1	The University of the South Pacific Solomon Islands Centre	3,700 students Mostly distance education through USPNet satellite communication service
2	SINU (Solomon Islands National University)	Provides teacher training, finance, nursing, secretary training and other courses in addition to technical marine/fishery and forestry/agriculture courses meant to help the Solomon Islands economy

Source: *Commonwealth Education Online*

SINU is composed of the following 5 faculties and does not have any ICT related faculties or departments

- School of Technology & Maritime Studies
- School of Nursing & Allied Health Science
- School of Natural Resources & Applied Sciences
- School of Education & Humanities
- School of Business & Management

2.4.9 Challenges for ICT Industry Growth

In the Solomon Islands, the primary industries of agriculture, forestry and fisheries are placed as the main industries. Out of the three countries it is the only one with a trade surplus and according to 2012 ADB documentation it has achieved a surplus of 136 million USD. The 2010 market recovery of the forestry industry towed the economy and GDP shifted to positive growth.

In 2015 submarine subject cable will be connected and the will lead to a turning point in new economic development. How to promote and utilize the ICT industry, along with the primary industry and the recently growing tourist industry are important decisions to be made.

The development direction of the ICT industry following connection is a serious matter to be considered. Either take an industrial development orientation which views the “ICT industry as a way to create economic development by attaining direct foreign demand” or “consider ICT as infrastructure for supporting other industries and aim to strengthen this infrastructure.”

When considering ICT industry growth the challenges for the Solomon Islands can be divided into three major categories: ICT policy, education and HR Development, and infrastructure. The challenges for each category are discussed below.

The first challenge is a lack of ICT policy. The government has not yet developed a vision for ICT. Solomon Islands liberalized its telecommunications market and proposed ICT policy later than other Pacific Island Nations, and it is behind them in launching an ICT industry as well. The reason for this can be attributed to two factors. The first is the fact that the important industry, the primary industry is performing strongly and the country has achieved a trade surplus and positive GDP growth. The second reason is that the connection of the undersea cable is still felt to be something that will occur well in the future. However, the connection of the submarine cable will be completed in 2015, which is fast approaching, and the development of an “approach for vision, strategy and policies” is essential.

The second challenge is HR Development. One thing that each survey destination mentioned was the lack of organizations providing ICT-related personnel training in Solomon Islands. As we have seen in 2.4.8 Education and HR Development in Solomon Islands, the only ICT related subjects are in the USP. The government has not focused on ICT personnel training because Solomon Islands is not yet connected to an international submarine cable and lacks a telecommunications environment. The submarine cable is expected to be connected and go into operation by 2015, so Solomon Islands

needs to develop ICT personnel right away.

Many students go abroad to study ICT, and many of them stay abroad because there are few employment opportunities in Solomon Islands.

Regardless of whether the Solomon islands take an industrial development orientation which views the “ICT industry as a way to create economic development by attaining direct foreign demand” or “consider ICT as infrastructure for supporting other industries,” a wide variety of workers are required to launch the ICT industry. Demand for a vocational training school is particularly high. SINU, Solomon Islands’ only national university, used to be a college offering training but is now a university, which is why there are currently no vocational training schools in Solomon Islands. A challenge is to establish an ICT training center that can offer training in actual fields that have taken root within the ICT industry.

The third challenge is to maintain infrastructure. The power situation in Solomon Islands is grim. The supply is barely enough to meet demand, so electrical overload causes frequent power outages, leading many users to set up emergency power systems as backup.

Though not current information, the Solomon Islands Electricity Authority reported at a workshop at the Pacific Power Association in 2005 that the deteriorating power transmission and distribution network is causing power losses. Solomon Islands urgently needs to establish high-quality, consistent power supply services.

2.4.10 Hierarchical Structure of the ICT Industries

Table 2.4.10-1 shows the hierarchical structure of the ICT industries in Solomon Islands with the Survey Team’s Solomon Islands survey destinations plotted in their layers in terms of time. On the figure, the **E** shows the year the company was established. Companies founded prior to 1993 feature the **O** in 1993, and the years they were established are listed in the column to the left.

One noteworthy event that has impacted the ICT industry in Solomon Islands is the liberalization of the telecommunications market in 2009. This allowed mobile telecommunications company Bemobile Solomon Islands to enter the Solomon Islands telecommunications market in 2010.

Advanced Technologies Ltd., a company that provides services from network design to equipment procurement, installation, wiring, and post-operation remote monitoring, was established in the Service Layer (ICT Source) concurrently with the liberalization of the telecommunications market, but the two events are not directly related.

The international submarine cable to Solomon Islands is still in the planning stages and is slated to begin operating in 2015, so the country depends on high-cost satellite communications for its international lines. Thus, the telecommunications and ICT markets are focused on domestic demand, and an ICT industry has not yet been established.

Table 2.4.10-1 Hierarchical Structure of the ICT Industries in Solomon Islands

	199X									200X									201X			
	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	
Application Layer (ICT User)																						
Service Layer (ICT Source)																						
Evaluation/research																						
Design services																						
Advanced Technologies Ltd																						
BPO																						
Software development																						
Direct Use Layer																						
Call center																						
Data center																						
Infrastructure Layer																						
Carrier																						
Bemobile																						
Carrier																						
STCL																						
O:1988																						
International gateway																						
SOCC																						

Telecommunications market becomes competitive after becoming free

(Note) **E** = Year of Establishment. Companies that were established before 1993 will be denoted by a **O** in the 1993 column with their year of establishment written to the left of this.

3. Possibilities for Using Experience from Okinawa Prefecture and the Support for ICT Industry Development in Pacific Island Nations

3.1 Matrix Analysis of Layer Structures in ICT Industries

3.1.1 Overlay of Layer Structures in the ICT Industries of each Country

Although the number of samples for ICT industry hierarchical structures in Okinawa, Fiji, Tonga, and Solomon Islands analyzed in Chapter 2 is small, they have been placed in an overlay to analyze trends. For this analysis, the industry names are retained for each industry layer, and the establishment years for the companies that comprise those industries are plotted. The colors representing each prefecture/country are: ●Okinawa, ●Fiji, ●Tonga, ●Solomon Islands. The following rules were used for plotting.

- a) Companies established prior to 2001 are plotted in the 2000 column.
- b) Okinawa Prefecture carriers were added and plotted.
- c) If there are multiple companies in the same industry, they are plotted under their respective years of establishment.
- d) If there are multiple companies established in the same year, only one point will be plotted to represent all of them.
- e) Companies that expanded into special zones will be plotted under the year of that expansion.
- f) If one company is engaged in multiple industries (e.g. data centers/call centers), they are plotted under the applicable year in each respective industry line.
- g) If operations are continued through a different company due to corporate mergers and acquisitions, etc., they are plotted under the year of initial establishment.

In order to see the correlation between the liberalization of telecommunications and the increase in the number of carriers, the timing of telecommunications liberalization in Fiji, Tonga, and Solomon Islands is specified in the table. The carriers established due to the effects of liberalization are signified by ovals; blue is for Fiji, red is for Tonga, and green is for Solomon Islands. Additionally, in order to see the correlation between the emergence of ICT industries and international submarine cables, the timing for the start of international submarine cable operation is also shown.

Using the above, the results of the overlay of hierarchical structures in the ICT industries in Okinawa and each country are shown in Table 3.1.1-1

Table 3.1.1-1 Overlay of ICT Industry Hierarchical Structures in Okinawa and each Country

20XX	00	01	02	03	04	05	06	07	08	09	10	11	12	13
Application Layer (ICT User)	Industries covered in Okinawa													
Marketing														
Translation services for the hearing impaired														
Creation of mobile contents for Gekiga (graphic novels)														
e-Commerce for local specialty products														
Service Layer (ICT Source)	Industries covered in Fiji													
Evaluation/Research														
BPO														
Education (e-Learning)														
CAD design														
Advanced software development														
Software development														
FX-related support														
Design services														
Direct-Use Layer	Industries covered in Tonga													
Call centers														
Data centers														
Infrastructure Layer	Industries covered in Solomon													
Carriers														
Network management (GIX/IGW)														
Special zones														
Liberalization of the telecommunications market			Tonga							Fiji				
Start of international submarine cable operations		★ Fiji								Solomon Islands				★ Tonga

3.1.2 Bird's-eye View of Overlaid ICT Industry Hierarchical Structures in Okinawa and each Country

(1) Bird's-eye view of overlaid ICT industry hierarchical structures

The method for looking at the development process of industries in a layer structure analysis of ICT industry hierarchical structures is one that is used to know the current position, and to investigate options for the next level of development. It is not a tool for transferring the methods used by Okinawa during their development process. In layer structure analysis, the Okinawa model is positioned as a measuring stick for the process of developing ICT industries and expanding them from lower layers to upper layers as they continue to grow. The analysis is a tool for studying where the three Oceania countries are positioned, as well as the direction in which each country will develop their respective ICT industries in the future.

In Okinawa, companies have been placed and conduct business in each layer, including the Infrastructure Layer, the Direct-Use Layer, the ICT-sourced services layer, and the application layer using ICT. Okinawa continues to progress from the lower layers to the upper layers. In the lower layers, technological breakthroughs in horizontal development such as cloud migration at data centers have occurred, as new development evolves and growth continues. Call centers in the direct-use layer have evolved from their initial operations as simple call centers to having combined services including advisory and counseling functions; they continue to be linked with BPO. The fusion and integration of new services leading to the further growth is one form of development. Measures for developing the ICT industry in Okinawa Prefecture have been effective, resulting in the attraction of companies and new start-ups at each layer, with employment and output also increasing.

In Fiji, various industries in the ICT industry sector are conducting business in the Infrastructure Layer, the Direct-Use Layer, and the ICT-sourced services layer, as shown by the blue hatched area labeled "Industries covered in Fiji." Fiji was connected to international submarine cables in 2001, which was relatively early, and has been successful in setting tax incentives and special zones to attract ICT industries. With this, call centers in the Direct-Use Layer and BPO industries in the ICT-sourced services layer have been gradually developed over the last 10 or so years.

In Tonga, industries have been established up to the second layer – the Direct-Use Layer, as shown by the red hatched area labeled "Industries covered in Tonga." However, since their use of international submarine cables began only recently in 2013, and because they have not formulated measures for attracting ICT industries yet, and their ICT industry layer is thin.

Solomon Islands has advanced into the ICT-sourced services layer, as shown by the green hatched area labeled "Industries covered in Solomon Islands." However, overall, they are still at the stage of enhancing the Infrastructure Layer centering on domestic telecommunications business. This is also due to the fact that international submarine cables have not yet been connected.

(2) Development of ICT industries in the Infrastructure Layer

The expansion of the telecommunications market, focusing on carriers, is part of the development of ICT industries in the Infrastructure Layer. The demand for this is generally dependent on domestic demand (internal demand). In Fiji, Tonga, and Solomon Islands, the increase and new formation of domestic carriers is in concordance with the timing of the liberalization of the telecommunication market. This trend is quite conspicuous. With the liberalization of the telecommunications market, private telecommunications carriers have entered into this market and operate along with the older government-run telecommunications carriers, as seen by the spread of such operators in each country. Market competition will occur, telecommunication fees will decrease, service will improve, and the number of subscribers will increase. Through the increase in subscriber numbers, demand for expansion and improvement of terminals (devices) and telecommunication systems will be stimulated. Furthermore, the increase in income from telecommunication fees will raise domestic output. Liberalization of the telecommunications market will spur growth of domestic demand-oriented ICT industries through the increase in the number of carriers and accompanying subscribers, as well as the expansion of the store network for selling terminals (devices). As such, with the liberalization of the telecommunications market, penetration ratios for ICT industries will increase greatly, output will grow, and areas of internal demand will be stimulated. However, in each country, the number of carriers will increase with the liberalization of the telecommunications market. Through competition, telecommunications fees will decrease, the quality of service will improve, and the number of subscribers will increase radically. However, since the market is small, once the penetration ratio among citizens has reached its limit, a large increase in output cannot be expected, with the exception of expanding service programs and the introduction of advanced services stemming from technological innovations, etc.

(3) Development of ICT industries in the Direct-Use Layer and higher layers

Since the domestic demand is small for ICT industries in the Direct-Use and higher layers, a target will be set by incorporating demand from the international market (foreign demand). However, the liberalization of the telecommunications market, which is a domestic market, will have only a small effect on the emergence of ICT industries in the upper layers from the Direct-Use Layer and up. This trend is also quite conspicuous. The emergence of ICT industries in the upper layers from the Direct-Use Layer and up will be less affected by the liberalization of the telecommunications market. It will also be affected by the industry environment conditions such as the country's development measures, the skill level of workers, the volume of labor, and quality/cost of international telecommunications lines. When developing ICT industries by incorporating foreign demand, the global market will be the target which is large enough and is expected to expand continuously if a proper framework is set up. Fiji continues to create a framework for expansion into this field, and progress is being made. However, Tonga and Solomon Islands have not created such a framework, with this field being left for the future.

(4) Development of ICT industries in Okinawa Prefecture

In Okinawa Prefecture, policies and visions for the information industry are constantly being formulated and include the Multimedia Island Concept, the Information Industry Promotion Plan, and the Smart Hub Concept. Specific measures have included developing infrastructure, setting special tax system zones and preferential tax systems, providing support for telecommunications costs, and creating finely-tuned HR support programs suitable for the industries. Progress and the status of goal achievement is constantly verified, and the PDCA cycle is utilized to link to subsequent plans. Additionally, since there are differences in locational conditions even within Okinawa Prefecture, support measures suited to the respective regional circumstances must be created. Therefore, a framework has been adopted that allows each municipality to have their own industry support measures. Prefectures and municipalities work in cooperation to advance policies and plans to achieve goals and produce assured results.

Okinawa has incorporated demand from outside the prefecture – mainly in the area of ICT industry development support. More specifically, they are increasing the focus placed on incorporating foreign demand. This is because they are aiming to develop industry that contributes to the sustainable economic growth of the prefecture. Since the market for internal demand is small, merely setting their primary objectives in this market alone will not increase productivity of the prefecture. ICT helps overcome the disadvantages caused by distance, and provides a chance to incorporate foreign demand.

When asked what changes will be brought by ICT in the Pacific island nations, many countries envision internet access becoming faster and less expensive. Using internal demand to jumpstart ICT is risky. Although the connection of international submarine cables will have a large impact, it is accurate to say that this can only be seen as an impact once ICT industries that incorporate foreign demand have been developed. Output will increase and jobs will be created. Indeed, as ICT industries that incorporate foreign demand continue to grow, these benefits will spread to various domestic fields, and will become a factor that influences significant growth of internal demand. If the connection of international submarine cables is seen as triggering internal demand, it will not lead to sustainable growth.

The growth of ICT industries in Okinawa can be seen as exactly the type of growth that makes full use of the properties of these submarine cables.

Furthermore, in Okinawa, not only have human resources been developed, but measures have been set forward to employ talented personnel from outside the prefecture. The development of ICT industries is all about building communities that are comfortable and livable in Okinawa Prefecture. It can indeed be said that when livable communities are built, the development of industry has been fruitful.

Okinawa Prefecture used the submarine cables as a trigger for rectifying the disparity caused by its remote distance, developed ICT industries that incorporate demand from outside the prefecture, and has succeeded in developing an industry with a high level of growth in terms of output volume and employment numbers. They will continue to further develop the industry to the next stage. This

entire process is an asset for Okinawa's experience in developing ICT industries, and can be used to develop ICT industries in Pacific island nations that have similar conditions.

Additionally, the further development of ICT industries after cloud data centers are built in Okinawa is currently being studied. Rather than simply incorporating data center business from mainland Japan (i.e. incorporating mainland data into Okinawa), ASP and SaaS will be created in Okinawa and implemented in Okinawa cloud data centers as a part of services transmitted from Okinawa. Businesses that can offer services to the mainland and to the world will be created. To do this, measures to bring in ideas and people from the mainland are moving forward.

3.2 Challenges of ICT Industry Development in Fiji, Tonga, and Solomon Islands

3.2.1 Current State of and Challenges with Internal Demand-type ICT Industries

The current conditions of the environment for internal demand-type ICT industries in each country that have been brought to light through past surveys and analyses are summarized in Table 3.2.1-1.

Table 3.2.1-1 Current state of the environment for internal demand-type ICT industries

Country	Telecommunications market opening	Population	Number of subscribers		Ratio of population
			Fixed broadband	Mobile communication	
Fiji	Open	881,000	Fixed broadband	13,516	1.5%
			Mobile communication	858,809	97.5%
Tonga	Open	105,000	Fixed broadband	1,500	1.4%
			Mobile communication	56,000	53.3%
Solomon Islands	Open	561,000	Fixed broadband	2,132	0.4%
			Mobile communication	302,147	53.9%

Source: Population: *World Population Prospect. The 2012 Revision, United Nations*

Subscriber numbers: *ICT Statistics/ITU*

*Population data is from 2011, subscriber data is from 2012. The ratio of population is calculated assuming the population for 2012 was the same as 2011.

In each country, the number of subscribers for mobile communication systems increased as the free market was furthered through the liberalization of telecommunications. Since the penetration ratio (ratio of population) in Fiji is close to complete market saturation, the future issue for this country will be increasing output by offering a higher level of service including a shift to 3G.

In Tonga and Solomon Islands, the penetration ratio is still just above 50%; the market will still expand.

The number of subscribers for domestic fixed broadband services is low in each country. The cause for this is that the network has been monopolized and the development of ADSL has been insufficient. The maintenance of fixed systems will also be an issue in the future expansion of internal demand.

Although no data is available, the rapid development of wireless broadband in Fiji and Tonga is expected.

3.2.2 Current State of and Challenges with Foreign Demand-type ICT Industries

The current conditions of the environment for foreign demand-type ICT industries in each country that have been brought to light through past surveys and analyses are summarized in Table 3.2.2-1.

Table 3.2.2-1 Current state of the environment for foreign demand-type ICT industries

Country	International submarine cables	Support measures for industry development	ICT HR development	Employment opportunities
Fiji	Operational	Special tax zones, preferential tax systems, etc.	Insufficient reservoir of skilled human resources	Few
Tonga	Operational	None	<ul style="list-style-type: none"> • Insufficient reservoir of skilled human resources • Few HR development organizations 	Very few
Solomon Islands	Not connected	None	<ul style="list-style-type: none"> • Insufficient reservoir of skilled human resources • Almost no HR development organizations 	Almost none

In each country, there are issues regarding the lack of development and small reservoir of skilled human resources. As a JICA technical cooperation project, two new bachelor's degree programs for software development net-centric computing have been created in USP. However, since no students have graduated from this program yet, this point must be taken into consideration. This will become an important issue in future development of ICT industries, especially in Tonga and Solomon Islands, where there are few or no domestic human resource development organizations.

Additionally, Tonga and Solomon Islands do not have support measures in place for the development of ICT industries. Issue for Tonga and Solomon Islands will pertain to ICT policies and ICT industry promotion plans, as well as the establishment of implementation methods for such.

3.2.3 Six policies in Okinawa Prefecture and the Current State and Challenges of Each Country

Okinawa Prefecture has formed the vision to be reached as follows:

- ① Autonomous economic development through the accumulation and promotion of ICT-related industries in Okinawa;
- ② Distinctive regional promotion using advanced information and communication technologies; and
- ③ International contribution through hub functions in ICT fields in the Asia-Pacific region.

Okinawa has also formulated policies and strategies based on this. Measures have been developed in order for this to materialize.

After formulating a vision and planning policies and strategies that follow that vision, measures will be created as an implementation plan based on those policies and strategies. This process will be an important approach for developing the prefecture and the nation.

In Okinawa Prefecture, six policies were put forth based on this vision and by incorporating demand outside the prefecture in order to further develop ICT industries. With this, results were produced in terms of output, attraction of companies, and job creation. These six policies are listed below.

- i Establishment of facilities
 - Establishment of ICT-related industry facilities
 - Establishment of an ICT base

- ii HR development
 - Securing and developing human resources
- iii Actively attracting industries
 - Use of regional systems for promoting ICT-related industries and special district systems for ICT-related industries
 - Promotion of unified company attraction activities and revitalization of companies within the prefecture
 - Accumulation of ICT-related industries and the promotion of R & D
- iv Reduction of telecommunications costs
- v Support for software development
- vi Support for contents creation

Based on the policies, ICT industries, industry support measures, and status of special zones surveyed in each country thus far, looking at the state of ICT policies and ICT industry emergence trends in each country show the following.

【Fiji】

- ICT policies have been created.
- ICT industries have emerged in the Infrastructure Layer, Direct-Use Layer, and ICT-sourced services layer.

【Tonga】

- ICT policies have not been created.
- ICT industries have emerged in the Infrastructure Layer and Direct-Use Layer.

【Solomon Islands】

- ICT policies have not been created.
- ICT industries have emerged mainly in the Infrastructure Layer.

The current conditions of each country as shown above are compared against Okinawa Prefecture's established measures in Table 3.2.3-1. These are the issues that should be resolved by the central governments of each country.

Tonga and Solomon Islands have not created ICT policies, and need to take a quick action.

In terms of measures to be taken, all three countries share the same issues regarding HR development. In each of the countries, the reservoir of skilled, ICT-related human resources is insufficient. Additionally, there is a shortage in the broad range of ICT related human resources, from the vocation training school to university levels.

The development of ICT policies, active attraction of industries and the establishment of facilities are also issues faced by Tonga and Solomon Islands. These are especially pressing issues for Tonga, where international submarine cables have been laid and conditions incorporating foreign demand have just started. For Solomon Islands, since international submarine cables have yet to be connected, an environment incorporating foreign demand has not been created. Therefore, the active attraction

of industries and the establishment of facilities have a low level of importance at this moment.

None of the countries have set support policies for telecommunications costs. In Okinawa Prefecture's support measures for telecommunications costs, the prefecture does not merely subsidize costs. Instead, a company called Tropical Techno Center, Co., Ltd., which was established with investments from the prefecture and private companies, is able to reduce the cost of telecommunications lines by procuring the lines in bulk and contracting with telecommunications companies. Tropical Techno Center Co., Ltd. is thus positioned as a telecommunications line reseller. The companies that use these lines procure them from Tropical Techno Center. Instead of simply subsidizing costs, this method of support that introduced a system to reduce the cost of telecommunications lines is effective.

In terms of support for software development, since software development industries exist only in Fiji, the target is limited to Fiji. In Fiji, domestic software development companies are small and have been subject to the expansion of large software development companies from overseas. Since their domestic market is small, they have targeted the Pacific island nations market in addition to the domestic market. However, they are exposed to competition from large companies.

In terms of support for creating contents, there is a film industry in Fiji, and measures for supporting the industry have been set, but there are no ICT contents industries in the country. Contents industries do not exist in either Tonga or Solomon Islands

Table 3.2.3-1 Issues regarding each measure in each country

Measures	Fiji	Tonga	Solomon Islands
Current state of ICT policies	Created	Not created	Not created
Establishment of facilities	USP Statham ICT Park, etc. are established.	No Park or incubation facilities.	No Park or incubation facilities.
HR development	Insufficient reservoir of skilled human resources	Insufficient reservoir of skilled human resources Few HR development organizations	Insufficient reservoir of skilled human resources Almost no HR development organizations
Stimulation of activities to attract industries	Special tax zones, tax breaks measures are established.	No incentives measures for stimulating the attraction of ICT industries.	No incentives measures for stimulating the attraction of ICT industries.
Reduction of telecommunications costs	No support measures for telecommunications costs.	No support measures for telecommunications costs.	No support measures for telecommunications costs.
Support for software development	No support measures for software development.	No software development industries.	No software development industries.
Support for contents creation	No contents-creation industries. Emphasis is placed on film industry.	No contents-creation industries.	No contents-creation industries.

3.2.4 Challenges with New Service Infrastructure

ICT, due to the nature of the services provided, has an impact on the activities of the government and administrative services. These include e-Government and e-Administrative Service, the

development of which requires efforts specific to the small size of Pacific island nations. The issues faced in developing these government-related services, as well as those involving the USP Cloud Data Center being examined at USP as an educational platform to be shared among Pacific island nations are shown below.

i. Infrastructure development for e-Government and e-Administrative Service

e-Government and e-Administrative Service are important services for the growth of the ICT industry. However, for Oceanian countries with small populations, it is not economical for each country to build their own e-Government and e-Administrative Services, nor will operations be efficient after implementation. Thus, it is necessary to examine shared specifications for these systems. Conversely, since each country has its own administrative policies, some functions must be defined as mutually unique functions. Therefore, the examination of shared infrastructure that takes into account the compatibility of both unique and common functions is an issue. These issues are shared themes among Oceanian countries, and should be addressed with the Pacific Islands Forum (PIF) /USP in the central role.

ii. Infrastructure development for the USP Cloud Data Center

In connection with the item above, USP is considered to be an appropriate organization as its public nature for shared infrastructure. Additionally, using this as an opportunity to connect international submarine cables to Tonga, USP will transition their USPNet from satellite communications to submarines cables. In conjunction with this, it is planned to aggregate the databases currently distributed to each department and implement cloud migration for distributed deployment as a part of risk dispersion. The study and assessment of plans for its possible utilization in e-Government and e-Administrative Service systems, including its convenience and reliability as a shared infrastructure is an issue for consideration. These issues should be addressed by USP in the central role while collaborating with PIF and other entities.

3.3 Framework of Support for ICT Industry Development in the Pacific (proposed)

(1) Submarine cable situation in Fiji, Tonga, Solomon Islands, and neighboring island nations

In order for ICT industries to grow, it is important to incorporate foreign demand. To do this, laying international submarine cables is the first necessary condition. When using satellites for international communication, low-cost/high-quality services cannot be offered. International submarine cables will resolve these issues.

In the process of surveying Fiji, Tonga, and Solomon Islands, we have noted the submarine cable situation of Vanuatu and Samoa. The situation in these five countries is shown in Table 3.3-1.

Table 3.3 -1 Situation of submarine cables in 5 Oceanian countries

Country	Situation
Fiji	Connected to SCCN in 2001, currently in operation.
Tonga	Branched from Fiji to connect to SCCN in August 2013, currently in operation.
Solomon Islands	Route is currently being studied. Completion planned for 2015.
Vanuatu	Branched from Fiji to connect to SCCN in November 2013. Start of operation planned for January 2014.
Samoa	New submarine cable routes are currently being studied.

Vanuatu connected to SCCN in November 2013, and is aiming to begin operation in January 2014. The Samoan government is working with the ADB in studying new submarine cable routes. Submarine cables, which are a necessary condition for promoting the ICT industry, are currently connected or are being examined in these two countries. From the viewpoint of wide-area support policy, we propose to expand the countries targeted for support to five countries, including Vanuatu and Samoa.

(2) Support for ICT industry development

The support that Japan can conduct in Fiji, Tonga, and Solomon Islands is proposed below.

Before formulating specific measures, ICT policies must first be developed. The initial approach will be to formulate a vision that firmly describes the hopes and goals of the countries. For Tonga and Solomon Islands, it is possible for Japan to provide support in formulating ICT policies that include their future vision, policies, and strategies. This will be positioned as Priority 1.

The proposed support that Japan can conduct in each country is shown in Table 3.3-2. This reflects five of the six measures taken in Okinawa to develop ICT industries, not including support for creating contents, which does not exist as an industry in these countries. Priority for support other than HR development in Solomon Islands is low, since development will be conducted while monitoring the progress of the plan to lay submarine cables. The priority order for each is shown in the table as a relative sequence.

For development support for ICT industries, HR development will be assigned Priority 2,

following the provision of support for formulating ICT policies. Since the reservoir of skilled human resources is insufficient in each country, support will be provided as regional cooperation by establishing courses in ICT-related vocational training schools and universities with the aim of building up skilled human resources. The creation of an educational environment is also an important target for support for Tonga and Solomon Islands in particular, as neither country sufficiently has an educational environment.

One choice for HR development will be through distance learning that is implemented in cooperation with USP and uses the USPNet to allow people in each country to take courses. It is also necessary to examine HR development support for face-to-face instruction at vocational training schools and universities in each country while taking the countries' conditions into consideration.

Furthermore, HR development will involve the cultivation of ICT, software, and network engineers, as well as entrepreneurs by using universities and other higher education institutions. A relatively long period of time is necessary before results are produced in this medium- to long-term approach. Another HR development approach focuses on providing the fundamental education required for developing ICT industries at vocational training school, which allows results to be obtained in a shorter period of time. The latter approach will have immediate effects since it will be implemented while cooperating with invited or developed ICT industries, based on their needs. Accordingly, this support assumes that employment will be stimulated. Thus, support is necessary for constructing development that includes a combination of the above.

Priority 3 is assigned to support for Tonga, where international submarine cables have already been connected and have begun operations. As part of this, providing support for measures to establish Park and incubation facilities, as well as support in establishing incentives that will help attract ICT industries is a prime task.

Priority 4 is assigned to support for establishing telecommunications cost subsidies as a wide area support measure. Measures using telecommunication line resellers, as were used in Okinawa, are expected to be effective.

Priority 5 is assigned to support measures for software development. This will be support targeted for Fiji as the only country with a software development industry. The development of software industry in their own country is a target. There are the software development companies in Okinawa Prefecture, who will work from the upper processes. The work of the Okinawa Software Center, who aims to bring projects back to Okinawa, and the work of the Ryukyu Software Business Support Center, who aims for the distribution of open source software, will be valuable.

Priority 6 is the same as Priority 3, but it will be developed in accordance with the progress of connecting international submarine cables in Solomon Islands.

Table 3.3-2 Proposed support for each country

Measures	Fiji	Tonga	Solomon Islands
ICT Policy		Priority:1	Priority:1
		Drafting ICT policy	Drafting ICT policy
Establishment of facilities		Priority: 3	Priority: 6
		Individual support	Individual support
		Support for establishing park and incubation facilities.	Support for establishing park and incubation facilities.
HR development	Priority: 2	Support as regional cooperation	
		Support for establishing courses in ICT-related vocational training schools and universities with the aim of building up skilled human resources.	
Stimulation of activities to attract industries		Priority: 3	Priority: 6
		Individual support	Individual support
		Support for establishing incentives for stimulating the attraction of ICT industries.	Support for establishing incentives for stimulating the attraction of ICT industries.
Reduction of telecommunications costs	Priority: 4	Priority: 4	Priority: 4
	Individual support	Individual support	Individual support
	Support for establishing telecommunication cost subsidies	Support for establishing telecommunication cost subsidies	Support for establishing telecommunication cost subsidies
Support for software development	Priority:5		
	Individual support		
	Support for software development		

(3) Concrete plan for support

Through this Survey, we were able to understand the current situation and issues in the ICT field for the Oceanian countries of Fiji, Tonga, and Solomon Islands. Additionally, it was shown that the process and results of the successful systematic development of ICT industries in Okinawa can be applied to ICT industry development in Oceanian countries and used as proposals for support development.

Furthermore, in order to further advance the support plan more concretely, it is important for Japan to continue to support the strategic development of ICT industries in the target countries of Oceania.

Support for strategic development of ICT industries for each country

For ICT industry development, support for formulating ICT policies and their implementation strategies, and for formulating specific measures that follow these strategies is important as a part of strategic development support. Based on this process, measures may include various fields and approaches such as providing support in terms of tax systems, support for job creation, setting special zones, and support for starting businesses and attracting companies through the

establishment/financing of incubation facilities. This also includes the fundamental measure of providing support for HR development. First, ICT policies should be formulated, with support provided for formulating their implementation strategies. Then, once the directionality of the measures has been determined, concrete measures will be selected and priority will be determined. Measures for HR development can also be taken by determining the intended directionality, compensating for weaknesses, and fortifying strengths. Although the insufficient reservoir of ICT human resources has been presented as an issue, depending on foreign demand industries that have been strategically incorporated, the development of human resources outside the ICT field will also be an issue. Finely-tuned HR development will be necessary in connection with the industries that are attracted and developed – in other words, in connection with ICT industry strategy. We thus propose this type of strategic development support for ICT industries.

Okinawa has positioned the ICT industry as an industry that incorporates foreign demand and increases output and employment. Formulating a vision and planned strategies, Okinawa has developed concrete measures using many different approaches. By skillfully incorporating a telecommunication line reselling system, support for reducing telecommunications costs was achieved. Additionally, in an effort to compensate for weaknesses and expand on the strengths of the Okinawa software industry, consortium-like software development companies and the Okinawa Software Center were created and open source software was used to keep development costs down. The Ryukyu Software Business Support Center was also created to provide development support for products independently produced by companies. Introducing these approaches in a workshop format would be an effective method of support, we propose this as one of the support measures.

Furthermore, for e-Government and e-Administrative Service infrastructure development, we propose to assist PIF/USP in establishing a shared infrastructure as unique and common functions of the systems and services.

We propose supporting USP in cooperation with PIF, etc. in their examination of plans for the use of the USP Cloud Data Center infrastructure in e-Government and e-Administrative Service systems, including its effectiveness, convenience and reliability as a shared infrastructure in the region.

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Schedule 1: Okinawa

Date		Organizations visited
September 8	Sun	Traveling
September 9	Mon	Okinawa Office of Telecommunications, MIC Information and Communication Division: JICA Okinawa Regional Economy Division Economy, Trade and Industry Department Okinawa General Bureau Government of Japan Information Industry Association of Okinawa (public interest incorporated association) Information Policy Division of the Department of Planning and IT Industry Promotion Division Department of Commerce, Industry & Labor Okinawa Prefectural Government, Okinawa Prefectural Government
September 10	Tue	Industrial Site and Employment Promotion Division Department of Economy Uruma City Fujitsu Learning Media Okinawa Ltd. Iscec Japan Ltd.
September 11	Wed	Okinawa IT Shinryo Park Okinawa Open Laboratory (general incorporated association) Okinawa Design Center, UNITEC Inc.. Okinawa Software Center Co., Ltd.
September 12	Thu	Commerce and Industry Section of the Civil Affairs Division, Urasoe City Government Nago Development Authority (NDA) (specified nonprofit corporation) Qualysite Technologies Inc.
September 13	Fri	OCC Inc. Uruma Contact Center in Okinawa, Aicam Inc. Customer Support Center, Gaitame.com Co., Ltd. First Riding Technology Inc. Okinawa Center, HR One Corp.
September 14	Sat	Traveling
September 15	Sun	
September 16	Mon	
September 17	Tue	Traveling Nago Development Authority (NDA) (specified nonprofit corporation) TSYS Okinawa Data Center EC Division, Droog Inc.
September 18	Wed	Nago Development Authority (NDA) (specified nonprofit corporation) TIDA-WORKS Inc. Mediaflag Okinawa Inc.
September 19	Thu	Okinawa Cross Head Co., Ltd. GIX Okinawa Okinawa National College of Technology
September 20	Fri	JICA Okinawa Faculty of Engineering, University of the Ryukyus OCC Inc.
September 21	Sat	Traveling

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Schedule 2: Fiji

Date		Visit Destinations
October 28	Mon	▪ JICA Fiji Office
October 29	Tue	▪ Software Factory ▪ Ministry of Industry and Trade/Investment Fiji ▪ USP PiRRC(Pacific ICT Regulatory Resource Center) / PacCERT(Pacific Computer Emergency Response Team)
October 30	Wed	▪ Department of Communications, Government of Fiji
October 31	Thu	▪ USP VC's Forum with FSTE (Faculty of Science Technology and Environment)
November 1	Fri	▪ USP FSTE
November 11	Mon	▪ Travel from Nadi to Suva, PacCERT
November 12	Tue	▪ ATH(Amalgamated Telecom Holdings Limited) ▪ PITA(Pacific Islands Telecommunications Association) ▪ ITCS(Information Technology & Computing Services) /PTL(Pacific Technologies Limited)
November 13	Wed	▪ TFL(Telecom Fiji Limited) ▪ ADB(Asian Development Bank)
November 14	Thu	▪ AusAID(Australian AID, Australian Government)
November 15	Fri	▪ TFL(Telecom Fiji Limited) ▪ FINTEL(Fiji International Telecommunications Limited)
November 18	Mon	▪ Digicel (Fiji) Limited ▪ Vodafone Fiji Limited
November 19	Tue	▪ Connect Internet Service (Fiji) Limited ▪ Telecommunications Authority of Fiji (TAF)
November 20	Wed	▪ USP Deputy Vice-Chancellor ▪ Mindpearl ▪ ANZ in Fiji banking segments
November 21	Thu	▪ Go2Solutions ▪ Standss (South Pacific) Limited
November 22	Fri	▪ Datec (Fiji) Limited ▪ Greymouse
November 25	Mon	▪ PacCERT
November 26	Tue	▪ USP ITS (Information Technology Services)
November 27	Wed	▪ USP FSTE
November 28	Thu	▪ Ministry of Industry and Trade ▪ JICA Fiji Office
November 29	Fri	▪ ICT Conference at USP, travel to Nadi

Data Collection Survey on Okinawa-type Vitalization of Information and
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Schedule 3: Tonga

Date		Visit Destinations
October 21	Mon	<ul style="list-style-type: none"> ▪ JICA Tonga Office ▪ Ministry of Information and Communications
October 22	Tue	<ul style="list-style-type: none"> ▪ Tonga Communications Corporation ▪ Ministry of Public Enterprises
October 23	Wed	<ul style="list-style-type: none"> ▪ USP (The University of the South Pacific)/IOE (Institute of Education)
October 24	Thu	<ul style="list-style-type: none"> ▪ ProComm Services ▪ Tonga Institute of Science/School of Tourism and Hospitality ▪ Tupou Tertiary Institute
October 25	Fri	<ul style="list-style-type: none"> ▪ Tonga Cable Limited ▪ Embassy of Japan ▪ Digicel Tonga Limited ▪ JICA Tonga Office

Schedule 4: Solomon Islands

Date		Visit Destinations
November 5	Tue	<ul style="list-style-type: none"> ▪ JICA Solomon Islands Office
November 6	Wed	<ul style="list-style-type: none"> ▪ USP ▪ Solomon Telekom Company Ltd. ▪ Solomons Oceanic Cable Company
November 7	Thu	<ul style="list-style-type: none"> ▪ Government Communication Unit, Office of the Prime Minister and Cabinet ▪ ADB Pacific Department ▪ Advanced Technologies Ltd.
November 8	Fri	<ul style="list-style-type: none"> ▪ ICT Support Unit, Ministries of Finance & Treasury ▪ Bemobile Solomon Islands