Orchestrating a brighter world

NEC

FY 2020 Briefing on ESG

Smart Cities create social value from the perspective of climate change

December 5, 2019

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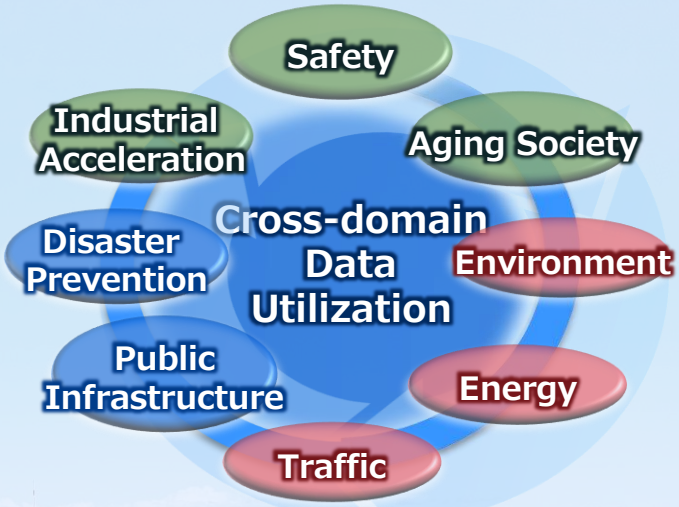
Senior Vice President, NEC Corporation

Smart City biz addresses climate change & social value creation

■ Smart Cities with cross-domain data utilization contribute to solving recent diversified social issues in cities



Sustainable City Society 5.0

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Issues getting complicated, Resources decreasing

Climate change brings frequent and serious damages

Disaster Prevention

Public Infrastructure

Aging and lack of skilled engineers for maintenance

Safety

Recent Diversified social issues in cities

Increased need to care for elders, children, etc.

Aging Society

Lack of labor, budget, and economic stagnation

Industrial Acceleration

Traffic

Inbound promotion, and regional activation

Heavy traffic, increasing traffic accidents, budget deficit in local public transport services

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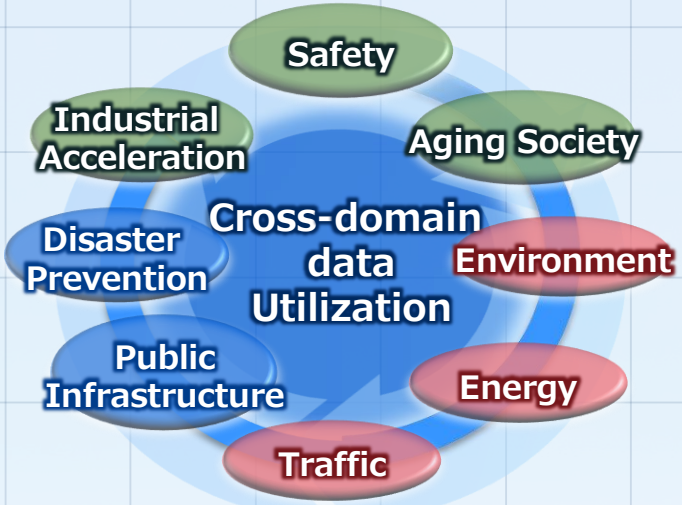
Data technology for Smart Cities

New services for residents are generated across fields and regions by cross-domain data utilization

Industries

Individual systems required for each service



Network capability / Speed

AI maturity, growth

Tech branch

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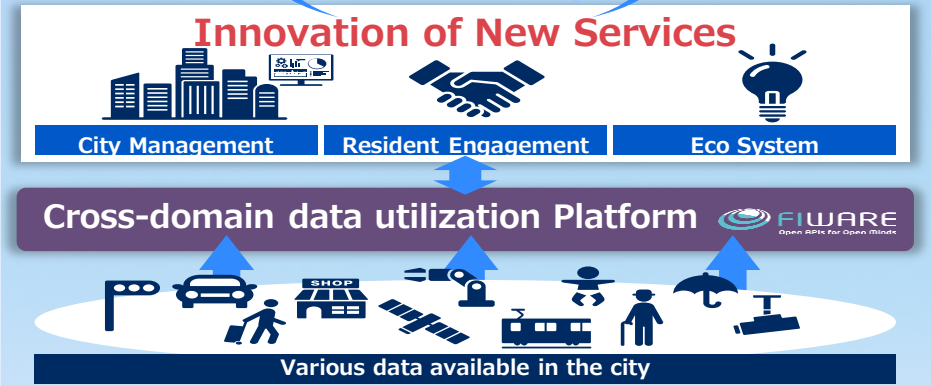
“FIWARE” - Cross-domain data utilization platform -

“FIWARE” penetrating globally (Members: 24 countries, 117cities, 993Enterprises)

NEC

- Joined from development stage. Only Platinum member from Japan
- Several “FIWARE” use cases in Japan

Expand to other cities and fields



- Development started in 2011
- Expanded and localized globally
- NEC joined development in Europe

NEC joins FIWARE Foundation as a Platinum member, 2017

FIWARE Members※3

- 993 Enterprises *1
- 16 FIWARE Lab nodes (Europe · Africa · India · Mexico · Brazil)
- 11 Business hubs (iHub)
- 200 FIWARE Foundation Members*2
- 2 Accelerator programs
- 24 Countries, 117 Cities *3

Source *1) http://map.fiware.org/ *2) https://www.fiware.org/foundation/members/ *3) http://oascities.org/list-of-cities/

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Santander City, Spain

Contributing to "Mitigation"

- Reduced traffic jams and enhanced efficiency of waste collection
- Sustainable ecosystem with residents and companies

IoT sensors monitoring and providing parking availability information

Optimizing waste collection routes by using bin monitoring sensors

Traffic jams down 80%

Human resource costs down 15%

Waste collection | Parking | Water usage | Electricity | etc.

Participating Companies

Making solution proposals for city services

Resident Participation

Providing feedback for city services

Santander city data integration platform

City sensors 20,000

Cross-domain data utilization Platform

FIWARE Open APIs for Open Minds

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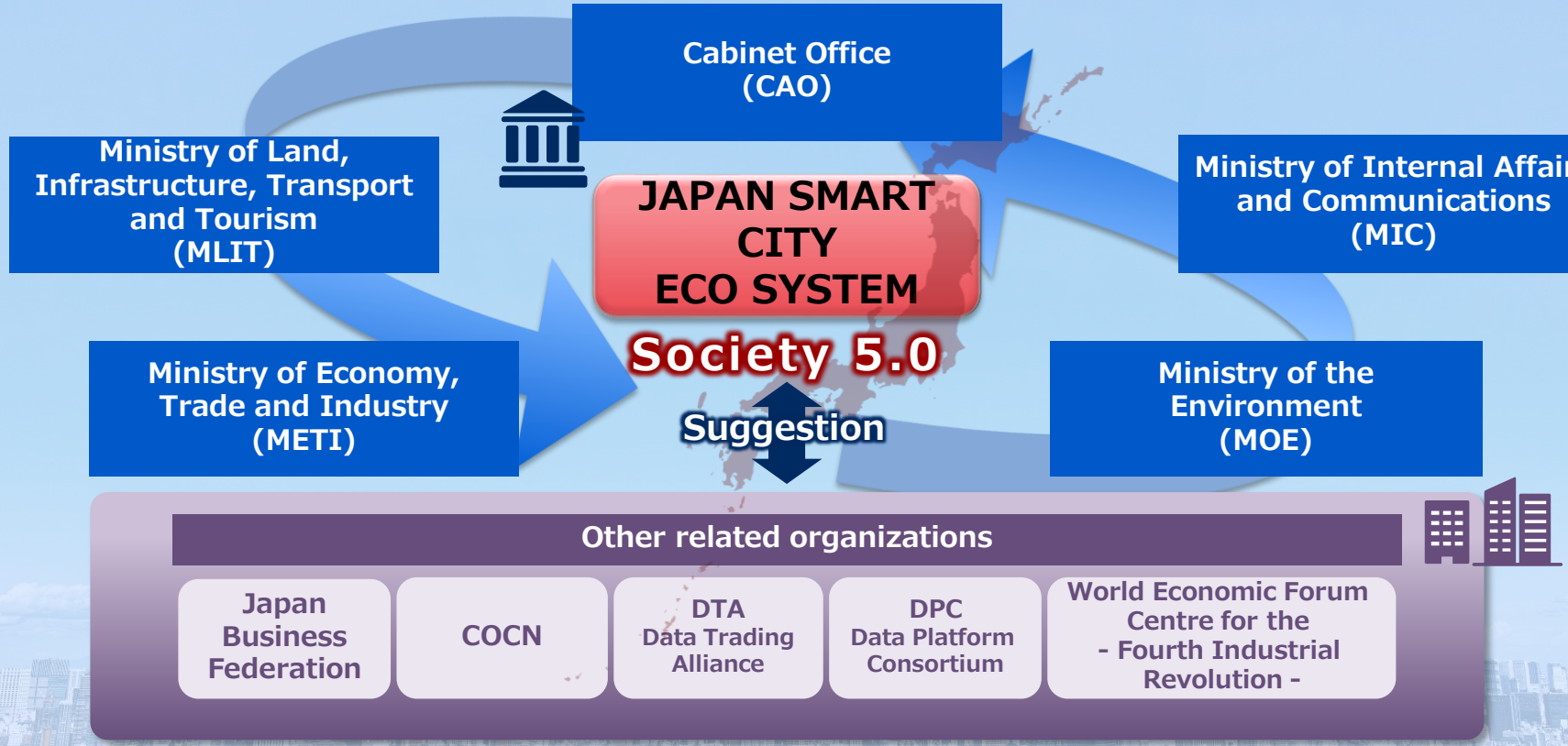
Smart Cities in Japan

Public and private partnerships lead the Smart City discussion



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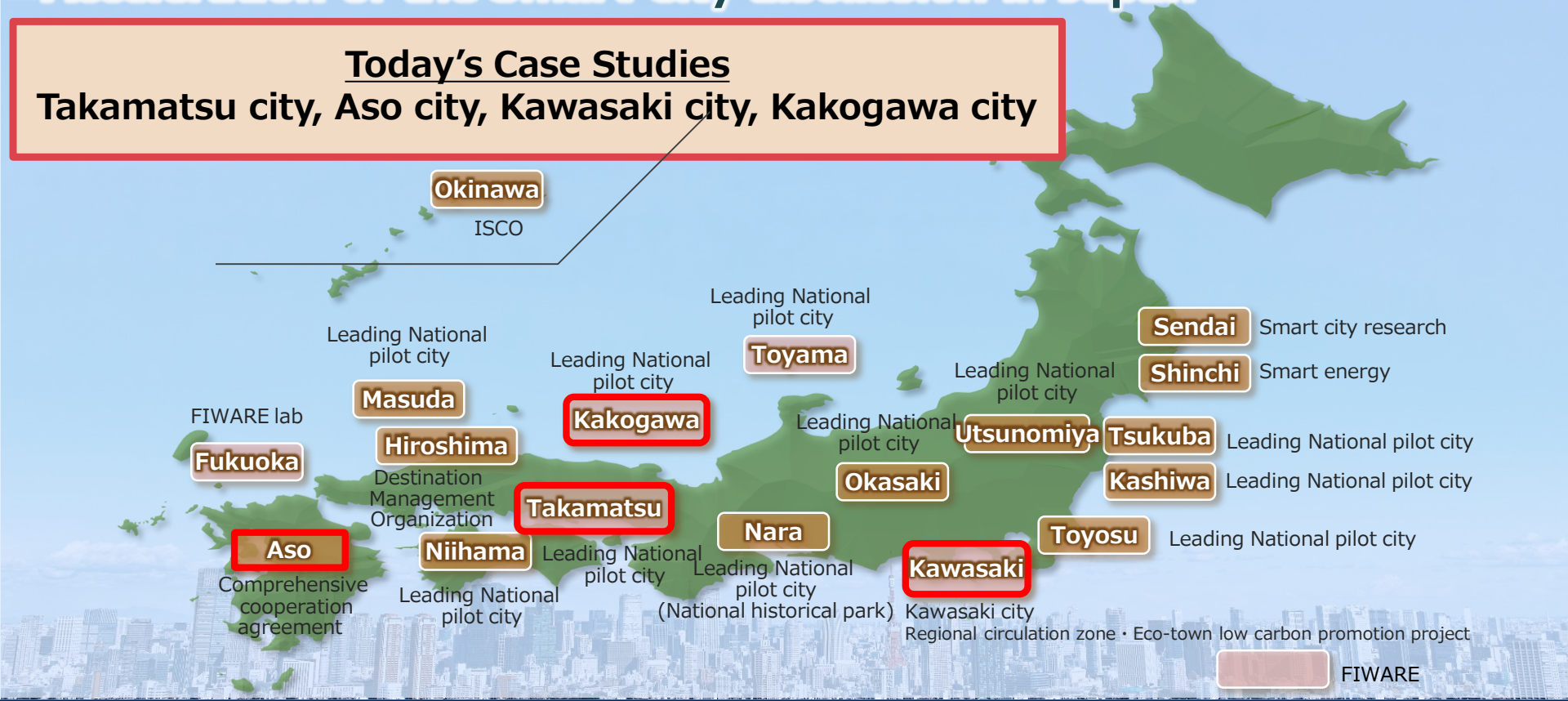
Overview of NEC Smart Cities

Acceleration of the Smart City discussion in Japan

Today's Case Studies
Takamatsu city, Aso city, Kawasaki city, Kakogawa city



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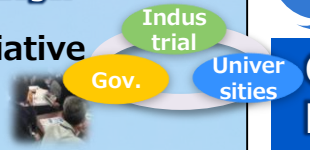
Takamatsu City, Kagawa Prefecture

Contributing to "Adaptation"

Cross-domain data utilization addresses city challenges. Real-time monitoring contributes to mitigate disaster damage.

In February, 2018, MOU for establishment and utilization of Smart City solutions signed among Takamatsu city, NEC, STNet, Kagawa University, Kagawa tech college.

- ✓ **Smart City Takamatsu promotion initiative**
  ;more than 60 authorities joined
- ✓ Focus areas in cross-domain data utilization
  expand Disaster Prevention & Tourism to Welfare & Traffic.



Disaster Prevention

Tourism

Rental cycle route analysis captures new popular spots.
⇒Develop new tourism spots.

Welfare

Collecting senior's vital data with wearable IoT sensors.
⇒Virtual care promotes senior care / illness prevention.

Traffic

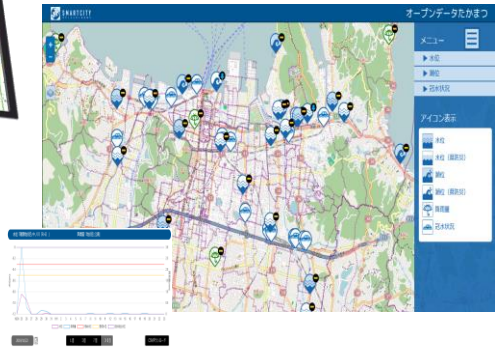
Analyzing local governments and private sector traffic accident data ⇒Point out dangerous spots for traffic accidents.

Monitoring water & tide level enables early warning & evacuation instructions

City : Rapid decision, Early warning
Residents : Visualized disaster information

Takamatsu city Dashboard

Dashboard for residents



Visualization of real-time disaster info generates collaboration among neighboring areas

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Aso City, Kumamoto Prefecture

Contributing to "Adaptation"

Real-time volcanic activity information from harsh environmental conditions in Mt. Aso contributes to tourism

Comprehensive cooperation with three parties consisting of Aso city, Aso Volcano Museum and NEC signed an agreement pact (July 18, 2018)

Secure, Safer, and Sustainable city creation

Tourism × **Disaster Prevention**

Promote Disaster Prevention for Tourism

Data from observing & monitoring crater utilized for disaster related measures and research

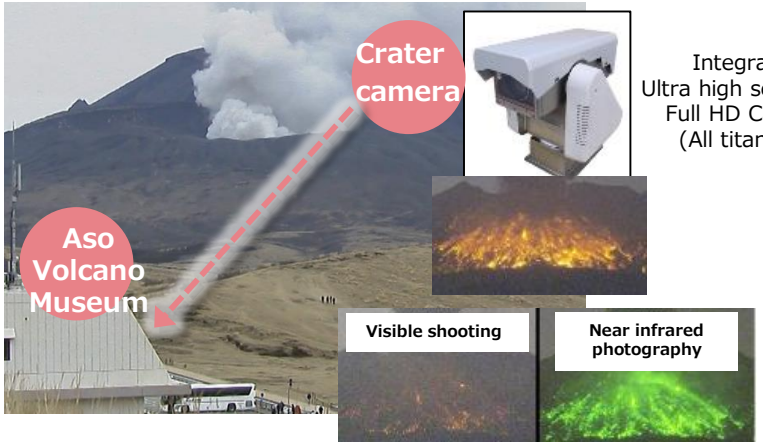
Provide 24h 365d volcanic activity information

For monitors

Monitoring 24H×365D

For tourists

Observe crater status



Integrated Ultra high sensitivity Full HD Camera (All titanium)

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Kawasaki City, Kanagawa Prefecture

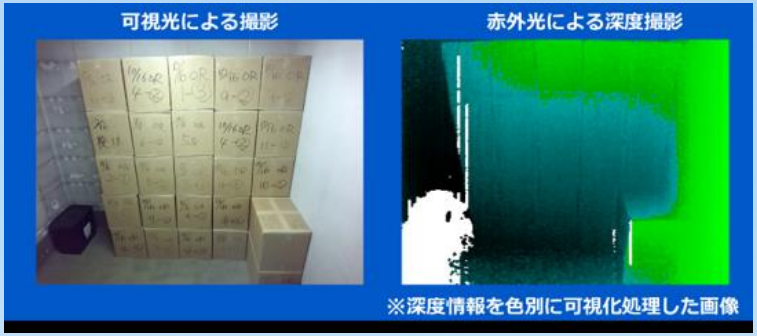
Contributing to "Mitigation"

- Conducted PoC for optimizing collection routes for medical waste
- 9.2% mileage reduction alleviates carbon emissions and driver shortages

NEC & Kawasaki City completed research on advanced resource recycling with IoT technologies in Kawasaki Eco Town in May, 2018

※1: Estimation

- Calculate waste amounts at hospital storage with camera image analysis



- Simulate the optimum route to clinics nearby by calculating the remaining truck capacity
- Maximize usage of truck capacity

Picking up waste based on requests from hospitals/clinics

Optimizing truck routes with data analysis

Reduce mileage by up to 16% by cooperating with multiple vendors

NEC & Kawasaki City identified outcome of AI & platform utilization for optimization in waste collection transportation and processing, May 2019

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Kakogawa City, Hyogo Prefecture

- Data* utilization contributes to city safety and security
- Information provision service for residents on the “Kakogawa App”

* Monitoring, Transportation, Disaster Prevention, Welfare

Published APIs

Dashboards for Administrative information

Bus Location Service

FIWARE Open APIs for Open Minds

Smart City IOT platform

Cross-domain data utilization platform

Open data

Vehicle data

Sensor data

AI・Data Analysis

Financial data etc.

Resident questionnaire

Internal Data Utilization Project

Kakogawa City (Contractor: NIKKEN SEKKEI RESEARCH INSTITUTE)

Utilization of Kakogawa App (Monitoring・Traffic, etc.)

かこがわアプリ

Service Expansion

Residents (Parents)

Detection

Children/Elders

Monitoring Function

Children Monitoring

Camera Monitoring System

BLE Tag Detection information

Camera Data

Upgraded & Expanded

Safety and Security Monitoring project

Monitoring

Provide location info detected by monitoring tags

*Awarded by Ministry of Land, Infrastructure and Transport for advanced town planning competition

Japan’s first Public-Private Partnership monitoring service

Transportation

Real-time distribution of bus location information

Disaster Prevention

Detection & Collection of Water level/River condition data

Traffic

Childcare / Caregiver burden reduction measures

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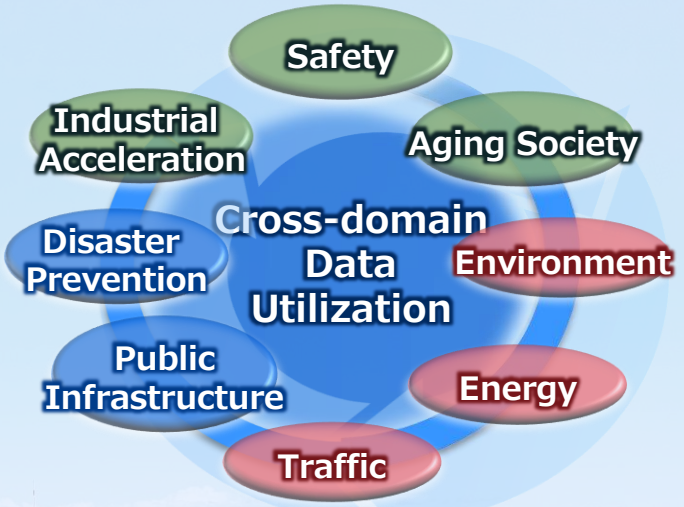

Sustainable City Society 5.0

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Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.
We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.