Orchestrating a brighter world

NEC

Looking beyond the Horizon
- Future EU-Japan collaboration on R&I

NEC Laboratories Europe
- Experiences & Opportunities
- Challenges & Expectations

JBCE Seminar 13 November 2017

Lars Brückner NEC Europe Ltd

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.

About the NEC Group

To be an information society friendly to humans and the earth

Established	**: July 17, 1899**	
Net Sales (Consolidated)	**: \ 2,821.2 billion**	(Mar. 2016)
Employees (Consolidated)	**: 98,726**	(Mar. 2016)

5 businesses fields

- Public Solutions Business
- Public Infrastructure Business
- Enterprise Business
- Telecom Carrier Business
- System Platforms Business

6 regional HQs / 226 locations

- Japan (Global Headquarters)
- Greater China
- APAC
- North America
- Latin America
- EMEA

Organization of the Central Research Laboratories

Value Co-creation Center

Utilizing the world's most advanced technologies and collaborating with customers to resolve global social problems and create new areas of business

Data Science Research Laboratories

Developing data science technologies to create new value for society from data

- Video understanding
- Signal processing
- Speech & audio understanding
- Data mining
- Text analysis

Security Research Laboratories

Developing security technologies that not only protect the cyber world but also ensure stable operation of social infrastructure in the real world

- Invariant analysis
- Data security
- System security

System Platform Research Laboratories

Developing communications, computing, and integrated platforms to help us to solve ever more complex social problems

- Real-time analytics platform
- Sensing actuation platform
- Network platform
- Multimedia communications
- Software-defined networking technology

IoT Devices Research Laboratories

Developing technologies that deepen the linkage the real and cyber worlds building upon knowledge of physics and chemistry as well as materials and device technologies

- Sensing and actuating technologies to link with the cyber world
- Optical communications
- Environmental technologies required for the era of IoT

Strengthening Global R&D Activities

NEC Labs. Europe

- **Open innovation of core technologies through EU projects & standardization**
- Software networking and virtualization
- Distributed systems and IoT security
- Data analytics for public infrastructure solutions
- IoT-based smart city solutions

NEC Labs. China

- **Developing core technologies by taking advantage of the active biz innovation environment and the abundance of high-quality R&D talents.**
- Research into learning-based optimization technologies and application development
- Wireless communication networks

Central Research Laboratories (Japan)

- **The control tower for research**
- **Developing new solutions in collaboration with customers/divisions**
- Data science
- Security
- System platforms
- Technologies for IoT devices

NEC Labs. America, Inc.

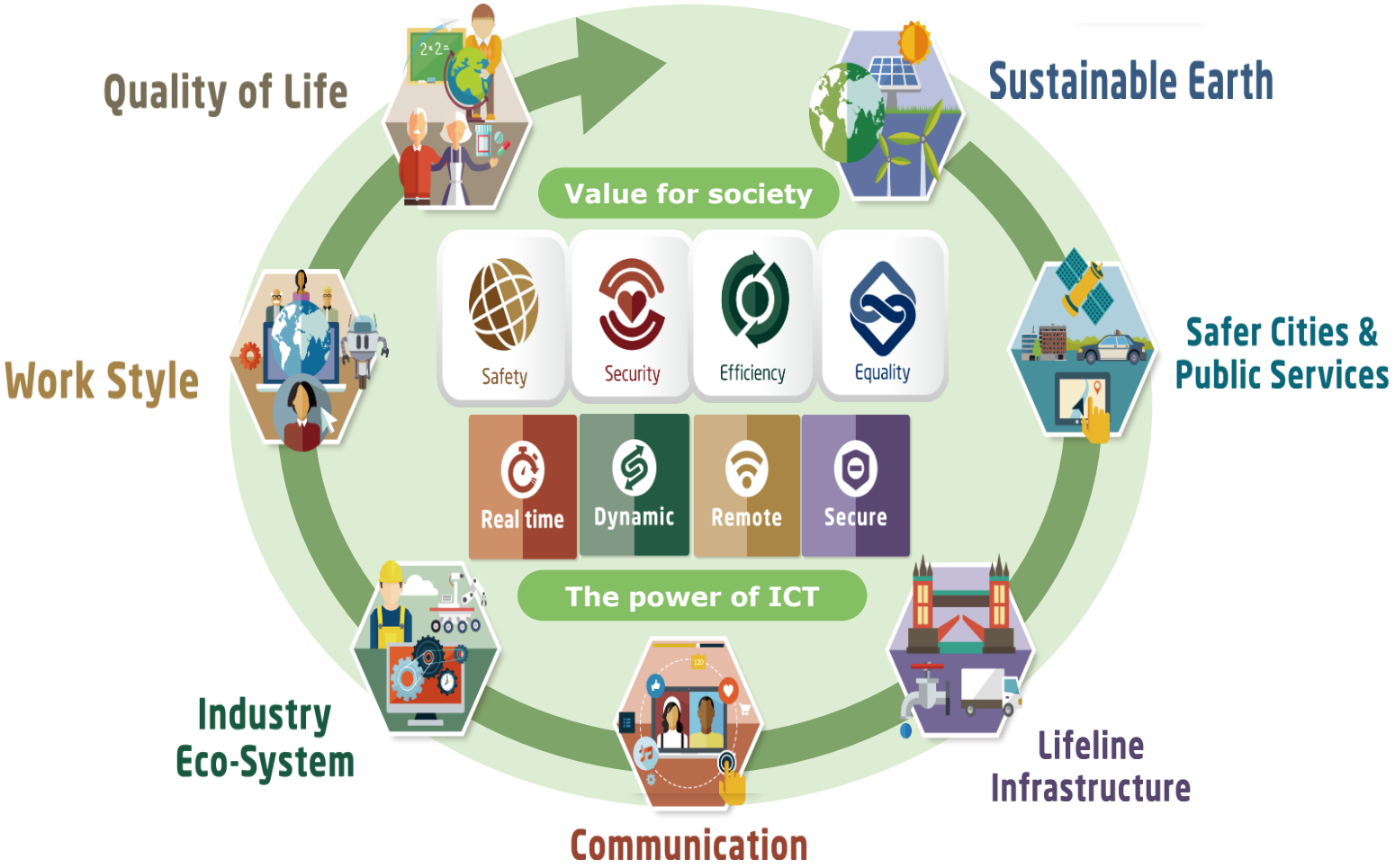
- **Developing core technologies, taking advantage of its location in the leading hub of technology**
- Complex system analysis and management technology
- Advanced network and sensing technology
- System solution technology for IoT
- Security technology

NEC Labs. Singapore

- **Enhancing core technologies from other labs for developing solutions with governments and enterprise customers**
- Public Safety and Security
- City Mobility
- Healthcare

Seven Themes for Social Value Creation

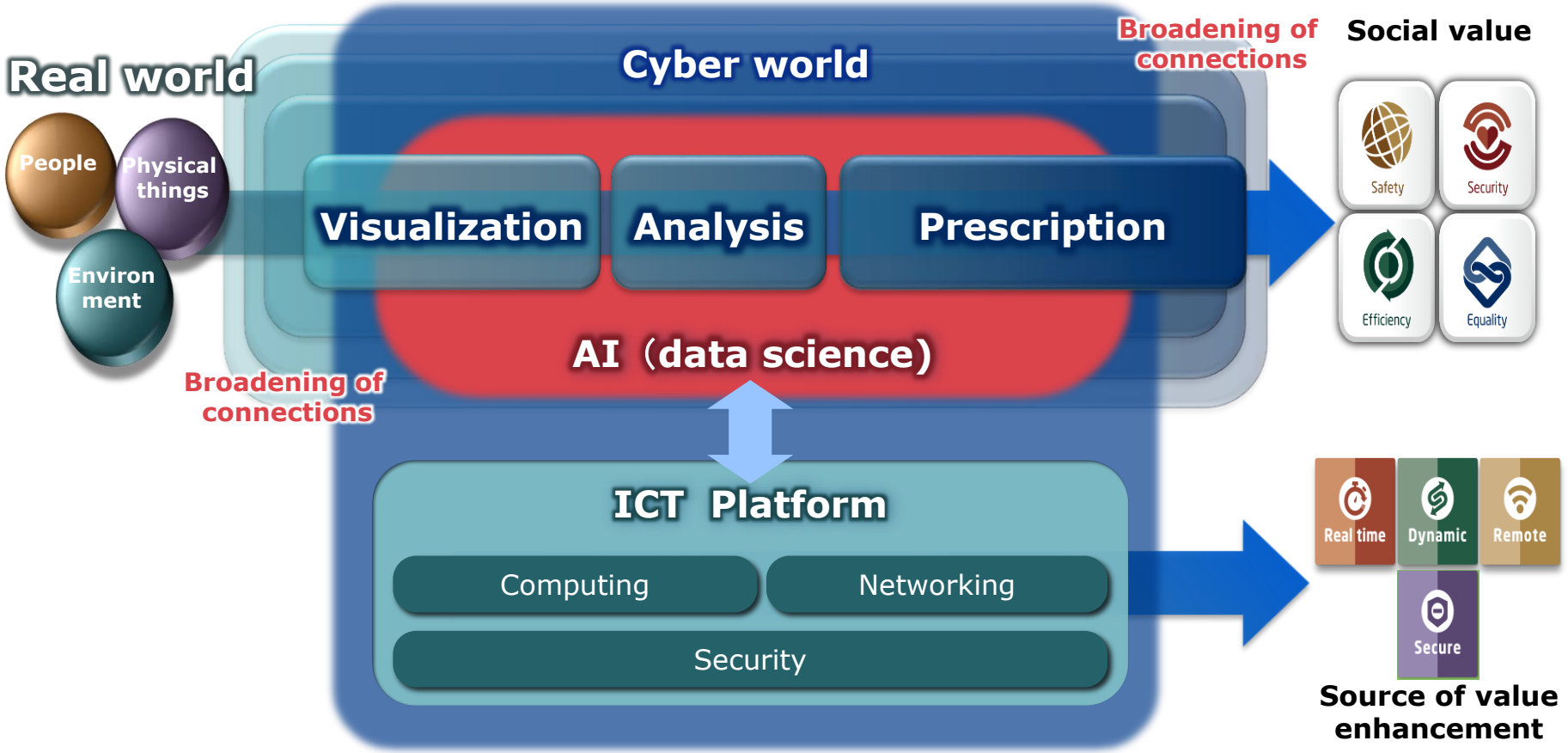
NEC is focusing on Solutions for Society based on seven themes to provide the values of safety, security, efficiency and equality.



NEC Laboratories Social Value Creation Processes

Creating social value through AI and ICT platforms

Value for society brought by ICT and source of value enhancement



NEC Laboratories Europe (NLE) - History

- 1993, 1995, 1997 several NEC Europe Laboratories established across Germany (Supercomputing, Networking)

- By 2010 all laboratories integrated at Heidelberg, Germany site – except for UK site

- First participation in EU projects as of 1998 FP5/ACTS
  - 1st project - Ithaci - IP Switching

NLE - Overview

Around 100 leading researchers from all over Europe and world-wide in Heidelberg & London (Europe HQ)

Research addressing European and world-wide technology & business trends on

- Technology Platforms: 5G, SDN/VNF, security, data science, IoT
- Solutions: smart transport , smart cities, public safety, industrial ctrl.

Close collaboration with

- Top European universities & research institutes
- Major industry in Europe, e.g., network operators, automotive, utilities etc.
- European Standardisation Organisations

NLE - Overview

- **NLE has a strong track record in innovative technologies and solutions**
  - **Product contributions**
    including 3G/4G/5G, IoT Platforms (LeafEngine), ...
  - **Solutions development**
    for Smart City Solutions, SDN networking, ...
  - **Open Innovation in European R&D framework**
    focusing on 5G, Security and Smart Cities

- **International standardisation**
  - Long influential experience
  - **Standardisation laboratory**

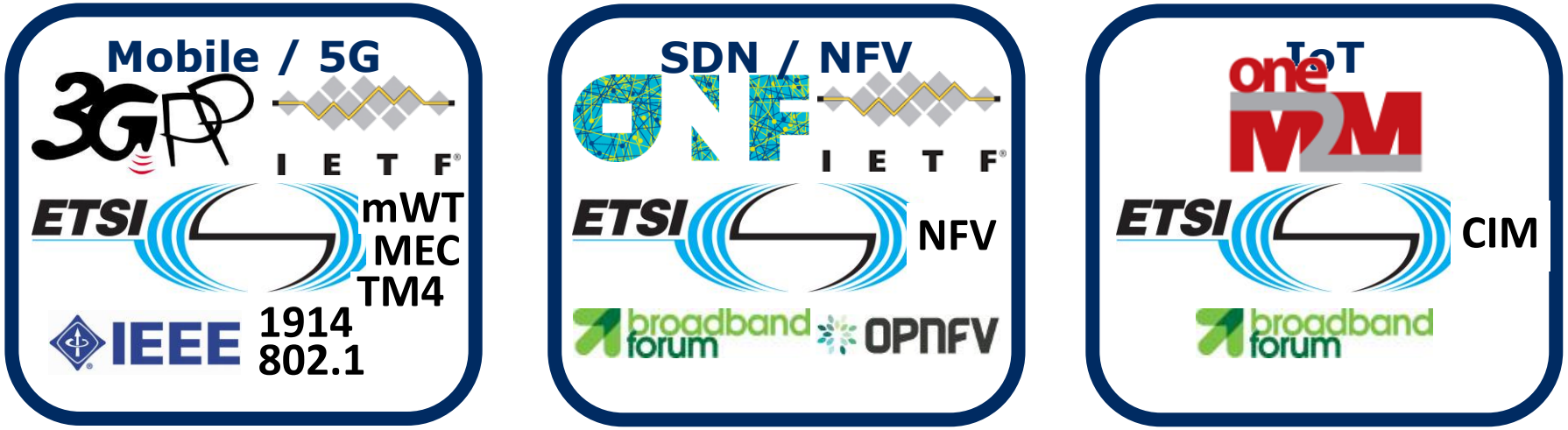
- **Collaboration with leading research institutes and NEC's Customers – particularly in Europe – and beyond**
  - **Value Co-Creation** through **joint R&D (=European & global)**
  - Support commercialization and market introduction

NLE Approach to Standardization

Add value for NEC and customers

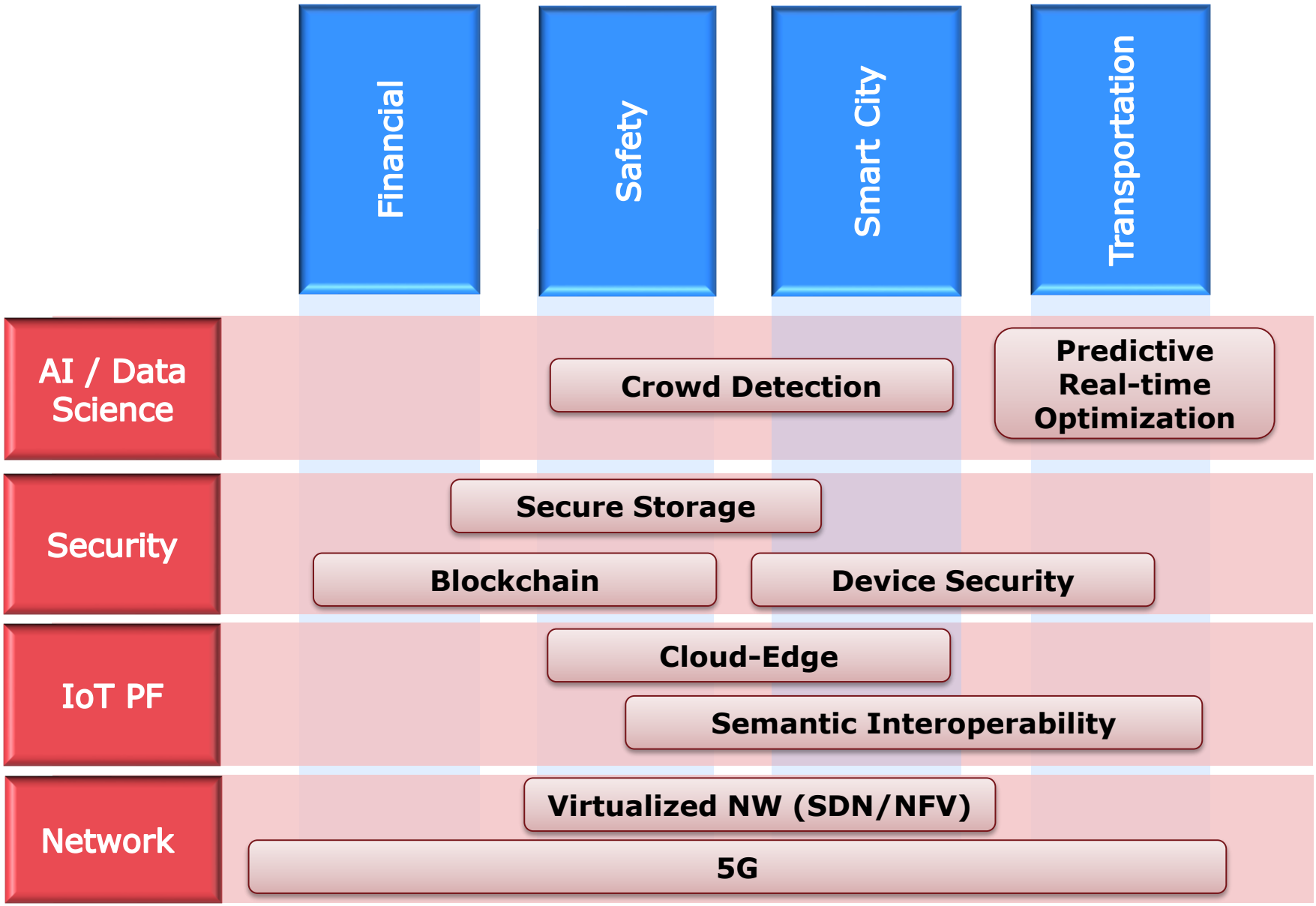
- Lead, not follow
- Take responsibility by acting in leading officer roles
- Contribute technology and research results (e.g. from EU projects)
- Work with and support customers
- Support sales and product teams with customer contacts and trends

Participate in the most relevant organizations



- (Co-)Create new organizations if needed, e.g. ONF, ETSI ISG NFV, CIM

NLE Research Landscape



NLE's Research Themes

- 5G Networks
- SDN / NFV
- Security
- Data Science
- IoT Platform
- Smart Transportation

NLE – EU R&I Programmes

Horizon 2020 – NEC supports & values all three pillars: Excellent Science; Industrial Leadership; Societal Challenges

NEC focuses on solutions for society on seven themes:

- Sustainable earth, safer cities & public service, lifeline infrastructure, communication, industrial eco-systems, work style, quality of life

> well-aligned with pillar III – societal challenges

Social Value Creation Processes NEC Laboratories are focusing on:

- Creating social value through AI (data science) and ICT platforms
- Creating social value at levels of security & networking (5G, cybersecurity, blockchain etc.) & data science & system platforms (connected driving, ITS, IoT, Big Data, smart city, AI/ML etc.)

> well-aligned with pillar II – industrial leadership

NLE – EU R&I Programmes

FP7 (JEUPISTE D2.2 ANALYSIS OF THE EU-JAPAN COOPERATION IN FP7 – slides 15-17)

"The internationalization of Japanese research and researchers has experienced an important dynamism in the last years."

The Japanese participation in FP7 has increased year after year since 2007 and around 100 Japanese entities have participated in almost 160 projects and have received around ten million Euros."

"It is noteworthy that the **entities with the highest participation are universities and public organisations**."

"The Japanese participants are mainly universities and public bodies and **around 70 Japanese affiliated companies located in Europe** also participated in the Programme."

NLE – EU R&I Programmes

FP7 - Japanese affiliated companies in Europe participation

"[…] almost 70 Japanese affiliated companies in Europe participated in FP7 projects, which indicate that the **involvement of the Japanese industrial sector in the European research and innovation system has been mostly through the affiliates in Europe**."

"Most of them are **engineering and electronics conglomerate companies or belong to the automobile sector** with legal addresses in the United Kingdom, France and Germany. **"**

NLE – EU R&I Programmes

FP7 - Japanese affiliated companies in Europe participation

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Affiliate	Nº of projects	EU host country
NEC Europe LTD.	48	United Kingdom
DOCOMO Communications Laboratories Europe GmbH	11	Germany
HITACHI Europe LTD.	10	United Kingdom
HORIBA Jobin Yvon S.A.S.	9	France
TOSHIBA Research Europe LTD.	8	United Kingdom
HITACHI Europe SAS	8	France
Sony Europe LTD.	5	United Kingdom

Table 3 *Main Japanese affiliated companies in Europe participating in FP7 projects*

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NLE – EU R&I Programmes

H2020 (JEUPISTE D2.10 Analysis of EU-Japan Cooperation in Horizon 2020 – slides 18-23)

"Although in the **first three years of Horizon 2020 Japanese participation has gone down** and does not follow the upward trend of the previous period, the participation level is still higher than the first years of FP7."

"Regarding **thematic distribution** of Japanese participations in FP7 and Horizon 2020 top-down calls, **ICT related projects rank first with 52 projects (24% of the total), followed by nanotechnology and environment with 21 and 2**0 projects respectively.

NLE – EU R&I Programmes

H2020

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13 / 55 142%

3. Japanese participation in Horizon 2020 by area

Excellent Science is the pillar with the highest number of projects funded, followed by Industrial Leadership and Societal Challenges with respectively 18 and 14 projects. The following figures and tables show the Japanese participation in Horizon 2020 by pillars.

	Projects (without Joint Calls)	Participants (without Joint Calls)	Projects (Including Joint Calls)	Participants (Including Joint Calls)	ERC
Excellent Science	26	31	26	31	24
Industrial Leadership	9	9	18	55	
Societal Challenges	7	9	14	32	
EURATOM	2	2	2	2	
	44	**51**	**60**	**120**	

Table 5. Japanese participation in Horizon 2020 by pillars and programmes.

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NLE – EU R&I Programmes

H2020 – Pillar II – Industrial Leadership

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18 projects have been funded under Space, ICT and NMBP thematic areas, with most of the participations coming from the 2014 and 2016 EU-Japan Joint Calls on research and development cooperation in ICT. The Space projects are related to Galileo and the competitiveness of the European space sector.

In comparison to FP7, participation of Japanese organisations has been greatly reduced in most of the regular calls (non coordinated actions), in particular the ICT area. In Horizon 2020, only the coordinated calls mechanism with the Japanese government seems to be a viable option to set up cooperation in ICT.

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Industrial Leadership		
	Without joint Call	With Joint Call
Projects	9	18
Participants	10	55
Subprogramme (Projects)		
LEIT Space	2	0
LEIT ICT	2	9
LEIT NMPB	5	0
..etc	0	0

Table 7. Japanese participation in Horizon 2020 Industrial Leadership Pillar.

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NLE – EU R&I Programmes

H2020 – Pillar III – Societal Challenges

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27 Japanese entities are participating in 14 projects related to climate (urban mine and mining waste; climate policies), health (active and healthy ageing) and transport (aeronautics). The number of participations of Japanese entities is 32, many of them due to the joint calls. Most of the entities participating in the joint calls come from the private sector (mostly enterprises).

Societal Challenges		
	Without Joint Calls	With Joint Call
Projects	7	14
Participants	9	32
Subprogramme		
SC1. Health, demographic change and wellbeing	1	2
SC4. Smart, green and integrated transport	0	5
SC5. Climate action, environment, resource efficiency and raw materials	6	0

Table 8. Japanese participation in Horizon 2020 Societal Challenge Pillar.

15 / 55

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NLE – EU R&I Programmes

H2020 - Japanese affiliated companies in Europe participation

"There have been so far 95 projects with a Japanese affiliated company in **Horizon 2020**, with a total of **50 different companies that have been participating**. This compares to 241 projects in **FP7 with 70 different companies that participated**."

"More than EUR 54 million (over 3 years) was awarded to the 50 Japanese affiliated companies in Horizon 2020, this compares to EUR 91 million EC contribution in FP7 (over 7 years)."

"**Most of the participation** is to be found in the **Industrial Leadership pillar**, with **most of the participation in the ICT programme**. These **companies are also frequently in PPP** (Joint Undertaking) projects."

"As in the previous analysis in FP7, **NEC Europe participated in the largest number of projects**, but Renault SAS received the largest amount of EC contribution."

NLE – EU R&I Programmes

H2020 - Japanese affiliated companies in Europe participation

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JEUPISTE
D2.10 Analysis of EU-Japan Cooperation in Horizon 2020 (Update February 2017)

	Affiliate Company Name	Number of Projects	Country in which the company is based	Amount of EC contribution (in EUR)
1	RENAULT SAS	17	France	10,555,570
2	NEC EUROPE LTD	19	United Kingdom	9,210,326
3	FUJIFILM MANUFACTURING EUROPE BV	4	Netherland	3,862,886
4	FUJITSU TECHNOLOGY SOLUTIONS GmbH	2	Germany	3,034,216
5	MITSUBISHI HITACHI POWER SYSTEMS EUROPE GMBH	3	Germany	2,183,381
6	DAIDO INDUSTRIAL BEARINGS EUROPE LIMITED	1	United Kingdom	1,963,033
7	Nissan West Europe SAS	1	France	1,941,275
8	TOYOTA MOTOR EUROPE	6	Belgium	1,750,824
9	HORIBA JOBIN YVON S.A.S.	4	France	1,496,860
10	FUJIFILM DIOSYNTH BIOTECHNOLOGIES UK LIMITED	2	United Kingdom	1,256,576

Table 11. Main Japanese affiliated companies in Europe (first three years in Horizon 2020)

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NLE – EU R&I Programmes

H2020 – NLE participation

		H1
EU H2020 Project 5G ENSURE	EU RIA 76/24	SEC
EU H2020 5GPPP Flex5GWare	EU RIA 76/24	NSDA
EU H2020 5GPPP 5G-NORMA	EU RIA 76/24	5GN
EU H2020 5GPPP 5G-CROSSHAUL	EU RIA 76/24	5GN
EU H2020 5GPPP P15 SONATA (SDN)	EU IA 58/42	SDN
EU H2020 5GPPP for Analytics	EU RIA 76/24	NSDA
EU H2020 5GPPP Superfluidity	EU RIA 76/24	NSDA
EU H2020 SSICLOPS (NSDA)	EU RIA 76/24	NSDA
EU H2020 SSICLOPS (SDN)	EU RIA 76/24	SDN
EU H2020 TYPES	EU IA 58/42	NSDA
EU H2020 5GPPP VirtuWind (NSDA)	EU IA 58/42	NSDA
EU H2020 5GPPP VirtuWind (SDN)	EU IA 58/42	SDN
5G Phase 2 Placeholder (no growth, 1:1 resource continuity)	EU RIA 76/24	SDN
EU REPLICATE	EU IA 58/42	IPC
EU H2020 Autopilot	EU IA 58/42	CSST
EU H2020 IoT CPaaS.io	EU RIA 76/24	CSST
EU H2020 IoT CPaaS.io (ITS)	EU RIA 76/24	ITS
EU H2020 IoT FIESTA-IoT	EU RIA 76/24	CSST
EU FP7 IoT Mobinet (CSST)	EU 43/57	CSST
EU H2020 IoT Wise-IoT	EU RIA 76/24	CSST
EU AUTOPILOT (ITS)	EU IA 58/42	ITS
EU Mobinet (ITS)	EU 43/57	ITS
EU SCOUT	EU RIA 76/24	ITS
EU H2020 Project TREDISEC		

NLE in the EU PPP/ETP Landscape

5G PPP
The 5G Infrastructure Public Private Partnership

- Member of the Board
- NW Software
- Wireless NW
- NW Security

BIG DATA VALUE PPP

- Data Analytics and Control
- Smart Cities
- Smart Manufaturing

NEC

- IoT Semantic Interoperability
- IoT Privacy

AIOTI

- Member of the Board
- IoT Platform
- NGSI API

FIWARE

FUTURE INTERNET PPP

ECS
EUROPEAN CYBER SECURITY ORGANISATION

Future EU-Japan collaboration - Looking beyond the Horizon

- EU-Japan Joint Calls/Projects
- EU Calls/Projects
- EU-Japan Regulatory Cooperation

EU-Japan Joint Calls/Projects

- Participants **based (!)** in both EU & Japan
- Contracts made both in EU & Japan

EU Calls/Projects

- Participants **based (!) in EU = local & global companies (!) = different parentages (!)**

EU-Japan Regulatory Cooperation

- Cooperation between regulators/policy-makers from EU & Japan (supported by industry stakeholders)
- In policy areas related to industry, similar/new societal challenges, new technologies, international standardisation etc. (related to H2020 pillars II (industrial leadership) and pillar III (societal challenges)

Experiences – Opportunities

Why did NLE enter into EU & EU-Japan projects?

- Open innovation with institutions and customers
- Identifying trends
- Setting/working on strategic research agendas
- Developing European standards > international standards
- Bringing Japanese technology to the EU market
- Opening international markets based on European work & success

Experiences - Opportunities

How to be successful in EU, including EU & EU-Japan projects:

- Good positioning in research area - good research & publications – scientific excellence - networks
- Working on strategic research agendas
- Identifying/pushing European work of global importance – strategically important – e.g. GSM, IoT …
- Early/timely investments and involvement – long-term commitment
- Standardisation work
- New areas (e.g. IoT, AI): own initiative, Japan initiative, EU priorities/budgets, results of discussions with partners in EU
- Leading work on European Technology Platforms

Challenges

- Long-time investment – reference work prior to actual project participation – e.g. big data value PPP: 2 years of preparation work before actual project inclusion
- Despite good networks, preparation work starts early and small
- Necessary: scientific work, good networking, good lobby work
- Necessary: own long-term strategy – not just joining/swimming along
- Necessary: good financial planning/additional financial resources – EU project funding/support does not suffice to survive
- Despite expertise, sometimes size matters even more (additional expertise helps, e.g. standardisation)

Challenges

- Beginning of 2000s EU projects seen as having too little impact in terms of innovation & products

- H2020 with bigger projects including PPPs - big impact focus regarding innovation & products

- Situation now:

  - Impact/results & KPI approach in principle good, but:
  - Impact focus too big
  - Heavily increased competition
  - Inflationary approach to impacts/results
  - Product focus at the expense of research focus & science focus
  - Expertise/excellence no longer key decider
  - Acceptance of proposals not transparent – appears random at times
  - Financial/budgetary problems in view of long-term investment and planning necessary – overhead too big

Expectations

H2020 & FP9

- Additional resources needed in view of long-term investment/overheads
- More resources for and appreciation of flexibility & research
- Expertise and excellence needs to be key decider
- More transparency and clarity on acceptance of proposals
- Project evaluation needs to be more professional and of higher quality

Expectations

H2020 & FP9

Participation & role of European companies of Japanese parentage in EU projects

- **Openness & clarity of fundamental importance and necessity**
- **Welcoming companies – understanding and appreciating contributions**

Japanese affiliated companies in Europe

- Are European companies - employ Europeans - invest in Europe
- Open innovation - work with European universities, research institutes, local companies (start-ups, SMEs, multinationals)
- Develop European standards – export to international level
- Help open international markets for all European companies

Expectations

- **H2020 & FP9**
- European Commission has stated that H2020 is 'open to the world'
- Indeed, there should be no so-called 'European'-companies-only approach
- Therefore, there should be no IPR-in-EU-only approach
- Consequently, Article 30.3 (of Model Grant Agreement) should not be added to grant agreements as matter of principle/pre-condition
- Unfortunately, European Commission appeared to announce just that during last week's Budapest ICT proposals Day
  - "Commission right to object to transfers or licensing" to be added to all grant agreements – announcement made in context of Big Data calls
- **This approach risks being a show-stopper for many companies**

Expectations

- **Why is Article 30.3 – objection to transfers and licensing – a risk and show-stopper?**
  - Heavily affects affiliated companies in Europe (Japanese, US etc. parentage)
  - Also strongly affect so-called 'European' companies
- R&D in EU is co-funded by company HQs in 3rd countries
- IPRs are globally administered
- For tax reasons there need to be deliverables vis-à-vis HQs in 3rd countries
- **NEC Laboratories Europe** – one of the biggest and most successful histories in EU regarding R&D projects participation by affiliated companies – **would be negatively affected!**

Expectations

- **Why is Article 30.3 – objection to transfers and licensing – a risk and show-stopper?**
  - Open innovation in EU at risk
  - R&D&I investment in EU at risk
  - Global impact of European standardisation work at risk
  - Opening international markets at risk
  - Actual business of European industry/business at risk
  - EU as global knowledge economy leader at risk

- Example: 

- **NLE has been one of core/leading companies** regarding FIWARE platform development
- **European companies are profiting/will profit** from FIRWARE business **internationally** – there are big business expectations
- **NLE is regularly contacted by European companies** who want to join for international business

Challenges & Expectations

EU-Japan joint calls

Projects generally are too small - bigger budgets are necessary

More clarity needed on focus/objective of joint EU-Japan calls:

- Cooperation or common work/interoperability?
- Common trials?
- How to manage with small budgets?

Clarity on openness and role of affiliated companies in Europe regarding participation in European consortium

Challenges & Expectations

EU-Japan joint calls

- Project (start) information different in EU and Japan
- Separate kick-offs - need for more time to get to know each other
- Coordination is key – as is language
- Advisable to have similar budget sharing
- Different contractual elements: EU consortium has contract with EU - in Japan only coordinator has contract with Japan authorities plus sub-contracts with participants;
- Different types of reporting
- In EU consortium has with EU on NDA, data protection etc. - not in Japan)

- Future: EU-Japan joint calls need to give greater attention to data protection topic

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