IFEZ SMART CITY

IFEZ SMART CITY

What is
SMART CITY?

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01

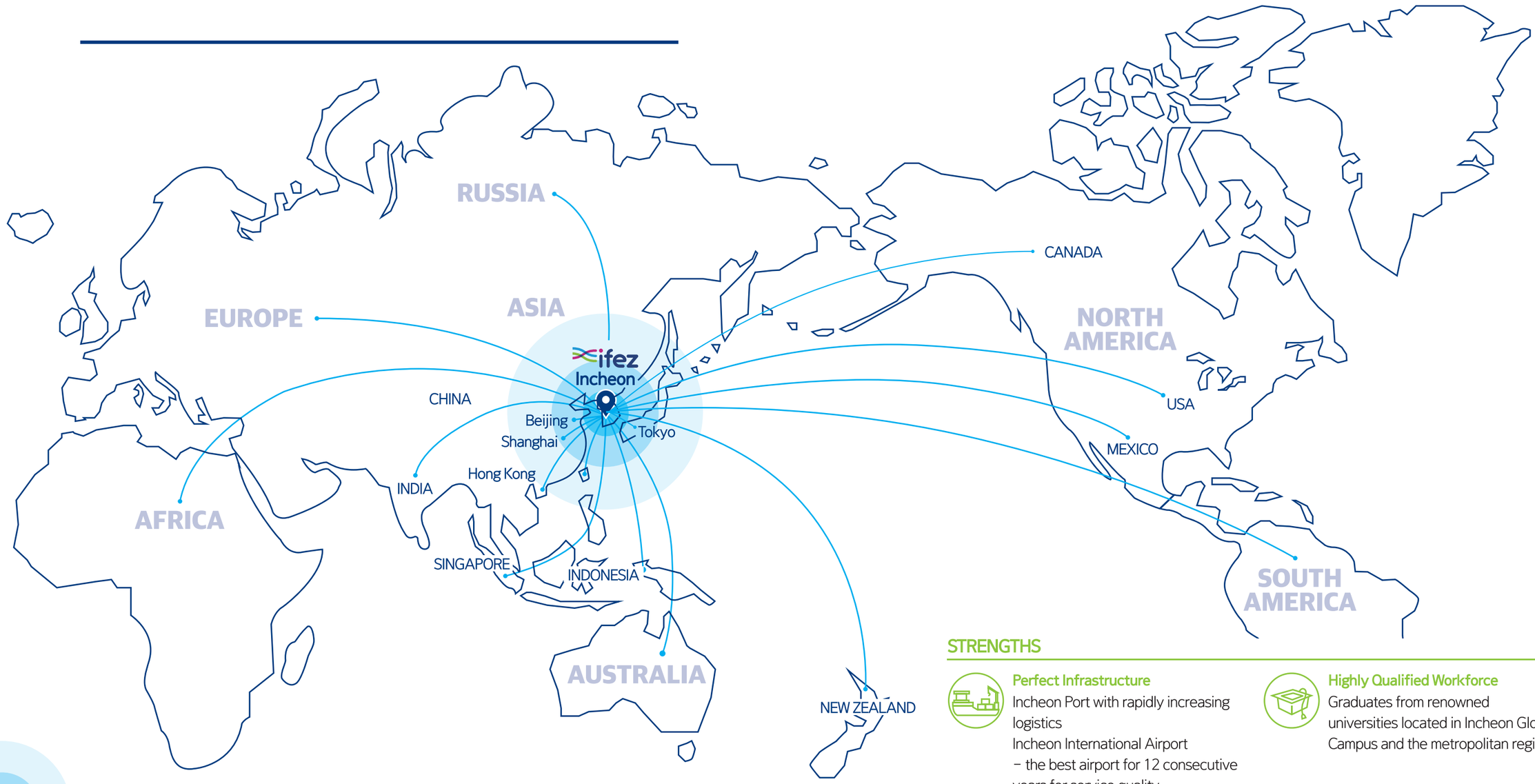
About IFEZ

1. Global Business Frontier IFEZ
2. Business Triangle

IFEZ
SMART CITY
CONSULTING

01 Global Business Frontier IFEZ

IFEZ is bridging optimal infrastructure and business environments towards successful businesses based on its outstanding geographical position as the hub of Northeast Asia.



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2hr
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Republic of Korea – the Northeast Asian Hub

- Korea is located between the 2nd (China) and 3rd (Japan) largest economies in the world.
- It can reach 147 countries and more than 1 million people within 3 hours flight.

STRENGTHS

Perfect Infrastructure
Incheon Port with rapidly increasing logistics
Incheon International Airport – the best airport for 12 consecutive years for service quality

Highly Qualified Workforce
Graduates from renowned universities located in Incheon Global Campus and the metropolitan region

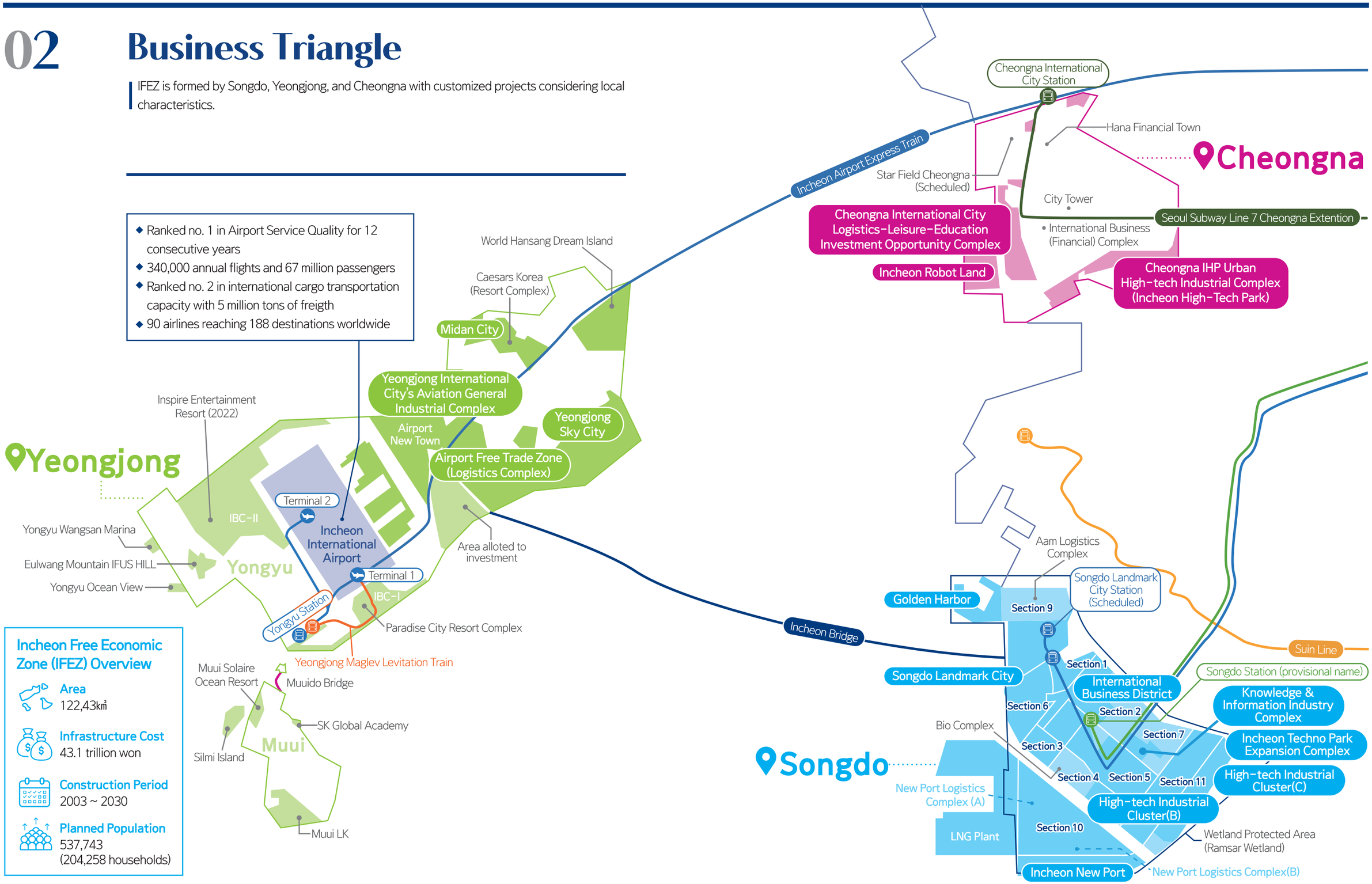
Optimal Business Environment
Active supply of central information
Incheon Free Economic Zone incentives

High Life Quality
Global standards infrastructure and living conditions

02 Business Triangle

IFEZ is formed by Songdo, Yeongjong, and Cheongna with customized projects considering local characteristics.

- Ranked no. 1 in Airport Service Quality for 12 consecutive years
- 340,000 annual flights and 67 million passengers
- Ranked no. 2 in international cargo transportation capacity with 5 million tons of freigth
- 90 airlines reaching 188 destinations worldwide



Incheon Free Economic Zone (IFEZ) Overview

Area
122,43㎢

Infrastructure Cost
43.1 trillion won

Construction Period
2003 ~ 2030

Planned Population
537,743
(204,258 households)

02

IFEZ Global Leading Smart City

1. IFEZ – Global Representative Leader in Smart Cities
2. IFEZ Smart City Composition
3. IFEZ Smart City Platform
4. IFEZ Smart City Accomplishments

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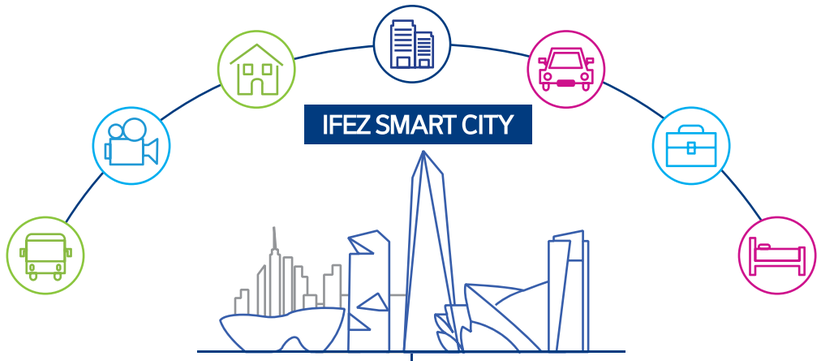
01 IFEZ – Global Representative Leader in Smart Cities

◆ IFEZ was designed to be a Greenfield smart city from its planning stages, providing the best residential conditions to citizens, optimal business environments to companies, and sustainable innovation dynamics to urban spaces.



To Citizens
Providing the best residential conditions

To Companies
Providing optimal business competitiveness

To Urban Spaces
Providing sustainable innovation dynamics

IFEZ Smart City Project Implementation Stages

◆ The IFEZ Smart City project is categorized into the Construction Stage (from 2003 to 2009) when the infrastructure was built, the Platform-based Connection Stage (from 2010 to 2016), and the Full-scale Implementation Stage (from 2017 to 2030) fostering new services.

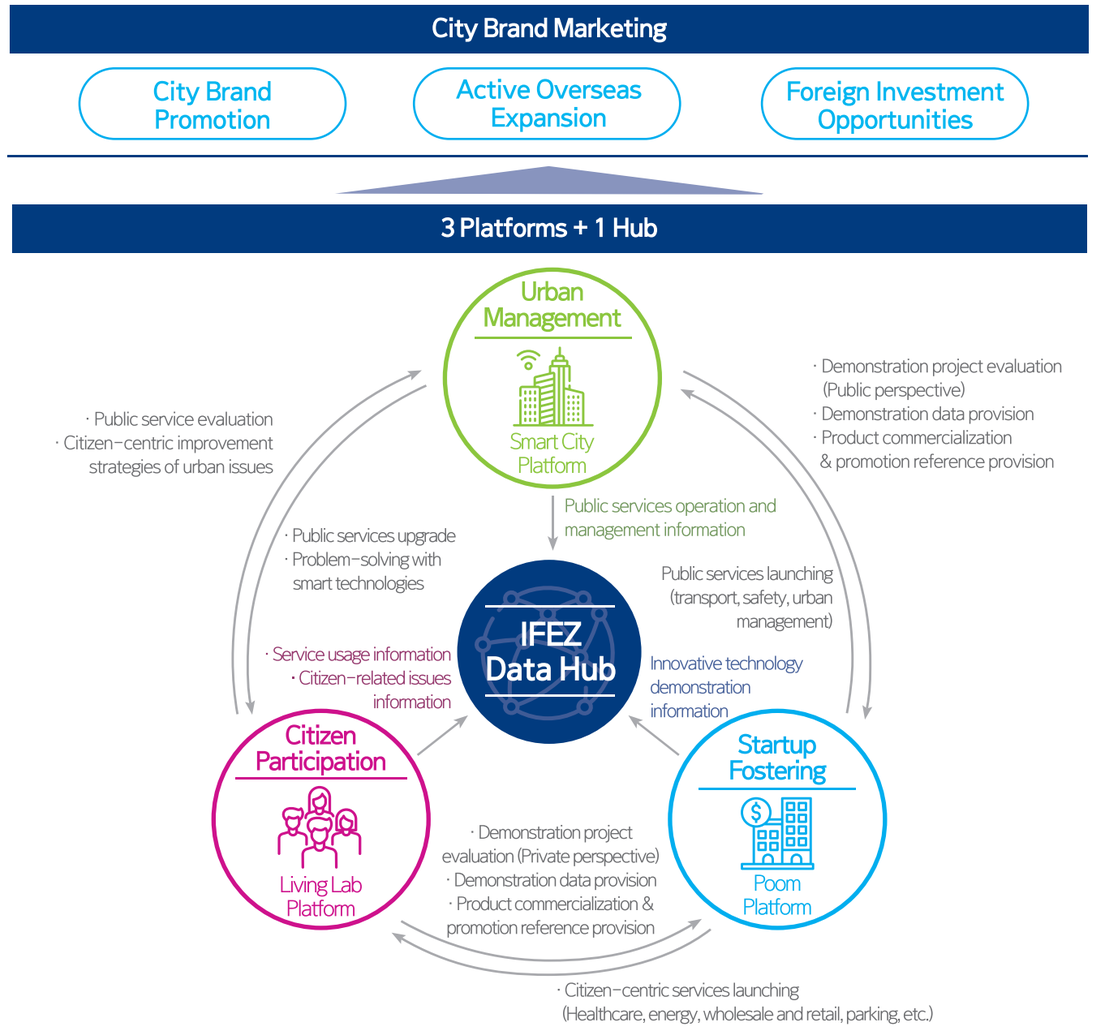
2003 – 2009 | 2010 – 2016 | 2017 – 2030

Smart City Infrastructure Construction Stage
- ◆ Smart city construction strategy and design
- ◆ Basic infrastructure through the convergence of construction and ICT

Platform-based Information and System Integration
- ◆ Platform-based integration of Songdo, Yeongjong and Cheongna
- ◆ Establishment of the IFEZ Smart City Operation Center

New Services/ Industries Identification and Fostering
- ◆ Smart services upgrade
- ◆ 4th Industrial Revolution technology startups fostering (Incheon Startup Park)
- ◆ Testbed for innovative technology

IFEZ Smart City Strategies

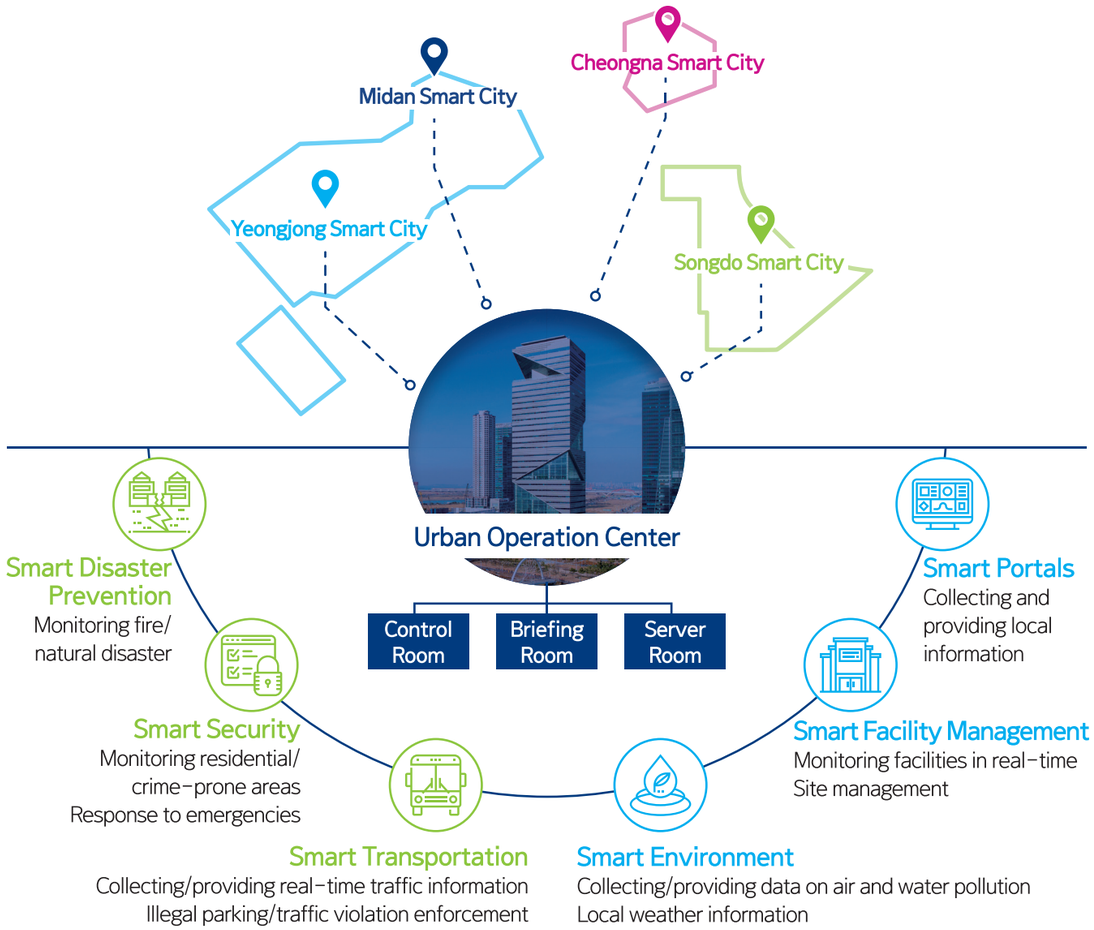


- Smart city services configuration based on the e-government framework
- 3 districts data collection 〉 Analysis 〉 Management, One Source Multi Use Function
- Public Big Data connection-based services development and operation function: connection with Yeonsu Police Station, Natural Disaster Prevention Center, etc.

IFEZ Smart City Operation Center

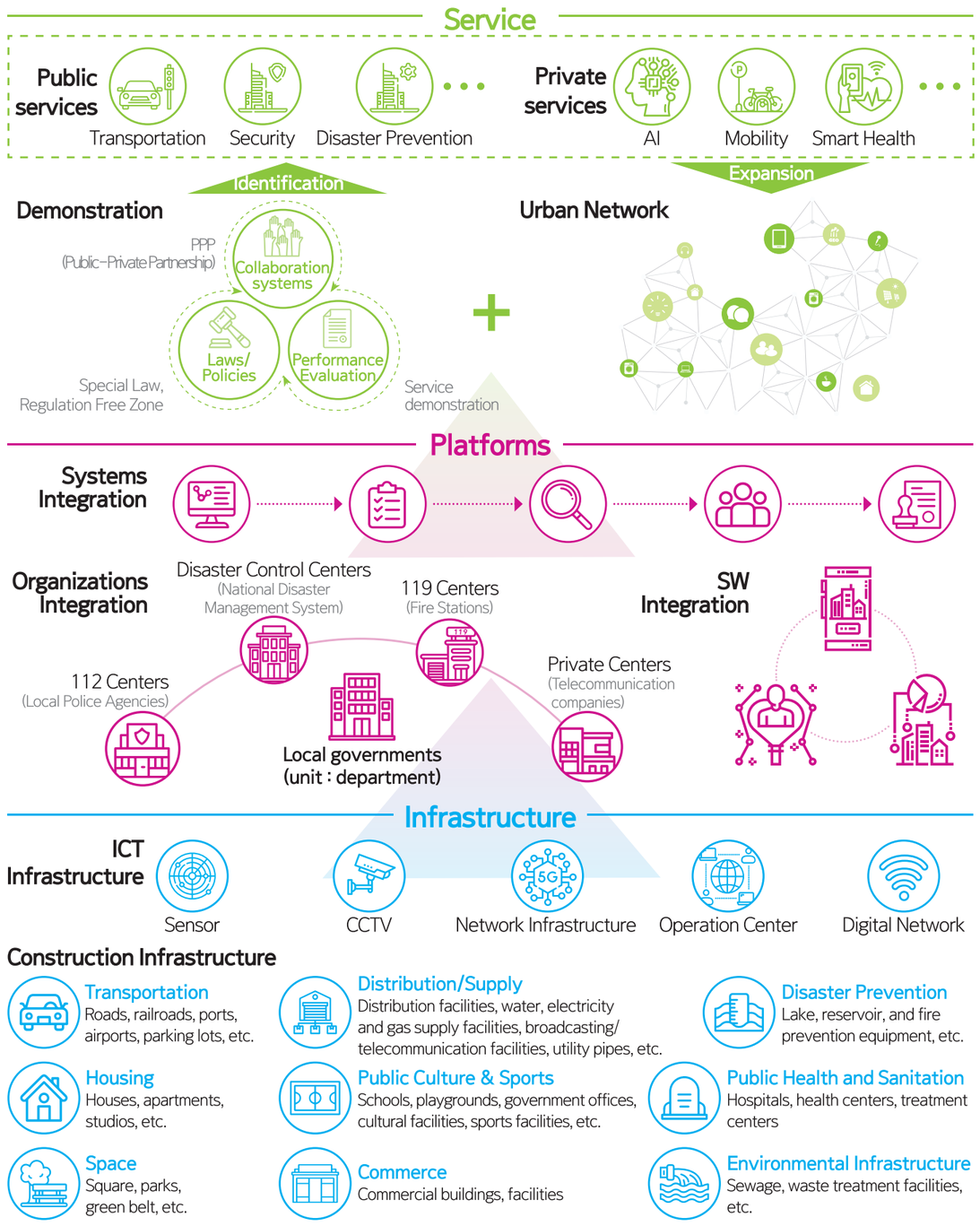
IFEZ Smart City Operation Center

- Implementation and operation of a single urban operation center integrating the 3 districts of IFEZ (Songdo, Yeongjong and Cheongna)
- Data collection and provision connecting public institutions such as Incheon Traffic Information Center, Incheon Fire Department, Incheon Police Department, etc.
- Establishment of consistent monitoring and management systems for smart city services based on the 4th Industrial Revolution technologies



Facility | IFEZ Smart City Operation Center
Location | 3rd Floor IFEZ Smart City Operation Center, Cultural Annex G-Tower, Yeonsu-gu, Incheon Metropolitan City
Composition | Integrated Control Room, Briefing Room, Equipment Room, Meeting Room
Area | 1,169.5㎡
Services ◆Management and operation of IFEZ Smart City facilities
◆IFEZ Smart City Operation Center management, 24/7 CCTV monitoring and incident control

02 IFEZ Smart City Composition



IFEZ Smart City
Construction Status by District

2007 — 2008 — 2018 — 2020 — 2030

Songdo International City

Project cost | 164.7 billion won **Scale** | 53.4㎢ **Project Operator** | IFEZ

Plans & Accomplishments

- Feasibility test and USP establishment (2007–2008)
- Construction of sections 1 to 4 (2013–2017)
- Opening of the IFEZ Smart City Operation Center (2017)
- Construction of sections 5 and 7 (2009–2019)
- Construction of sections 6 and 8 (2015–2023)
- Construction of section 11 (2021–2030)

Yeongjong International City

Sky City

Project cost | 102.7 billion won **Scale** | 91.6㎢ **Project Operator** | Korea Land and Housing Corporation (LH), Incheon Housing and City Development Corporation (iH)

Plans & Accomplishments

- Plan starting (2009)
- USP completion (2009)
- 1st stage construction (2013–2021)
- 2nd stage construction completed (2018–2021)

Midan City

Project cost | 17.6 billion won **Scale** | 2.7㎢ **Project Operator** | Incheon Housing and City Development Corporation (iH)

Plans & Accomplishments

- Plan starting (2009)
- USP completion (2009)
- Construction (2008~2018)

Cheongna International City

Project cost | 68.6 billion won **Scale** | 17.8㎢ **Project Operator** | Korea Land and Housing Corporation (LH), IFEZ

Plans & Accomplishments

- Plan starting (2007)
- USP completion (2008)
- 1st stage project (2007–2014)
- Block 2 investment project (2016–2019)
- IHP, Eco-friendly Complex (2017–2021)

Smart City Infrastructure Status

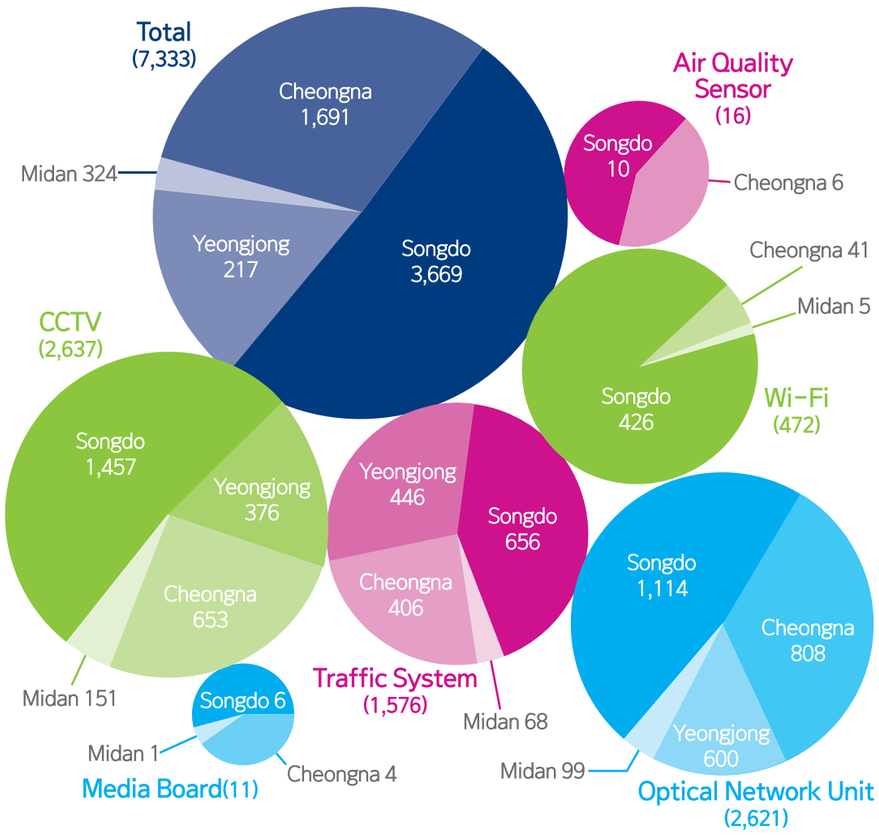
◆ Establishing smart city infrastructure that connects the entire city through one network and reflects various information communication technologies into urban spaces

Smart City Operation Center

IFEZ Smart City **Software Platform**

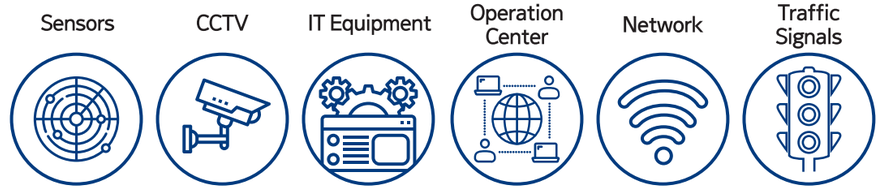
IFEZ Smart City **Hardware Platform**

On-site Smart City Infrastructure



As of October 2021

ICT Infrastructure



03 IFEZ Smart City Platform

◆ There is a wide range of smart city services. IFEZ provides an integrated platform to effectively and comprehesively apply and manage such services in urban areas. The IFEZ hardware and software platforms can be implemented in cities planning smart city projects.

ifez Smart City Platform

IFEZ Smart City Software Platform

The core software of the smart city operation center with the main purpose of providing unified software frameworks for easy expansion and management of smart city services

- ◆ Increased efficiency and reduced operating costs when adding new services
- ◆ Centralized operation within the same environment when managing existing services

IFEZ Smart City Hardware Platform

This hardware platform guarantees operating costs reduction and scalability by optimally applying virtual technology in various system resources in the management of smart city services

- ◆ Establishing systems to share and expand data center resources such as server, network, etc.
- ◆ Substantial reduction in operating costs

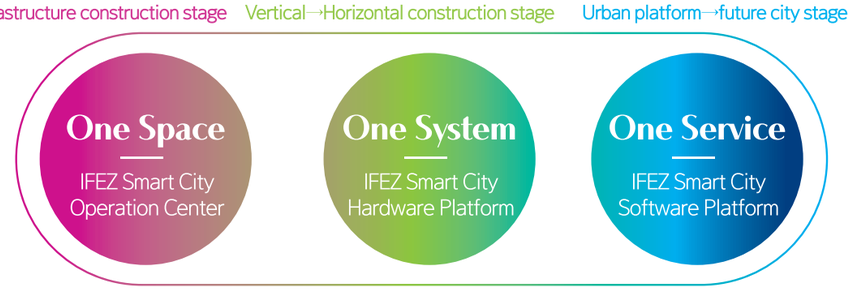
Smart City Platform Effectiveness

- ◆ Provides platform-based smart city services development model
- ◆ Maximizes efficiency through software and physical virtualization integration
- ◆ Applies open source and e-government standard architectures
- ◆ Provides intelligent integrated control solutions through effective data collection/storage/processing/distribution

Infrastructure
Urban infra, ICT infra, spatial information infra
–
Infrastructure construction stage

Data
Urban data, ICT data, spatial information data
–
Vertical→Horizontal construction stage

Service
Experiential services, new technology convergence
–
Urban platform→future city stage



Incheon Startup Park

◆ IFEZ is focusing on an innovative startup ecosystem creation through open innovation at 'Incheon Startup Park', which assumes core roles in the industrial ecosystem structure and smart city innovation growth.

Incheon Startup Park
– Korea's first public and private startup fostering model

Incheon Startup Park creates an ecosystem to unicorn companies by implementing a comprehensive startup support system combining the know-how and technology of the private sector with resources from the public sector.

START UP INNOVATION POOM — Public-driven
POOM

Private-driven — Shinhan S² BRIDGE INCHEON
Shinhan S² Bridge Incheon

START UP PARK INCHEON
인천광역시 · ifez 인천경제자유구역 Incheon Free Economic Zone

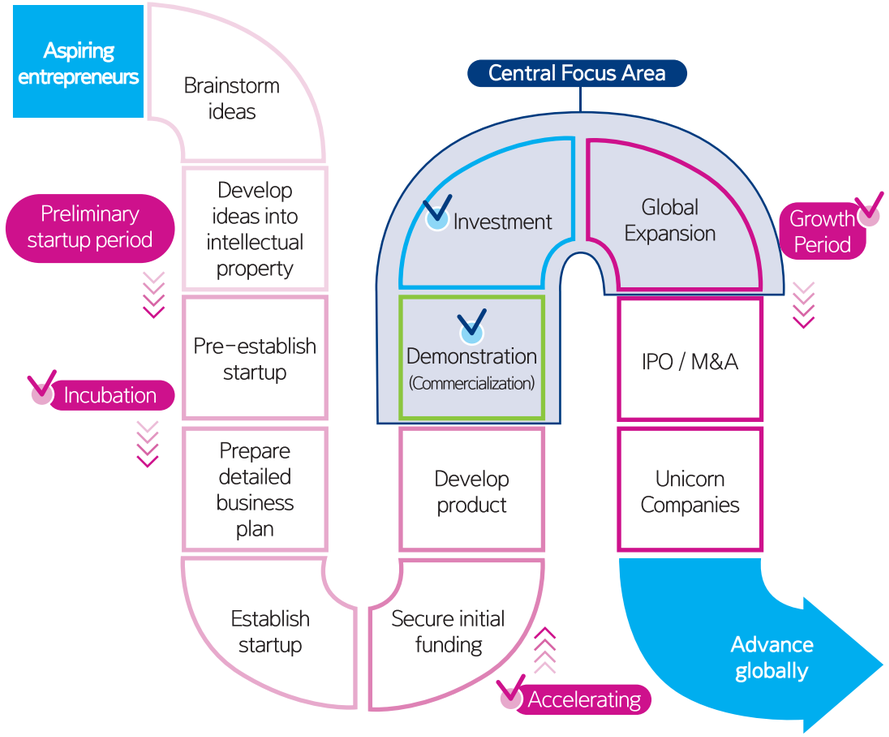
Insta I

- ◆ **Operation programs by public organizations**
  | IFEZ (Incheon Technopark)
- ◆ **Demonstration-based customized program**
  | Demonstration (Space, infrastructure/platform, data, expert support), investment, global expansion

Insta II

- ◆ **Operation programs by private organizations**
  Shinhan Financial Group, Celltrion, Google
- ◆ **Lifecyle fostering integrated membership program**
  | Incubation, accelerating, global membership

Customized Support Program by Stage



Incubation Programs	◇ Build-up incubation program ◇ Growth management and follow-up support
Accelerating Programs	◇ Customized accelerating program ◇ Connecting investment, including IR demo-day
Demonstration Programs	◇ Demonstration-based commercialization support program ◇ Collaboration partner (Institutions - company) program ◇ Scale-up challenge Lab program ◇ IoT test field supporting program ◇ Big data · AI platform supporting program
Investment Programs	◇ Spark IR Day ◇ Technology certification supporting program ◇ Incheon International Airport 3K + startup supporting program ◇ Virtual startup development program
Global Expansion Programs	◇ Startup boost program ◇ Support program to enter global markets

Governance Through Partnerships

- ◆ Public corporation and investment agencies –〉 Incheon Metropolitan City –〉 Piloting with Incheon affiliated agencies and turning Incheon into a city-wide testbed
- ◆ Early commercialization support of startup products and services through the provision of specialized demonstration resources

Incheon Airport · nipa 정보통신산업진흥원 National IT Industry Promotion Agency · 인천도시공사 · NIA 한국지능정보사회진흥원 · 인천교통공사 · 창업진흥원 KOREA START UP

- ◆ Supporting startup product and service demonstrations by utilizing special resources of universities
- ◆ Operating programs for smart city, biotechnology, global expansion, and big data AI branding-design

인천대학교 INCHEON NATIONAL UNIVERSITY · 세종대학교 SEJONG UNIVERSITY · 인하대학교 · THE UNIVERSITY OF UTAH · 연세대학교 YONSEI UNIVERSITY · 청운대학교 CHUNGWOON UNIVERSITY

Public Agencies

6 Universities

START UP PARK INCHEON

12 Companies

28 Investors

- ◆ Startup identification and fostering programs provision for specialized areas
- ◆ Providing demonstration resources for common market entry

※ Opening of Google for Startups (Smart city accelerating program)

신한금융그룹 · CELLTRION · Google for Startups · SAMSUNG BIOLOGICS · GS 칼텍스 · posco

- ◆ Startup specialized accelerating program
- ◆ Funding support for startup scale-up, such as mass production, market opening, etc.

CNTTECH · igniteXL VENTURES · BIGBANG ANGELS · MAGNA INVESTMENT · CREATIVE VALLEY · SEJONG VENTURE PARTNERS

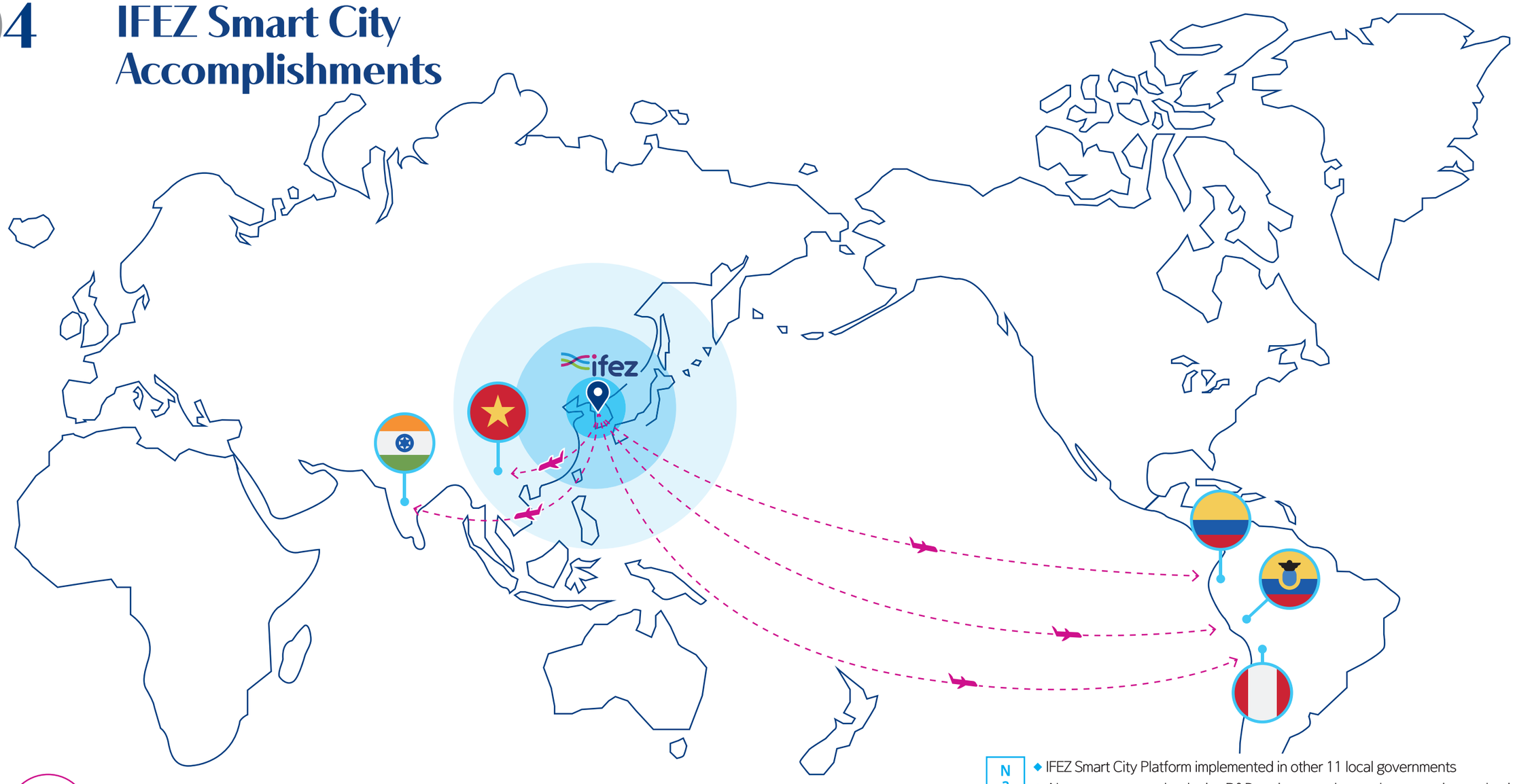
Incheon Startup Park

‘Embracing innovation and creating groundbreaking values’

Incheon Startup Park innovates cities by fostering startups to grow into global unicorn companies in the areas of biotechnology and the 4th Industrial Revolution

START UP PARK
INCHEON

04 IFEZ Smart City Accomplishments



Major Awards

- E-Government Best Practice 2017 by the Ministry of the Interior and Safety
- Smart City Asia Pacific Awards 2016 & 2017 by the International Data Corporation (IDC)
- GEO Smart 2017 GIS Excellence Software Award

Certifications

- IFEZ Smart City Platform Intellectural Property Rights: 2 software copyrights and 3 patents
- IFEZ Smart City Platform Certification |
  Smart City Platform Standard Certification by the Ministry of Land, Infrastructure and Transport
  GS (Good Software) Certification by the Ministry of Science and ICT
  GDC (Green Data Center) Certification by the Ministry of the Interior and Safety

National and Overseas Projects

National

- IFEZ Smart City Platform implemented in other 11 local governments
- AI convergence technologies R&D project to enhance the smart city productivity by the Ministry of Science and ICT (Mar. 2019 to Dec. 2021)
- Data map-based big data technology R&D project by the Ministry of Science and ICT (Mar. 2020 to Dec. 2023)
- IoT test field project by the Ministry of Science and ICT (Jan. 2020 to Dec. 2021)

Overseas

- Master plan for Yachay Knowledge City, Ecuador (2013)
- Smart city feasibility study for Valledupar and Villavicencio, Colombia (Jul. 2015 to Feb. 2016)
- Smart city operation center consulting services for Vietnam (Jun. 2017 to May 2018)
- IFEZ Smart City Platform-based drone air quality monitoring for India (May 2017 – present)
- Smart city collaboration MoU signed with Surco, Lima, Peru (July 2018 – present)

03

What Is Smart City Consulting?

1. IFEZ Smart City Consulting Service Overview
2. Consulting Service Areas
3. Consulting Service Categories
4. Consulting Procedures
5. Smart City Service Examples
6. Previous IFEZ Smart City Consulting Projects

IFEZ
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CONSULTING

01 IFEZ Smart City Consulting Service Overview

Contact
032-453-7465 Tel
mylee0610@korea.kr Email

What is Smart City Consulting Service?

- Smart city consulting services support the planning of smart city projects run by foreign and local governments, sharing IFEZ Smart City know-how and experiences.
- It supports a wide range of projects covering smart city plans, development, construction, and implementation, maintenance, and management of smart city services.
- It enables the connection of existing infrastructure and services with new smart city-related projects.
- It assigns consultants after selecting projects to assist in the planning of smart cities reflecting requirements, legal aspects, systems, urban problems, local conditions, etc.

Business Goals

To identify collaborative smart city projects in a joint effort with foreign and local governments, develop global smart cities and achieve mutual economic growth by sharing and spreading advanced technology and skills among participating countries.

Service Contents

Smart city consulting services support the planning of smart city projects run by foreign and local governments, sharing IFEZ Smart City know-how and experiences.

02 Consulting Service Areas

Current status research & analysis

- Analyzing general conditions such as socioeconomic status and statistics, demographic and industrial statistics, etc;
- Reviewing national economic development plans, policies, and implementation
- Analyzing the road traffic and existing ITS conditions for the route under consideration
- Analyzing the existing connected centers
- Analyzing legal system and environment for the management of a traffic control surveillance center
- Reporting analysis results and implications

Basic Planning

- Confirming the scale of a project
- Defining smart city services
- Designing smart city center and on-site facilities
- Identifying organizations in charge of projects and its implementation structure
- Providing technical training programs
- Guiding the project's standard management process (e.g. government approval, center space acquisition, etc.)
- Identifying problems and solutions for the project
- Guiding the operation and maintenance standards
- Suggesting follow-up projects

Basic direction and follow-up tasks

Budget calculation

- Calculating construction costs according to the basic plan (considering local prices and labor cost)
- Providing assistance in technical training expenses
- Assisting in developing funding plans

Project feasibility analysis

- Presenting the legal, policy and technical feasibility of the project
- Presenting the legal, policy and technical feasibility of a target project
- Analyzing the project's economic feasibility
- Analyzing management conditions, risk factors, and alternatives

03 Consulting Service Categories

City Development Type

| Greenfield

- Large scale projects developing, constructing, maintaining and operating new cities, industrial complexes, residencial areas, etc. including smart solution by city type
- Applicable in urban planning and new cities of developing nations with lack of infrastructure such as SOC information system, etc.
  Ex) Dubai's artificial island Palm Jumeirah, Japan's largest reclaimed land Ogata Village

Planning Stage
- Building urban infrastructure
- Preparing effective operation foundations such as data collection, monitoring, control, etc.

Connection Stage
- Connecting data with each system in the planning stage
- Building low-cost, highly effective urban services
- Using a smart city operation center or platform-based software

Implementation Stage
- Identifying new services based on new technologies
- Developing new industrial markets using project data, ideas, technology, etc.

Smart Solution Type

| Brown Field

- Small and medium scale projects implementing and operating individual smart solutions to solve existing urban problems
- Applicable in existing cities with basic infrastructure such as SOC information system, etc., and planned cities
  (e.g. Touristic cities in South America and Southeast Asia)
- Data can be used broadly in cities with basic infrastructure, whereas thorough preparation from the planning stage is required for the City Development Type

Theme 01 | Tourism and Traffic Infrastructure for Leisure and Convenience

- Convenience and leisure to tourists
- Convenient public transportation environment
- Traffic congestion relief

▸ Local tourist information
▸ Smart parking
▸ Smart bus stops
▸ Smart pole
▸ Intelligent traffic information
▸ Public Wi-Fi

Theme 02 | Safe City Based on Intelligent Security/Disaster Prevention Infrastructure

- Sensor/image-based integrated safety infrastructure
- Safety for the disadvantaged

· Lost child prevention
· Smart crosswalk
· Smart streetlamps
· Sensor-based intelligent safety management
· Real-time evacuation alarm service
· Care services for the disadvantaged
· Drone control services

Theme 03 | Smart Green City for Energy Saving

- Energy expenses reduction for houses/shops/buildings
- Cost saving by minimizing water leakage

· Smart home energy saving
· Real-time water leakage and quality control
· Integrated urban smart energy management
· Building energy saving
· Smart public bicycles

Theme 04 | Citizen Centric IoT Leading City

- Citizen participation in projects
- Citizens and local corporations-led services identification

· Sensor-based life quality improvement
· Realistic virtual classes
· Smart education
· Living Map
· Small businesses' marketing platform
· Digital signage

04 Consulting Procedures

1st Stage

Business Model Development

A business model is developed based on a thorough analysis of the local environment, including its market size, investment status, competitor trends, etc.

Detailed Activities

Environment Analysis | Assessing the overseas market and developing a promising business model
Target Region Analysis | Analyzing the project scope, local partners, informatization status, etc.
Business Model Definition | Defining a smart city model customized to the region

Core Success Factors

- Target market needs analysis
- Service type review and application
- Smart city best practices review

2nd Stage

Project Development

Specific action plans to enter a market are designed and a pilot project reflecting local needs based on strategic partnerships is conducted.

Detailed Activities

Entry Strategies | Analyzing the market size, status and best practice trends
Marketing Pilot Project | Conducting a feasibility Study, pre-master plan
Strategic Partnership | Signing MoU and developing future joint projects

Core Success Factors

- Establishment of pilot projects and formation of cooperative networks
- Project feasibility analysis through feasibility study and pre-master plan
- Decision-makers' approval and pilot project budgeting

3rd Stage

Financing Methods Search

Local financing and international aid potentiality are reviewed.

Detailed Activities

Local Investment Resources | Analyzing budgets of government and private organizations related to smart cities
Aid from Korea | Utilizing aid and resources in Korea (ODA, EDCF, etc.)
International Aid | Utilizing international aid and resources (UNDP, MDB, IDB, WB, etc.)

Core Success Factors

- Local funding resources and international aid potentiality analysis

4th Stage

Contract and Implementation

Project contracts are signed based on intergovernmental agreements and the Feasibility Study results and Master Plan from the previews stages.

Detailed Activities

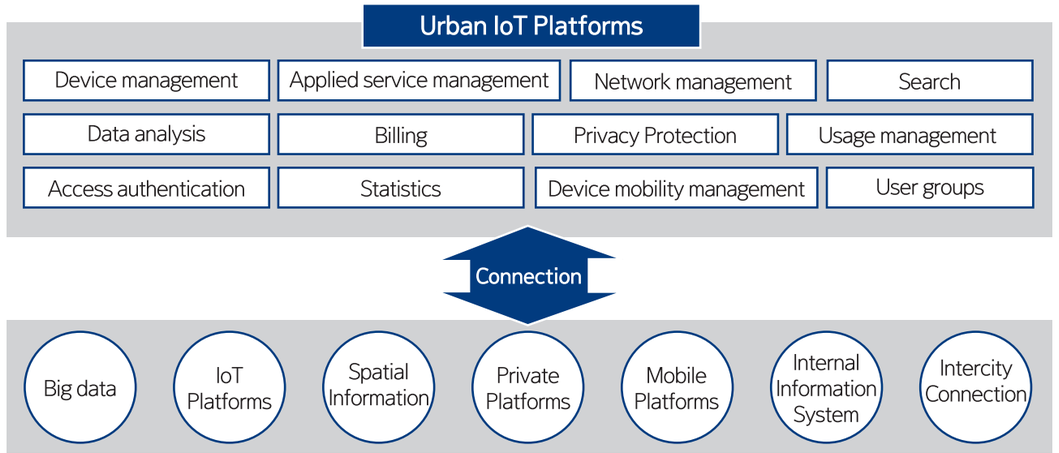
Negotiations with Central/Local Governments | Loan application and collaboration agenda between governments
Central/Local Governments Agreements | Signing agreements based on the agreement
Contract | Forming a consortium and participating in projects

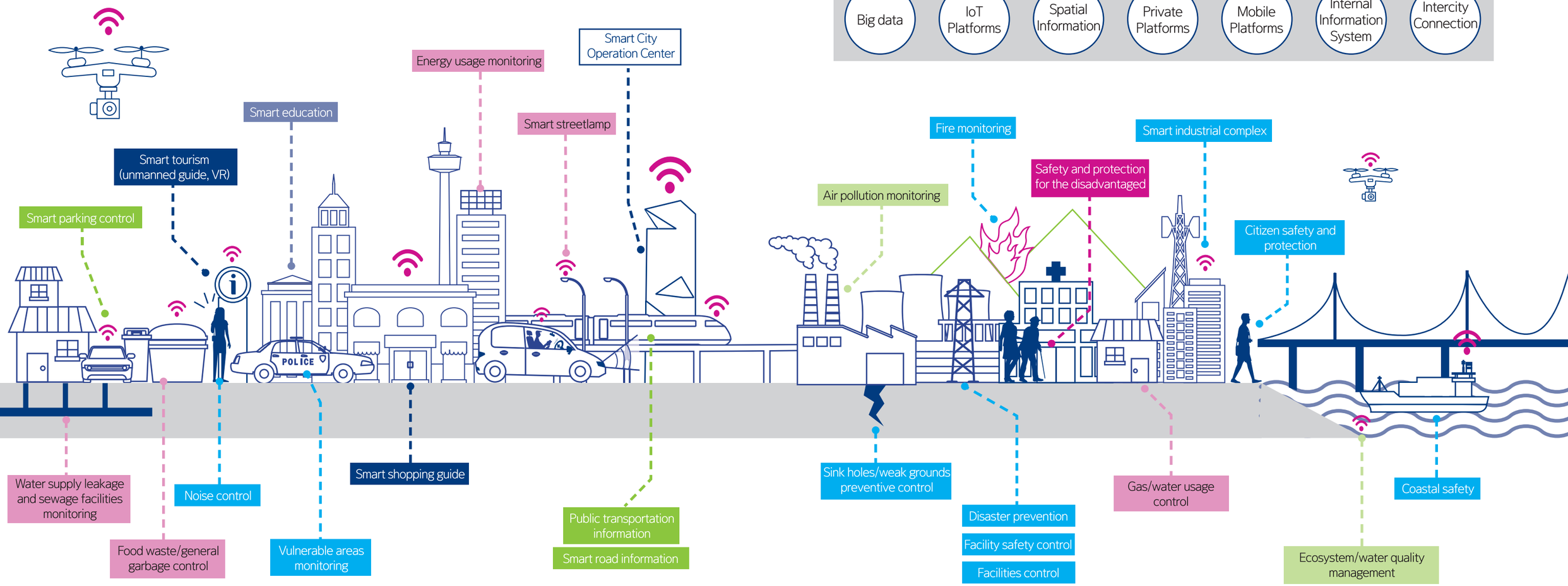
Core Success Factors

- Consortium formation among participating companies
- Skills, competitive prices and proposal differentiation

05 Smart City Service Examples

Smart City Consulting-based Services Examples





06 Previous IFEZ Smart City Consulting Projects

Overseas Projects

Yachay Knowledge City Master Planning, Ecuador

- ISP set up
- Feasibility studies
- Measures to improve metropolitan transportation

Period April 2012 - May 2013

Projects
- Setting up marketing strategies
- Reviewing feasibility study results
- Establishing metropolitan city development plans

Colombia Smart City Planning

- ICT current situation analysis
- City problems analysis
- IOC formation evaluation
- Smart City technology workshop

Period September 2015 - December 2015

Projects
- Designing smart city plans for Valledupar and Villavicencio
- Analyzing city problems and information communication technology infrastructure
- Conducting a Korean smart city case study analysis
- Evaluating the establishment of an integrated urban operations center (IOC)
- Providing training and workshops for employees of Colombian government agencies

Vietnam Smart City Consulting

- Feasibility studies (FS)
- Pre-FS
- Vietnamese version platform provision
- Platform technical support and training
- Smart city service survey
- Smart city service development

Period September 2017 - December 2017 (Consulting)
January 2018 - December 2018 (Pilot Service)

Projects
- Conducting pre-feasibility studies over 10 Vietnamese cities
- Conducting surveys and feasibility studies over 10 Vietnamese cities
- Reviewing the Vietnam Smart City budgeting
- Developing smart services customized for cities
- Providing technical support and training
- Building and applying platforms and IOC

Philippines Traffic Signal Control Implementation

- ICT current situation analysis
- City problems analysis
- IOC formation evaluation
- Smart City technology workshop

Period September 2019 – December 2020

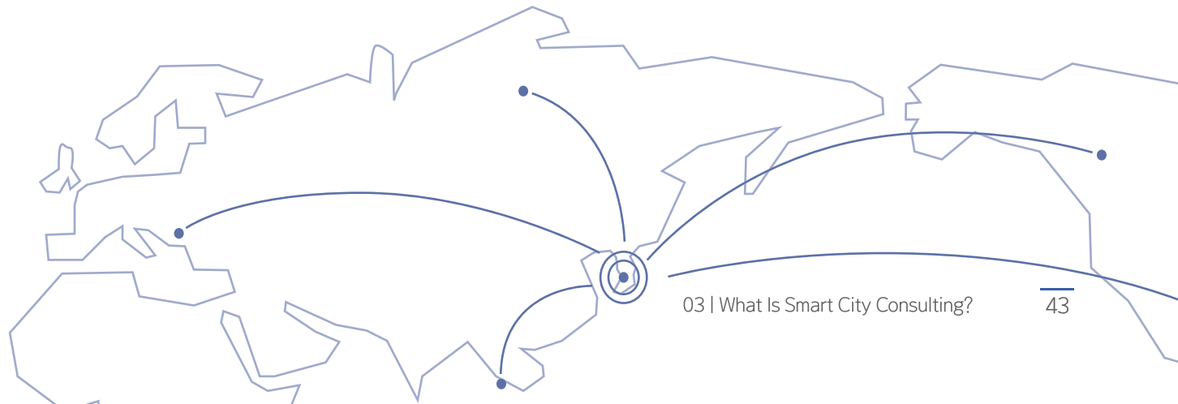
Projects Implementing a smart city platform-based pilot traffic signal control system

India Drone Monitoring Service Development

- Indian version platform provision
- Platform technical support and training
- Smart city service survey
- Smart city service development

Period June 2017 – October 2019

Projects Conducting R&D (environmental sensing) on platform-based drone control system



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Appendix
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#1 IFEZ Smart City Software Platform

IFEZ Smart City Software Platform

- Applies open-source and e-government architectures
- Provides ESB-based standards connection (applying IoT of international standards oneM2M), open API, HTML5-based web services
- Package-based solutions independent from solutions, vendors, construction companies, etc.

Integrated Control System

Internal connection, situation control, situation registration, task division, task management, statistics management, etc.

S-Service System Connections

S-Service System Connection
S-Traffic,
S-Crime prevention,
S-Disaster prevention,
S-Environment,
S-Facilities, etc.

Geographic Information System

GPS display, supporting the management of situation control facilities

Dashboard Editing System

Content management, dashboard editing management, dashboard display management, etc.

Image Management System

VMS,
Web-based image display, etc.

Server/Network Visualization System

Event, system, network integrated display

Connection Management System

Standard text and data collection management, resources processing and routing management, etc.

Application Areas

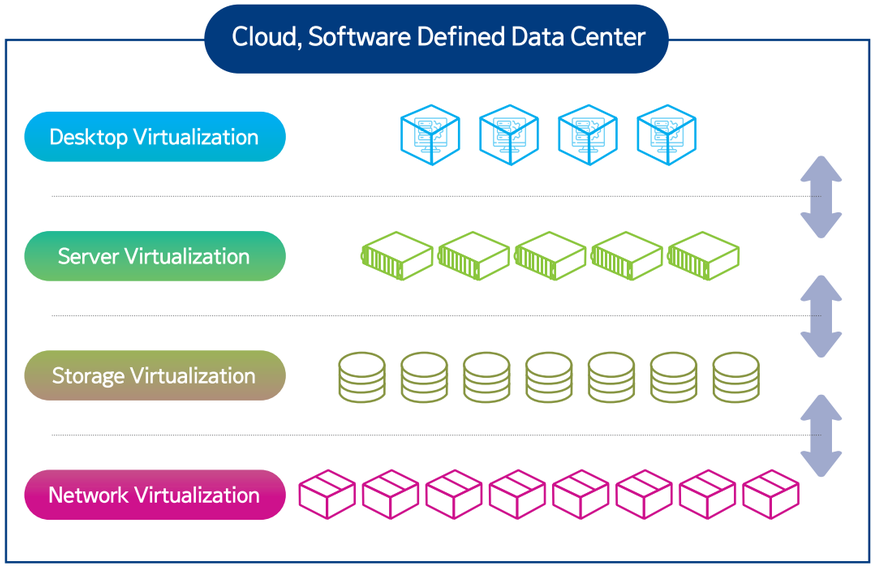
- Smart city operation integration and control software

#2 IFEZ Smart City Hardware Platform

IFEZ Smart City Hardware Platform

Cloud Data Center

- Korea's first software-defined data center in the public sector
- Desktop / Server / Storage / Network virtualization
- Minimizes operating costs and hardware/software implementation costs through center and service platform integration and Cloud technologies
- Secures system expansion through standardized systems



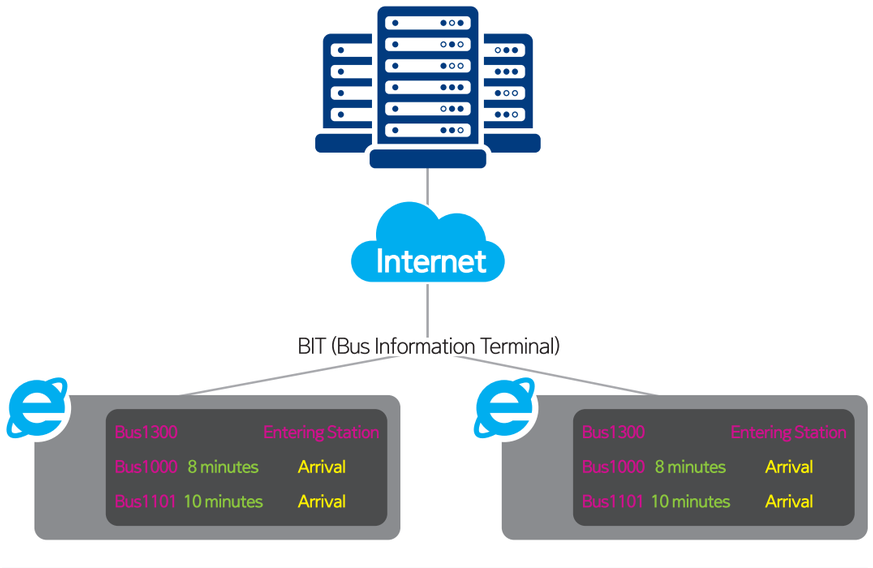
Application Areas

- Smart city cloud data center

#3 IFEZ Web-based Bus Information System [Barobus]

IFEZ Web-based Bus Information System (Barobus)

- Bus arrival information guidance system based on web technologies
- Cost-efficient and low-maintenance compared to existing systems
- Centralized web-based function upgrade
- Rapid response to service disruptions and easy adaptation to various system environments
- Multilingual function (voice guidance function, etc.)



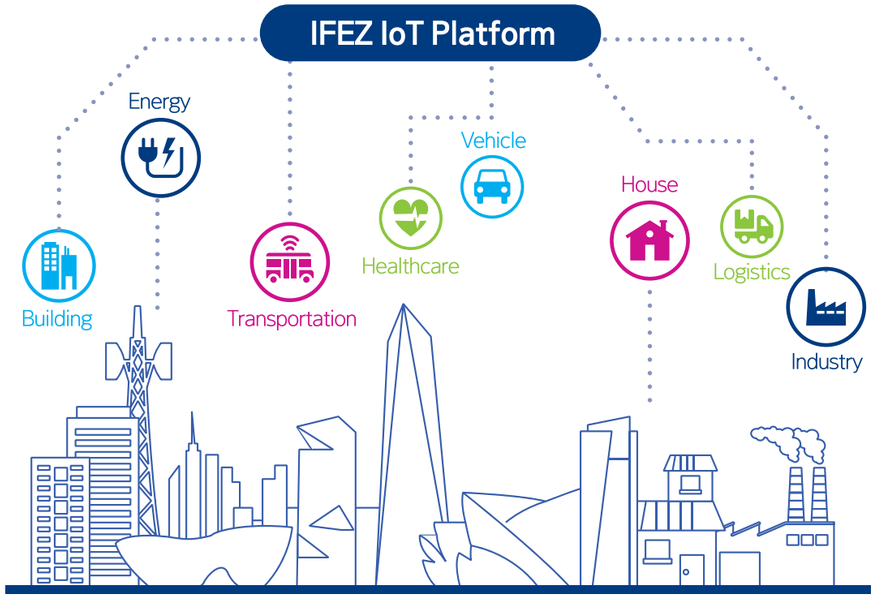
Application Areas

- Smart transportation (Bus arrival information devices)
- Smart signage (Information provision devices)

#4 IFEZ IoT Platform

IFEZ IoT Platform

- Information connection and collection from various IoT (Internet of Things) sensors
- OpenSource-based software
- Information connection from various smart city terminals
- Sensor information history management, rule-change, processing, etc.
- Dashboard-based status control



Application Areas

- Applicable to all smart services using IoT terminals

#5 IFEZ Web VMS (Video Management System)

IFEZ Web VMS (Video Management System)

- CCTV image collection, processing, storage, distribution system utilizing web-based technologies
- Cost-efficient implementation and management compared to existing systems
- GIS-linked efficient control
- Rapid response to service disruptions and easy adaptation to various systems

Application Areas

- Smart crime, disaster prevention, etc.
- Smart city operation center video control system

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