

NEC Innovation Day 2024

Driving NEC's Growth: Advanced Technology Development and Expansion into New Business Areas

November 27, 2024

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NEC

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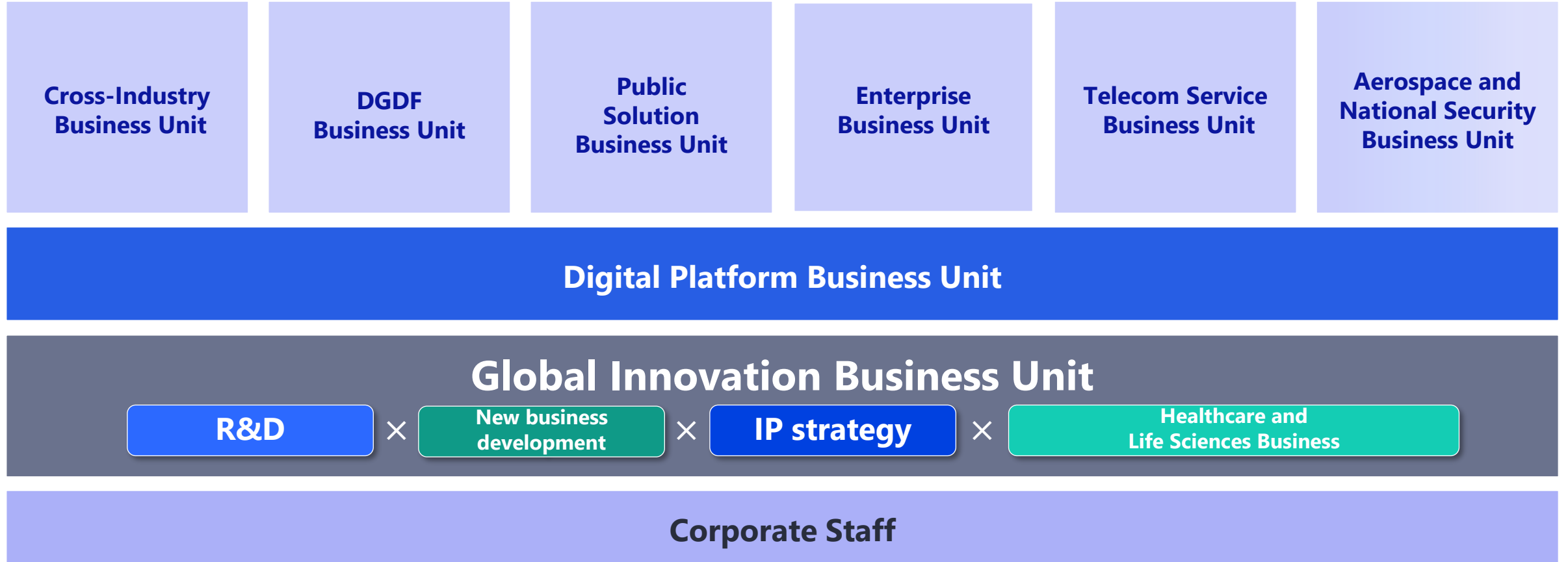


Driving NEC's Growth: Advanced Technology Development and Expansion into New Business Areas

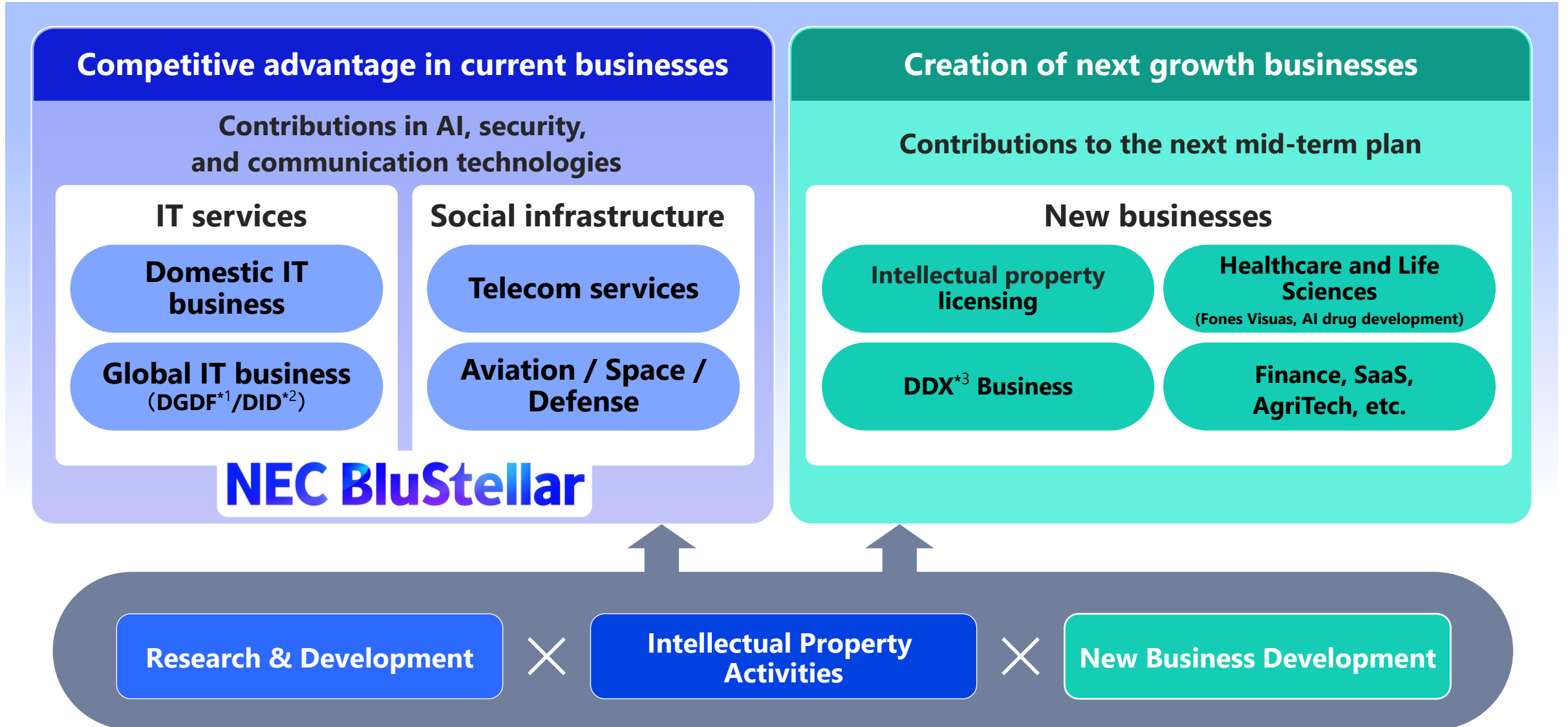
- **NEC's innovation creation scheme and strengths of NEC's R&D**
- **Contributions to existing businesses through global No.1 technologies**
 1. Shifting towards system integration with AI Agents
 2. Advancing biometric technologies for use anytime, anywhere
 3. Visualizing the Earth with satellite communications and advanced image analysis (from disaster prevention to adaptation)
- **Creation of new growth businesses**
 1. Expanding the intellectual property licensing business (including AI drug development business)
 2. Progress in various new businesses

NEC's innovation creation scheme and strengths of NEC's R&D

NEC organizational structure (April 2024)

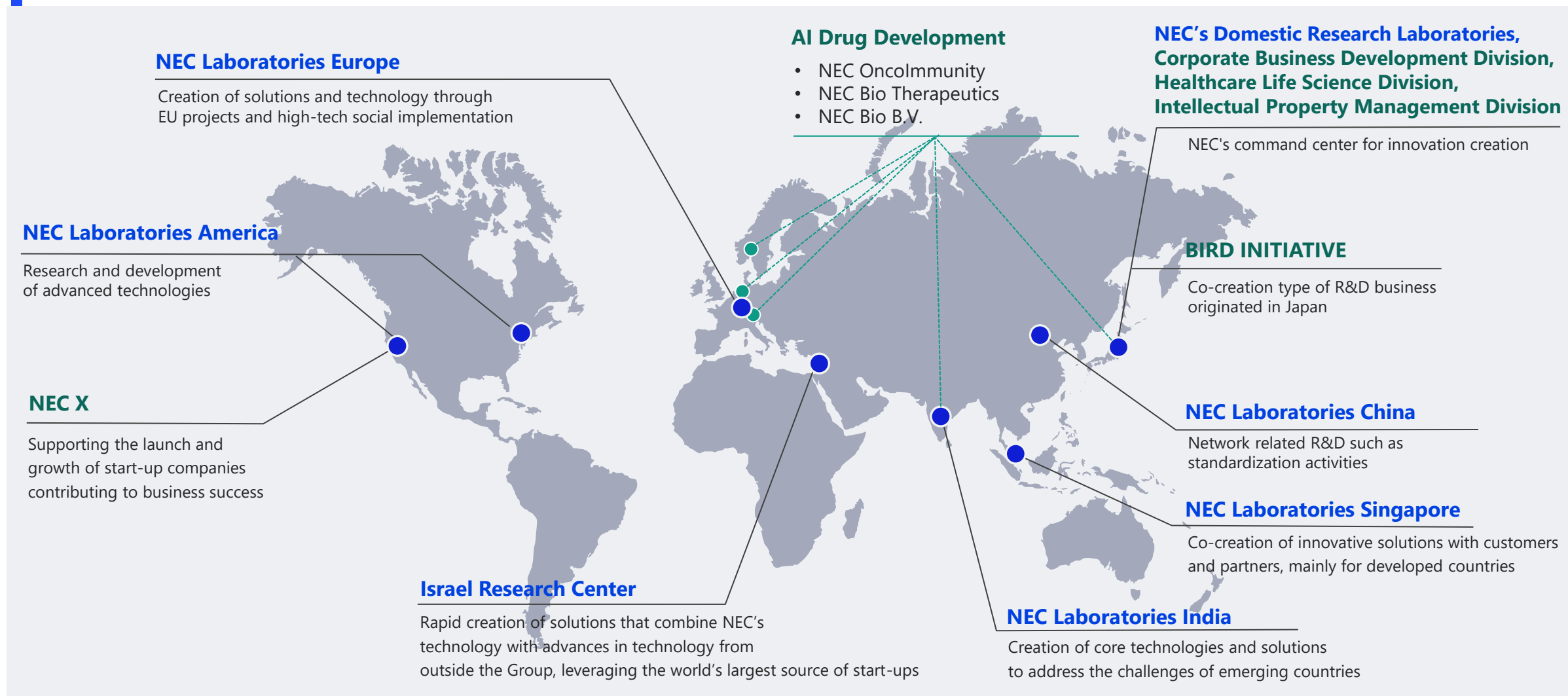


Overview of NEC's innovation creation scheme



R&D and business development utilizing our global assets

A team of 2,000 specialized professionals. 40% of our R&D team is based overseas.



High technological competitiveness on a global scale

Demonstrating world-class technological competitiveness in AI, security, telecommunications, and other fields at major international conferences

AI

Machine learning

The number of papers accepted by top-quality international academic conferences*¹

Ranked 10th in the world

Ranking of papers accepted at leading academic conferences (company-based)

Rank	Company name	# of papers
1	Google* ²	2562
2	Microsoft	1668
3	IBM	1129
4	Meta Platforms	675
5	Amazon	481
6	Alibaba	404
7	Huawei	362
8	Yahoo	357
9	Tencent	322
10	NEC	246

2000-2023 : Our research

Video & image processing

The number of papers accepted by top-quality international academic conferences*³

Ranked 1st in Japan

Awarded the Medal with Purple Ribbon in 2023

Hitoshi Imaoka, NEC Fellow

"Developing high accuracy face recognition technologies that contribute to global safety and security"

CEATEC's The 25th Anniversary Special Award

CEATEC
AWARD

"NEC's Video Recognition x Generation AI for Industrial DX Promotion and Business Efficiency"

Security

Cyber Security

Yamashita Memorial Research Award, CSS2021, etc.*⁴

Received numerous awards

Communication

Optical Communication

Acceptance of papers in top academic conferences*⁵

47th consecutive year

* 1 NeurIPS, ICML, ECML-PKDD, KDD, ICDM

* 2 Google includes Google-DeepMind

* 3 CVPR, ICCV, ECCV, ACCV, ICPR

* 4 ACM CCS, Eurocrypt, IEEE S&P, and others

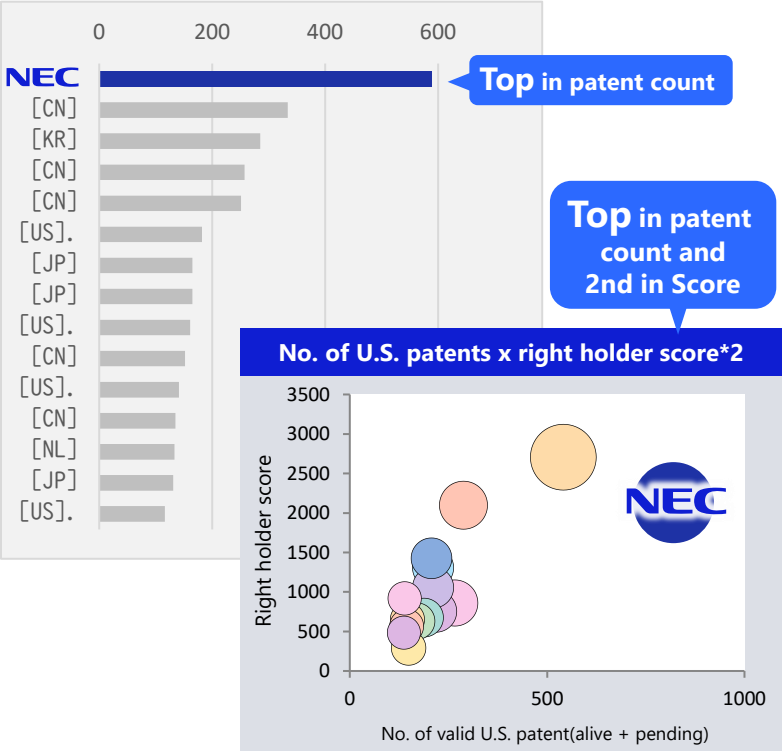
* 5 OFC/ECOC, and others

Global No. 1 in AI intellectual property (Biometric authentication, Video recognition, Analysis/Prescription AI)

Biometric authentication, video recognition, and analysis/prescription AI are NEC's core technologies across various business sectors and No.1 in accumulative PCT*1 international applications, aiming to be the global No.1 patent portfolio in each area by 2025

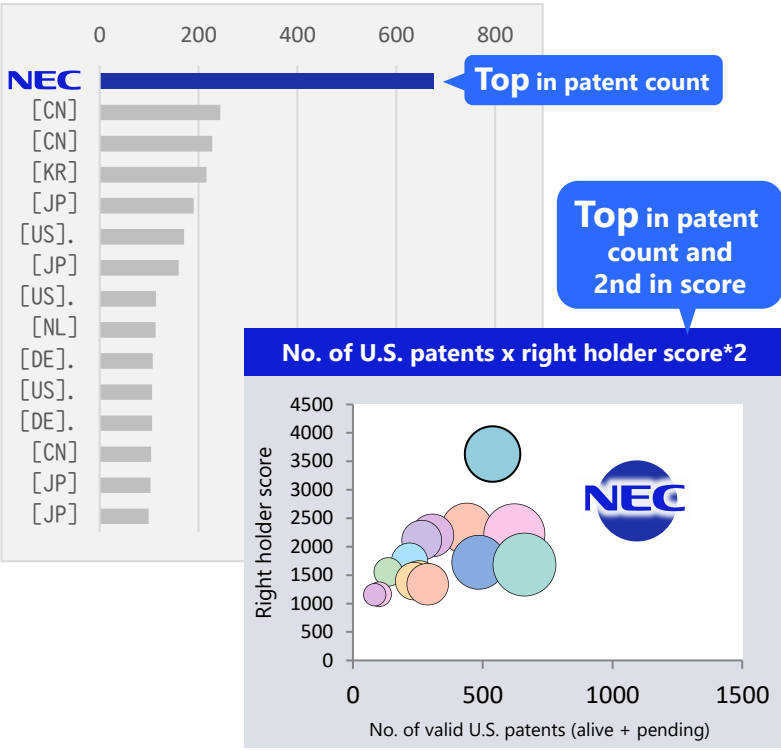
Biometric authentication

Number of accumulative PCT international applications



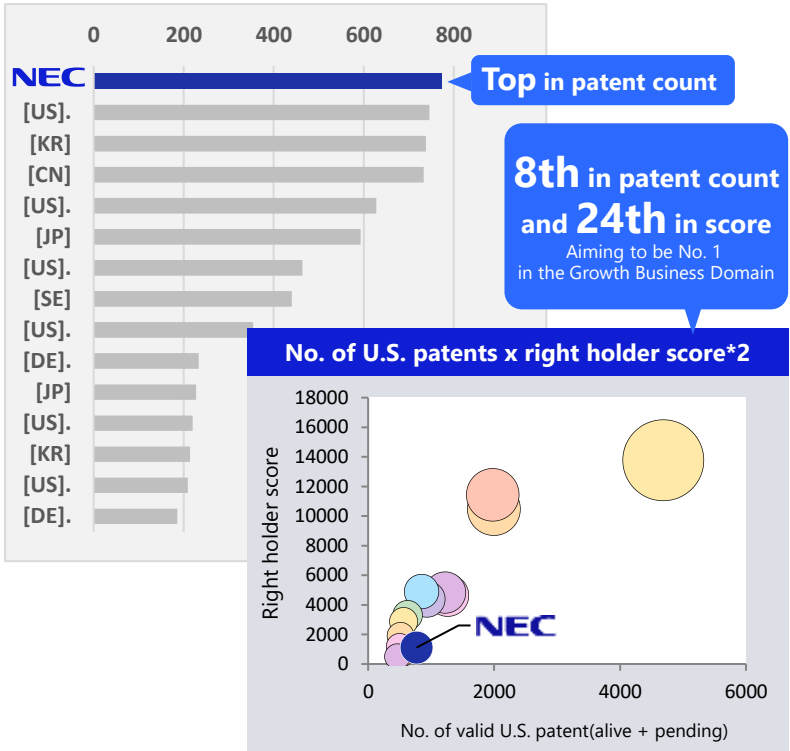
Video recognition

Number of accumulative PCT international applications



Analysis/Prescription AI

Number of accumulative PCT international applications



*1 PCT:Patent Cooperation Treaty
*2 Right holder score: index for strength of patent portfolio of each patent right holder by Patent Result Co. October 2024 (Research by NEC)

Preparing for inflection points for business growth based on technology vision

We are in an era where once-in-a-century breakthroughs are occurring simultaneously, including generative AI, quantum computing, satellite networks, and advancements in life sciences. Starting in FY2021, we have begun publicly sharing our technology vision to enhance collaboration with external partners.



Generative AI



Potential to simulate advanced human expertise

The integration of AI into diverse social activities is driving significant transformation across society, industry, and daily life

NEC technology

NEC cotomi: our lightweight and advanced generative AI solution



Quantum computing



Advancements in error correction and the resolution of technical challenges

Accelerated quantum and molecular computations could dramatically speed up the development of new materials and pharmaceuticals

NEC technology

Quantum computing technology



Space Technology



Civilian applications of satellite networks and sensing

Building resilient social infrastructure equipped with robust communication functions to ensure reliability during disasters and emergencies

NEC technology

Long-range optical inter-satellite communication (Gbps/40,000km)



Life Science



Overcoming a wide range of diseases through genome analysis

Leveraging AI and cutting-edge HPC* technologies for genome analysis to drive IP creation, develop new drug businesses, and revolutionize social infrastructure

NEC technology

AI drug development technology (Infectious diseases, various types of cancer)



* High Performance Computing

NEC BluStellar integrates advanced technologies to secure competitive advantage

Management Agendas

Innovation in Society and Business

Reforming Customer Experiences

Business Transformation

Transformation of Organizational and Human Resource

Transformation of Digital Platforms

Business Model

BluStellar Agenda

End-to-end approach to solving
our clients' management agendas
Value creation success stories and best practices

Technology

BluStellar Technologies

Provide services that rapidly integrate the technology
accumulated since the company's inception
and the expertise of the research institute



Organization / Human Resources

BluStellar Programs

Problem solving with more than 10,000 DX professionals
Talent and knowledge
Co-creation programs with customers

Contributions to existing businesses through global No.1 technologies

1. Shifting towards system integration with AI Agents
2. Advancing biometric technologies for use anytime, anywhere
3. Visualizing the Earth with satellite communications and advanced image analysis (from disaster prevention to adaptation)

Contributions to existing businesses through global No.1 technologies

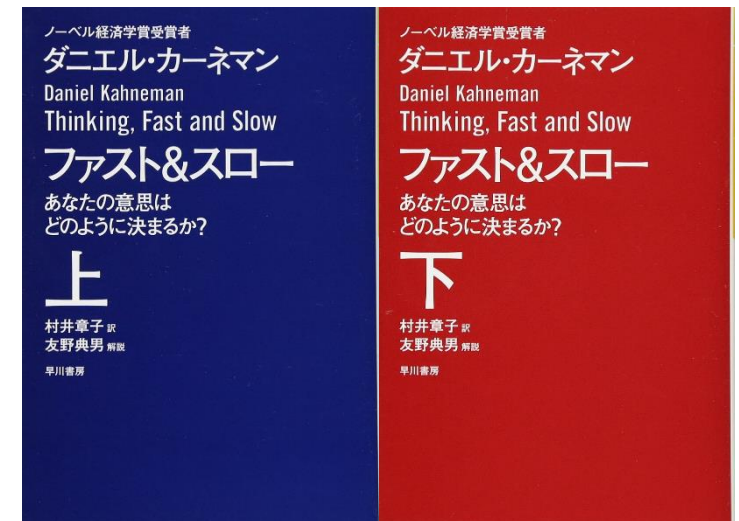
1. Shifting towards system integration with AI Agents
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Daniel Kahneman: "Thinking, Fast and Slow"

Answer quickly:
what is the color
of the next word?

Red

Your system 1 made you want
to answer "red",
your system 2 made you
decide for "green".



"Thinking, Fast and Slow" Daniel Kahneman,
translated by Akiko Murai, Hayakawa Shobo

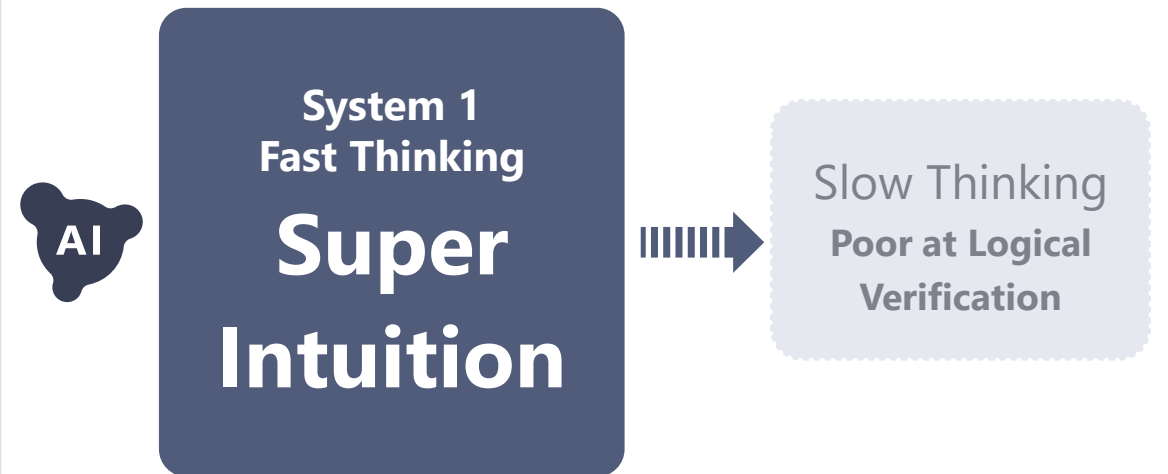
Human Intelligence

Humans verify intuition and logic each other



LLM Intelligence

LLMs have super intuition but lack sufficient logical thinking



NEC's vision for AI development

NEC envisions a transition from conversational capabilities and enhanced logical thinking to the deployment of AI agents that drive autonomous growth and foster business innovation.

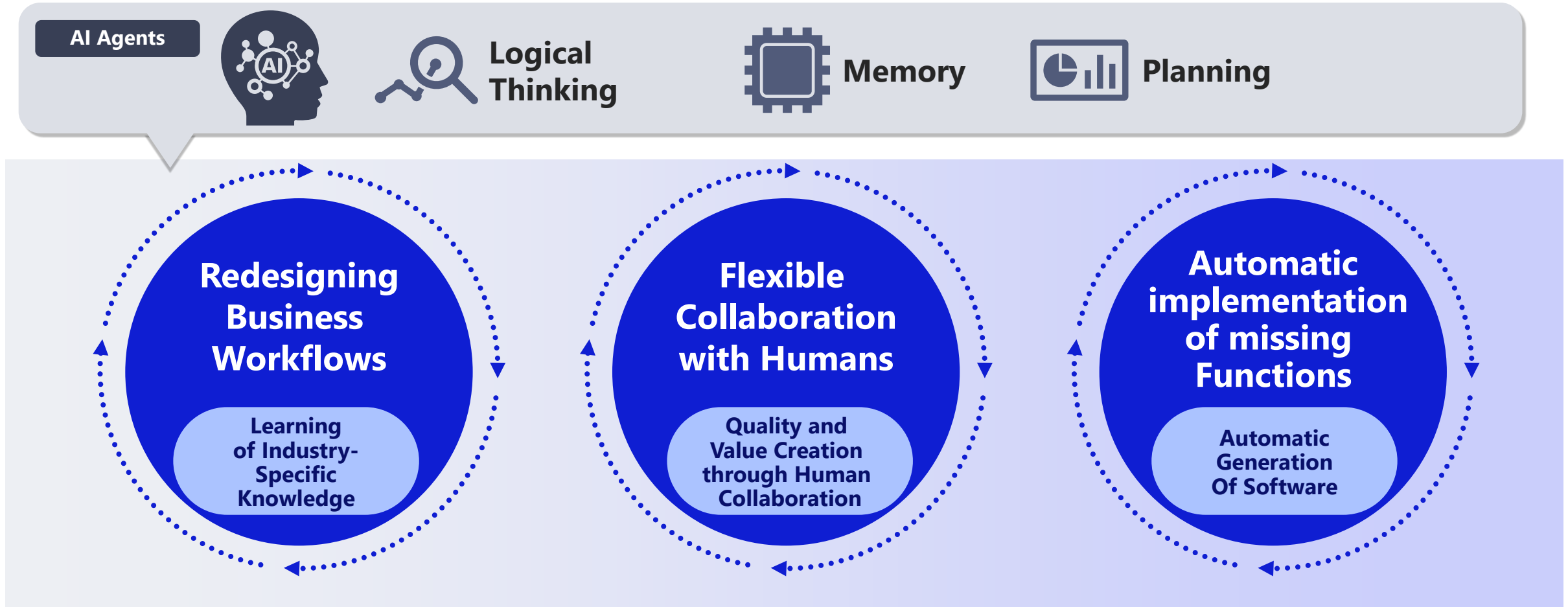


NEC introduced AI Orchestration, showcasing its concept for AI Agents.



NEC's Aim of AI Agents ~A Dynamic IT System that continues to evolve and grow~

AI systems that break down complex and sophisticated workflows into individual tasks and collaborate flexibly with humans. The missing features are autonomously recognized, designed, embedded, and operate the task autonomously and sustainably in real time



Shifting to System integration incorporating AI Agents

Current IT systems realize predefined specifications and provide fixed value.

⇒Future IT systems will continue to expand the value they provide and evolve autonomously (just like talented human resources)

Current IT Systems

The value provided
are fixed

Formulaic Interface

The Differentiating
Factors are Quality/Costs

IT Systems Aimed by NEC's AI Agents

The value provided will
Autonomously expand and improve

Interface similar
to instructions to human

The differentiating factors are (1) basic technological capabilities that support AI Agents, and (2) the ability to design new workflows.

NEC co-creates new industry workflows with customers and provides highly accurate AI Agent technology, security, and eco-friendly systems that provide high value.

Shifting to the System integration incorporating AI Agents

Anticipated markets for AI Agent implementation



Required initiatives and core technologies

Product Announcements

Enhanced AI models

Enhanced LLM performance
(speed&accuracy)

Product Announcements

NEC AI Agent

Core technology for agent-based automation
(Former AI Orchestrator)

Product Announcements

Multimodal support

Capturing Real-world sensing
information like images, sounds, etc.

Detailed Manu

Addressing AI regulations

Ensuring prompt and effective compliance
with increasingly stringent global AI regulations

Eco-Friendly Generative AI

Improving energy efficiency by efficient GPU use

Today we will announce industry-specific initiatives and common platform technologies (products)

NEC
Corporate Senior Vice President
Managing Director,
AI Technology Service Business Division

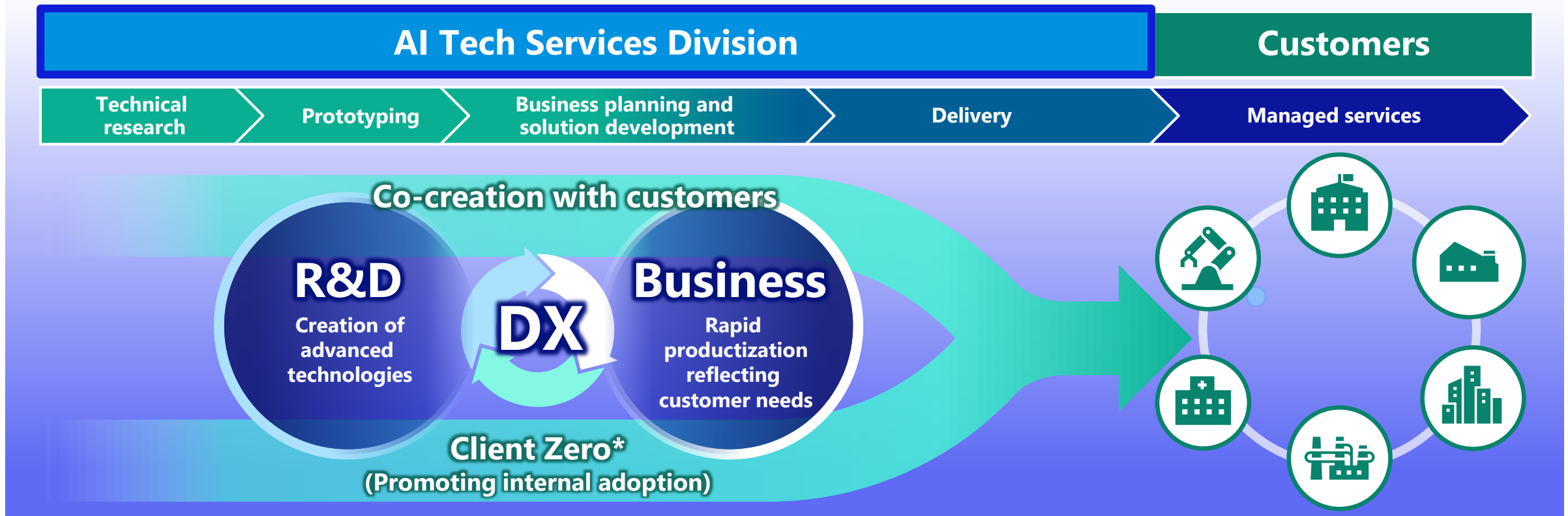
Akio Yamada



Establishment of AI Tech Services Division

With the establishment of the AI Tech Services Division, the generative AI business will be seamlessly launched by integrating market exploration, productization of research outcomes, and go-to-market strategies.

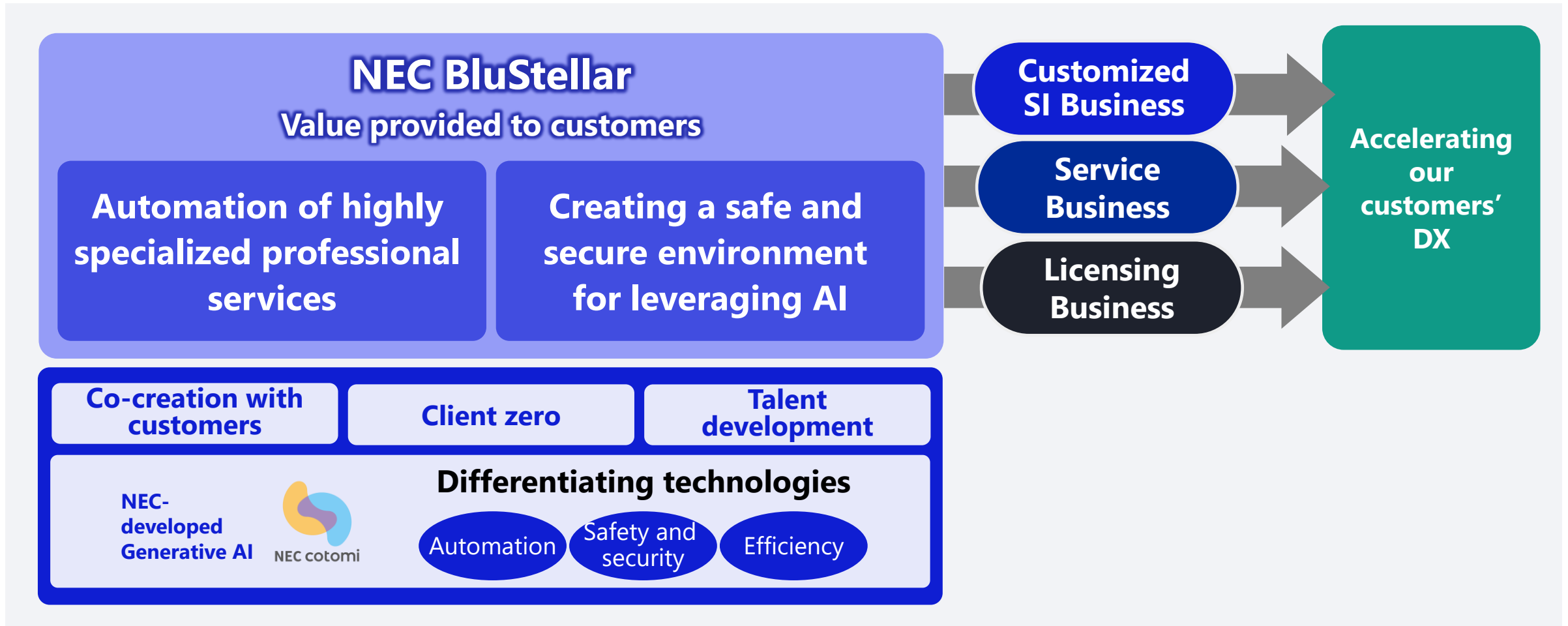
NEC BluStellar



* Client Zero: Practice with your company as the 0th client. Contribute to the promotion of DX for clients and society by providing lively experience and value.

NEC Focuses on automating highly specialized tasks to provide a secure and reliable AI usage

Promoting the dedicated business models with the strategies centered on NEC-developed high-performance generative AI model



Expansion of the Service Business

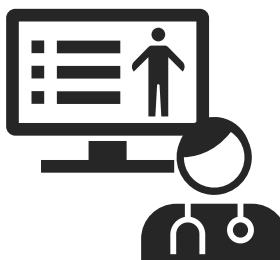
Enhancing customer experience and operational efficiency in DX solutions through generative AI

Beginning with the hospital-focused DX solution “MageOak/iS”, NEC also contributes to the transformation of business processes in the manufacturing sector with the PLM solution “Obbligato”.

Press release on
November 20, 2024

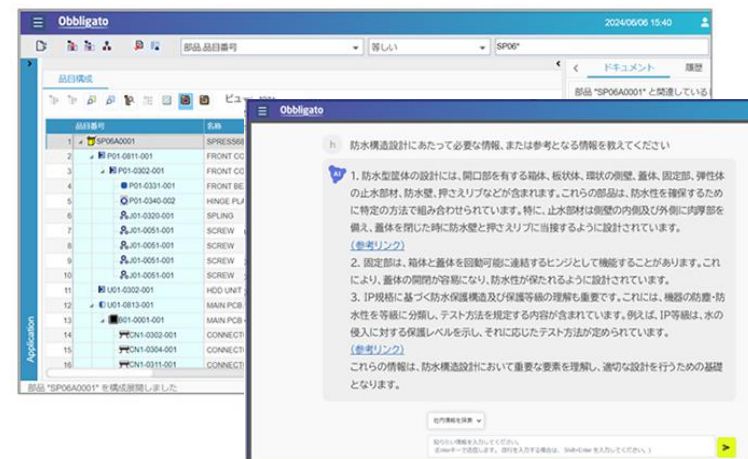
Began sales of the electronic medical record system
“MegaOak/iS” integrated with generative AI

Launched “Obbligato” with integrated
generative AI capabilities



Launched in
November 2024

In the medical field, where severe staffing shortage,
NEC contributes to the efficiency of document creation



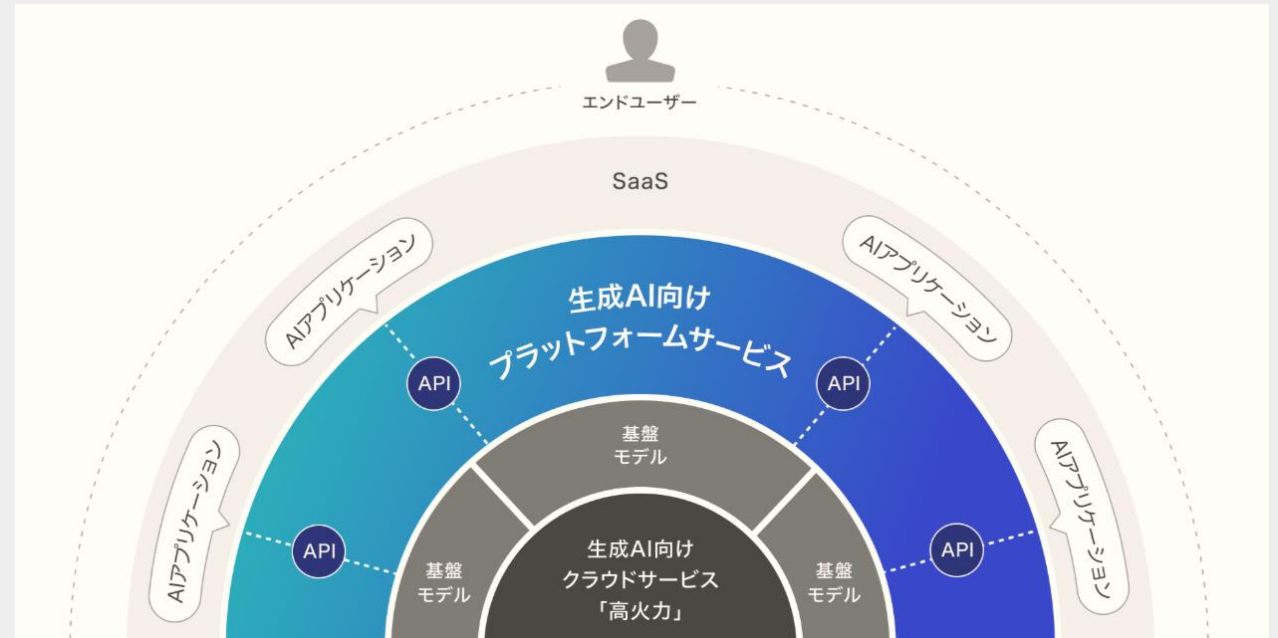
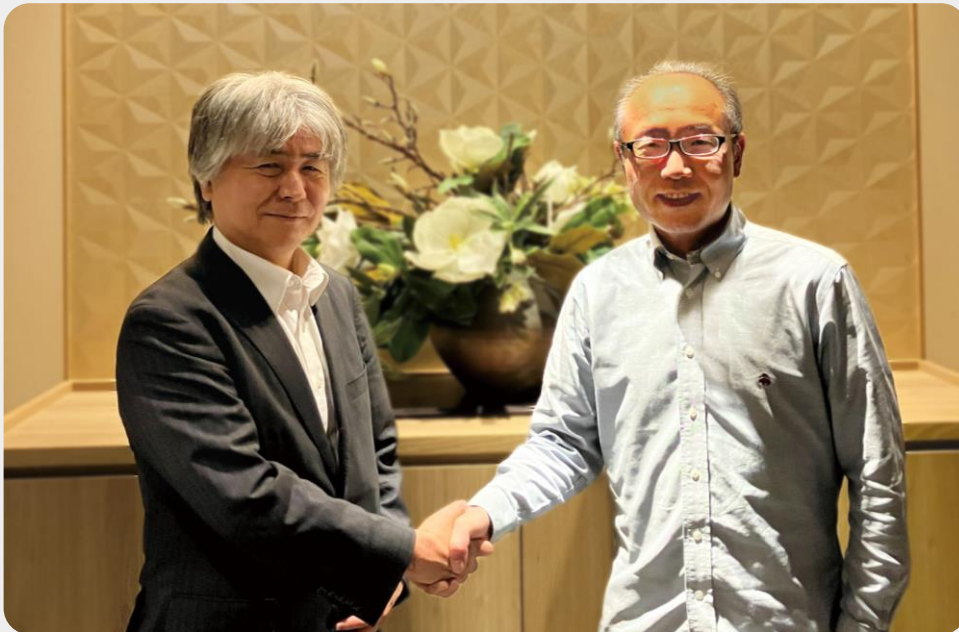
Available from April
2025

Enhancing the sharing of expertise among experienced
engineers and improving the efficiency, accuracy, and
speed of design operations

NEC is collaborating with Sakura Internet in the generative AI platform domain to meet the demand for services that prioritize reliability and safety.

Press release on
November 25, 2024

Sakura Internet's platform service for generative AI,* , is implementing NEC generative AI "NEC cotomi". NEC is the first to provide LLM for the platform service



*Press Release: "Sakura Internet Begins Development of Platform Service for Generative AI
- Enabling a Fully Domestic Solution From Cloud Infrastructure to Application"
<https://www.sakura.ad.jp/corporate/information/newsreleases/2024/11/25/1968217720/>

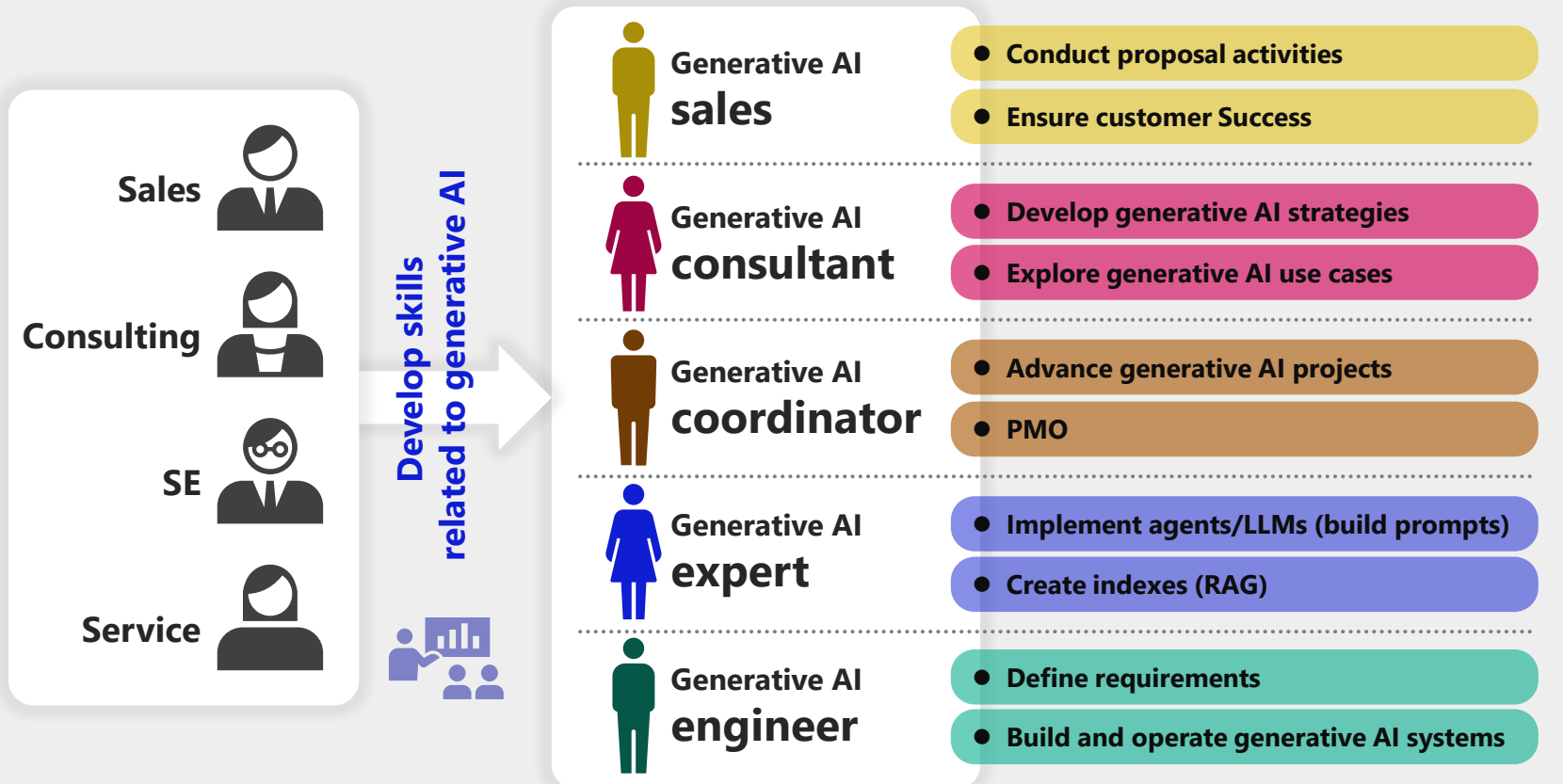
Developing talent to support AI Transformation

NEC is advancing talent development to support business growth, with 450 individuals having completed the LLM course by October 2024 and plans to increase this figure to 1,000 participants.

The workforce is being expanded, including reskilled personnel, to support the entire digital transformation lifecycle for customers, from planning to implementation and operations

LLM SkillUP STUDIO

Courses began in June 2024 with
450 unique enrollees having
completed the course by October



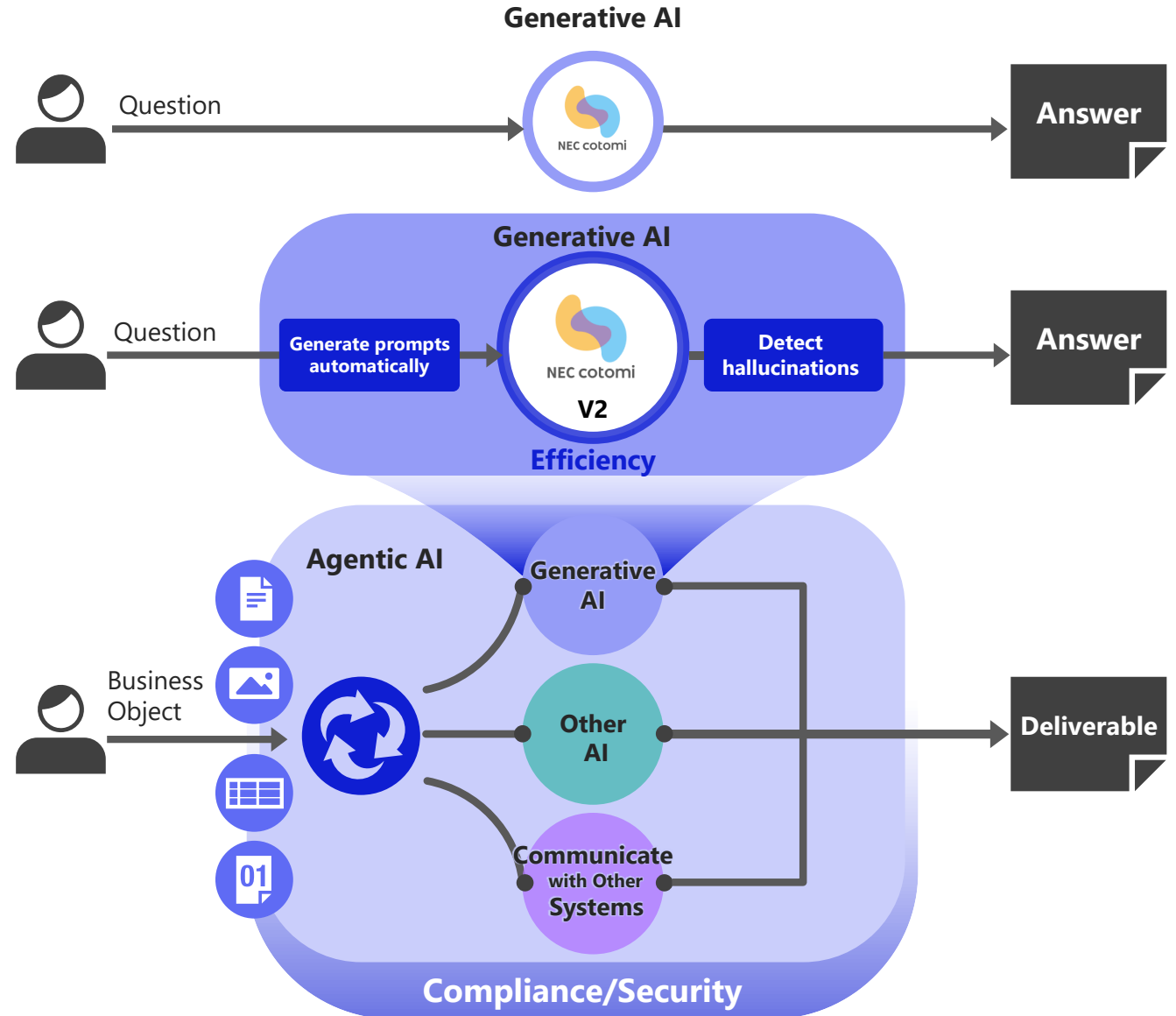
Three advancements

in NEC Generative AI are being harnessed for further business process improvements

1 Enhancing AI models for automating complex tasks

2 Deploying the NEC AI Agent for driving automation

3 Expanding capabilities with multimodal support



1 Enhancing AI models

We are enhancing NEC cotomi's world-class Japanese language processing capabilities to further support advanced workflow automation. This initiative targets fields like healthcare and finance, where high levels of accuracy, logical thinking, and efficiency are crucial.

BluStellar

Exhibit

Press Released on
November 27, 2024

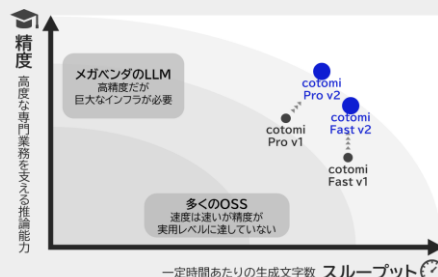
Key points

Highlighted

- Enhance world-class accuracy and speed
- Improve reliability by providing supporting evidence
- Reduce prompt creation burden through self-learning
- Double power efficiency without compromising performance

NEC cotomi v2 World-class Japanese processing

Public announcement:
November 27, 2024



Enhancing LLM reliability: Anti-hallucination measures

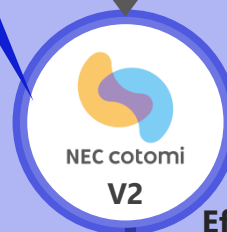
Public announcement:
September 18, 2024



Generative AI

Expand
prompts
automatically

Self-learning for
practical
applications in
workflows



Efficiency

Environmentally
conscious
generative AI:
(energy saving by
efficient use of GPU)

Hallucination
Detection

Answer

2 Deploying the NEC AI Agent for driving automation

Starting in January 2025, NEC will begin a phased rollout of the NEC AI Agent Service, which enables autonomous enterprise search

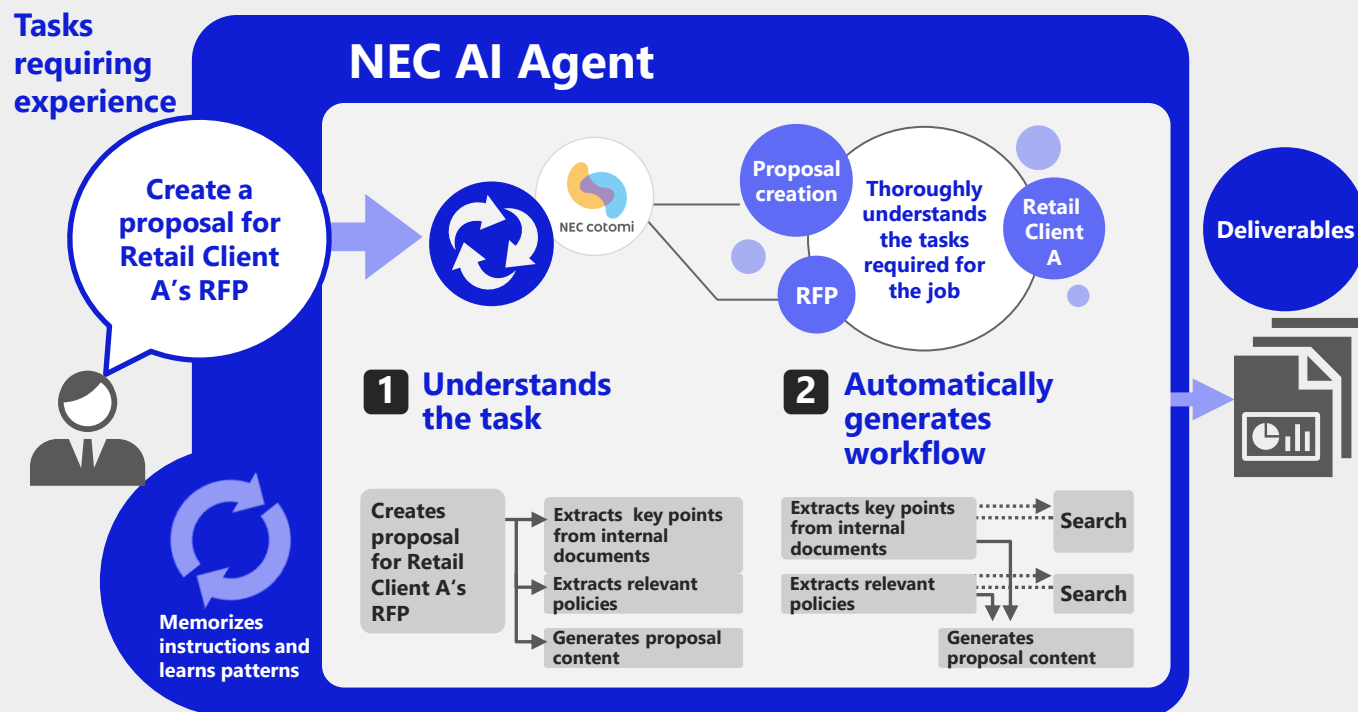
Exhibit

Press release on
November 27, 2024

Key points

- **Autonomously executes business processes with minimal guidance**
- **Task flow optimization ensures precise and efficient operations**

The NEC AI Agent independently thinks and solves problems without relying on predefined rules



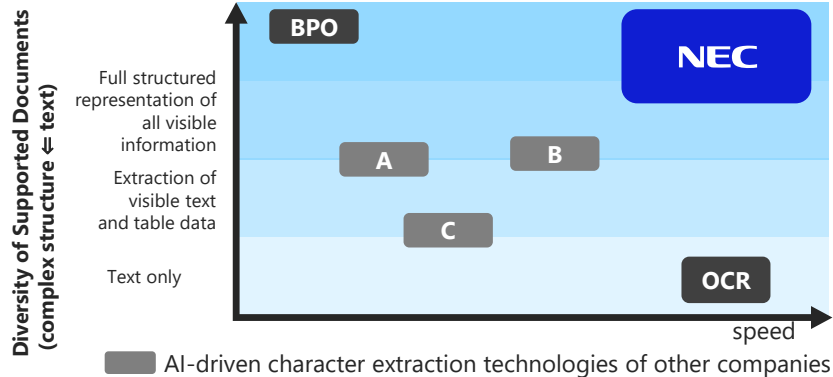
3 Expanding capabilities with multimodal support

Starting in January 2025, we begin providing a feature that uses retrieval-augmented generation (RAG) to harness information from diverse multimodal sources, leveraging our internal expertise to accelerate the automation of specialized tasks.

Key points

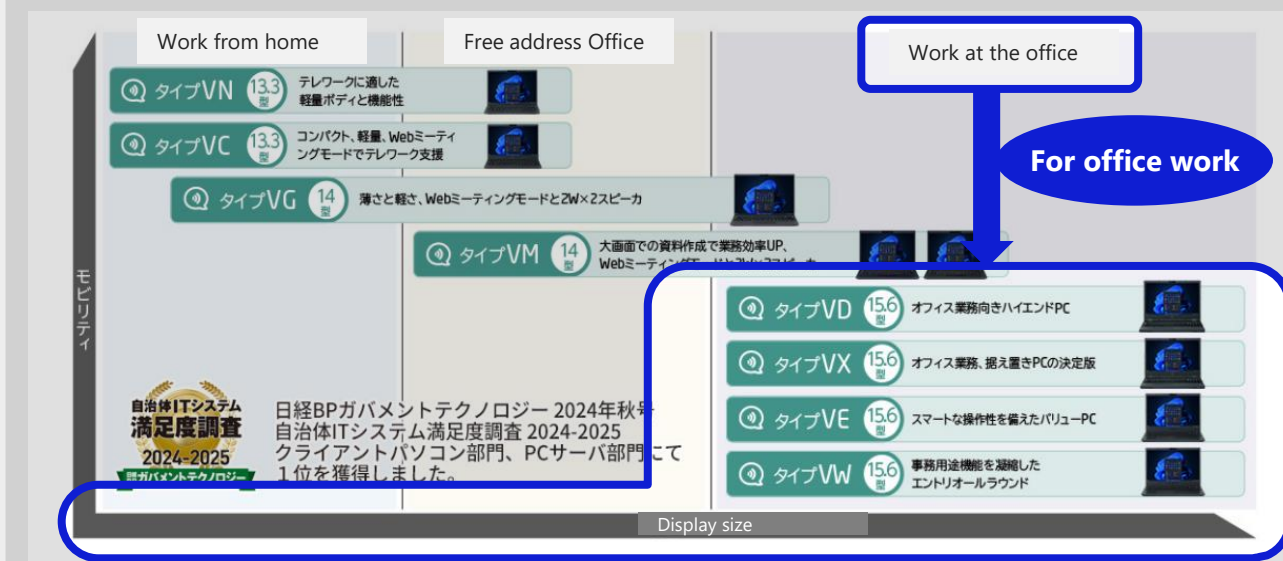
- Comprehends the structure of charts and diagrams to accurately interpret the flow of the text
- Recognizes implicit rules within these charts and diagrams to extract precise information

Positioning of NEC's technology for understanding charts and context



NEC AI Agent allows seamless use of customer-owned data, including charts and tables, without the need for manual review, thereby enhancing the quality of responses.

Understand as a unified whole



Grasps the display sizes, large and small

<https://jpn.nec.com/products/bizpc/mv/note.html>

Ensuring prompt and effective compliance with increasingly stringent global AI regulations

Comprehensive risk management framework Based on the METI's AI Guidelines for Business Appendix

	Risks associated with generative AI	External attack risks	Internal use risks
Solving with technology	Hallucination	N/A	AI Firewall(*) Detecting issues
			Anti-hallucination feature Assists in correcting problems
	Leak of confidential information	AI Firewall(*) Filtering various risks	Technology for handling sensitive information
	Misuse through jailbreaking		N/A
	Blindly trusting disinformation and misinformation	Misinformation analysis technology	
	Reproduction of bias (Prejudice, ethics, etc.)	AI Testing Risk Assessment for generative AI	
Solution with systems	Copyright infringement	Governance development and rule-making	
	Infringement of prescribed licenses and qualifications (Such as medical or legal)		

*:AI Firewall is a registered trademark of Cisco Systems, Inc.



NEC cotomi

Seamless integration
from R&D to GTM

Demonstration of
cutting-edge practices

Continuous enhancement
of NEC AI Agent

Rapid delivery
of value

Continuous delivery
of new services

Accelerating
Business Process
transformation



**NEC AI Agent is
everywhere**

Contributions to existing businesses through global No.1 technologies

1. Shifting towards system integration with AI Agents
2. Advancing biometric technologies for use anytime, anywhere
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Sustaining world-class expertise in biometrics: face, iris, and fingerprint

Ranked No. 1 in the world in benchmark tests conducted by NIST*¹(Jan. 2024)



Face recognition

World No.1



FRTE (2024/1 *²)

FRVT	(2019)
FIVE	(2017)
FRVT	(2013)
MBE	(2010)
MBGC	(2009)

No.1 in FRVT Ongoing 2021/8*³ and 2022/1*⁴



Iris recognition

World No.1



IREX 10 (2022*⁵)

IREX 10	(2021)
IREX IX	(2018)
(Iris Exchange IX)	



Fingerprint recognition

World No.1



MINEX	(2016,2006)
PFT/PFT II	(2013,2009)
FpVTE	(2012,2003)
SlapSeg	(2004)
ELFT	(2007)

*1 National Institute of Standards and Technology.

Results shown from NIST do not constitute an endorsement of any particular system, product, service, or company by the U.S. government.

*2 FRTE Identification (Jan 2024) Leaderboard Identification (T>0) Achieved No.1 ranking in 4 categories on the leaderboard: Gallery: Mugshot, Probe: Mugshot, N=12000000; Gallery: Visa, Probe: Kiosk, N=1600000; Gallery: Border, Probe: Border $\Delta T \geq 10$ YRS, N=1600000; Gallery: Mugshot, Probe: Mugshot $\Delta T \geq 12$ YRS, N=3000000.

*3 FRVT Ongoing 1:N Identification (Aug 2021) Leaderboard Identification (T>0) Achieved No.1 ranking in 2 categories on the leaderboard: Gallery: Mugshot, Probe: Mugshot, N=12000000 and Gallery: Border, Probe: Border $\Delta T \geq 10$ YRS, N=1600000.

*4 FRVT Ongoing 1:N Identification (Jan 2022) Leaderboard [Identification (T>0)] Achieved No.1 ranking in 3 categories on the leaderboard: Gallery: Mugshot, Probe: Mugshot, N=12000000; Gallery: Border, Probe: Border $\Delta T \geq 10$ YRS, N=1600000; Gallery: Mugshot, Probe: Mugshot $\Delta T \geq 12$ YRS, N=3000000.

*5 IREX 10: Identification Track(Sept 2022) Achieved No.1 ranking in 3 categories: Two-eye Accuracy, Single-eye Accuracy, Rank Accuracy.

Expand the market to all scenes by enhancing Implementation ability
(high performance, small size, light weight, robustness)



Accelerating widespread adoption through integrated sensors

Lightweight yet maintaining accuracy, the system enables face recognition even in natural light environments, allowing for easy deployment across various sites.

Results of collaboration between NEC and Sony Semiconductor Solutions, Inc. (SSS)

Lightweight Face Recognition

Achieves lightweight design with accurate face detection and feature extraction

AI camera
Prototype being
developed
by SSS



Face detection

Feature extraction

Liveness detection

Only face matching is performed in the cloud

Real-time Adaptation to Ambient Light

Outdoor and
backlit
environments

Before



Unclear face image
⇒ Authentication
failed

After



Control backlit face
detection for optimal
recognition quality

Detect and select
facial regions regardless of
lighting conditions

Control imaging parameters
for face recognition



Eita Yanagisawa

Senior General Manager,
System Solution Business Division
Sony Semiconductor Solutions Corporation



Compact and high-accuracy multimodal recognition

Exhibit

We've achieved iris recognition even with small low-resolution standard cameras.
It supports over 10 million users combined with face recognition.

- By combining the world's No.1* face and iris recognition, we have achieved multimodal biometric recognition on dedicated terminals, embedded systems and portable devices

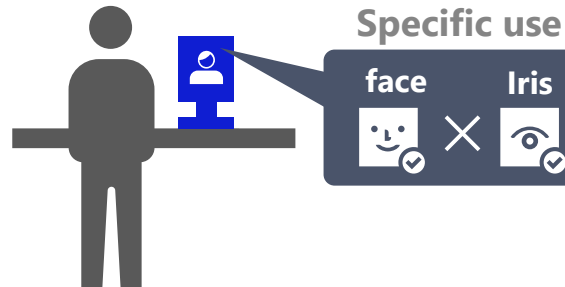
Fast and accurate authentication even with low-resolution images, enabling diverse use cases

with dedicated terminals

Ultra-high precision authentication

National ID

Immigration control



for existing systems and portable devices

Enabling wide range of applications
even with low-resolution images

Integrate with
existing equipment

Portable devices



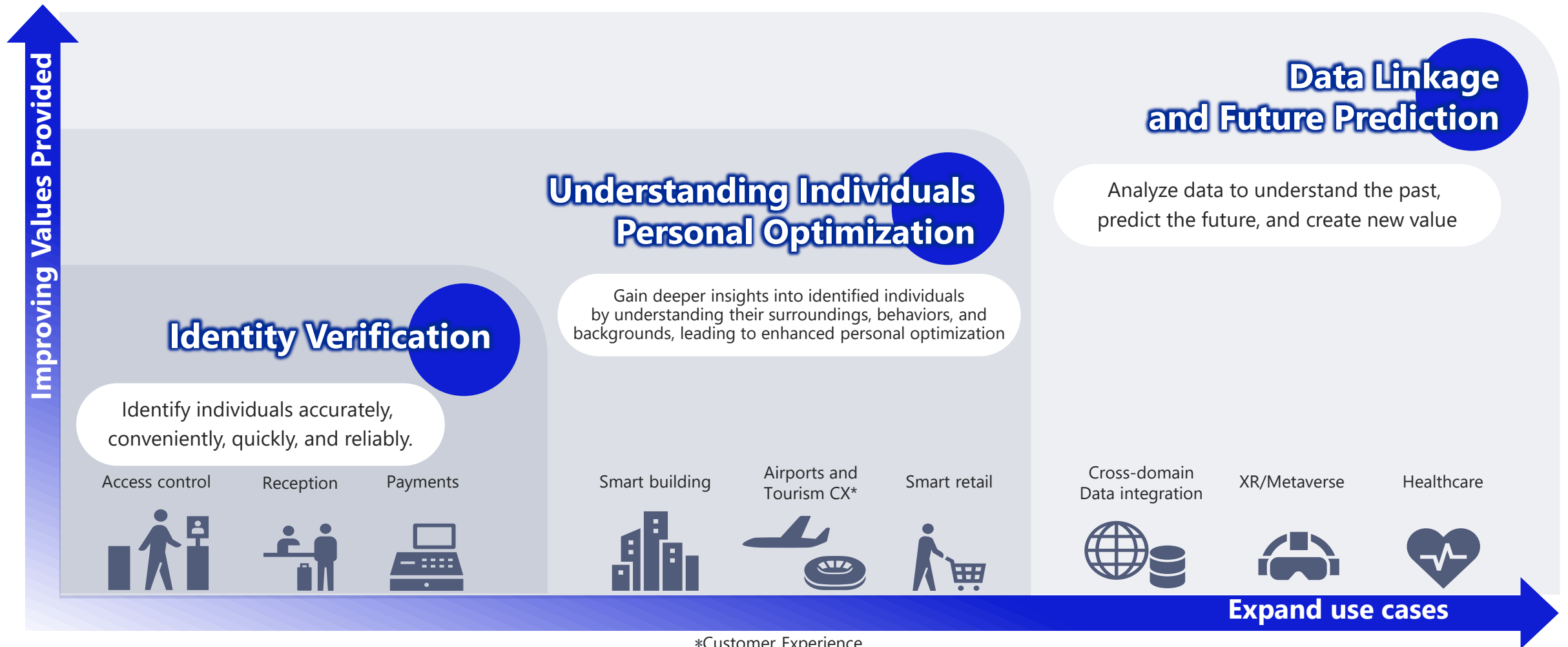
* FRTE Identification (Jan 2024) の Leaderboard [Identification (T>0)] Achieved No. ranking in 4 categories: Gallery: Mugshot, Probe: Mugshot, N=12000000; Gallery: Visa, Probe: Kiosk, N=1600000; Gallery: Border, Probe: Border $\Delta T \geq 10\text{YRS}$, N=1600000; and Gallery: Mugshot, Probe: Mugshot $\Delta T \geq 12\text{YRS}$, N=3000000

IREX 10: Identification Track(Sept 2022) Achieved No.1 ranking in 3 categories: Two-eye Accuracy, Single-eye Accuracy, Rank Accuracy.

Press released November 2024

Goals of the biometrics and video analytics business

From individual identity verification to understanding and optimizing individuals, taking into account their surroundings and background, and furthermore, we aim to make personal life more convenient through data linkage and future predictions.



*Customer Experience

Contributions to existing businesses through global No.1 technologies

1. Shifting towards system integration with AI Agents
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Participation in COP29*¹ (Climate change countermeasures through communications and AI)

Adaptation to climate change is one of the main themes at COP29. NEC introduced a specific case study of adaptation efforts combining communications and AI.



CTO Nishihara speaks at UNFCCC / MIC Japan Pavilion Seminar

Consideration of climate change adaptation is progressing worldwide.
The key issue going forward is the specific implementation of adaptation measures.

**Investment in Climate
Change Solutions by 2030
6.7 trillion dollars*²**

**Contribution to adaptive measures
through analytical techniques using AI**

*1 COP United Nations Climate Change Conference

*2 United Nations Framework Convention on Climate Change UNFCCC UNEP/UNDP estimates

Satellite image analysis x LLM to quickly assess the damage around the world

Changes can be analyzed over wide areas using pre- and post-disaster images, enabling interactive, detailed damage assessments for each household

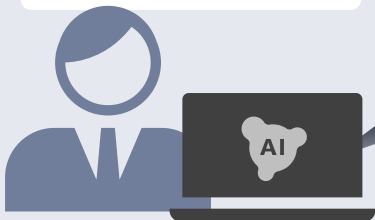
Exhibit

- By combining topographical observation data with land and building information, it is possible to predict disaster risks on a global scale.
⇒ Simulations visualize the effectiveness of disaster prevention and adaptation strategies for municipalities and companies, as well as support the development of financial products.

Quickly assess large areas

Identify the areas with the most significant damage

Gather on-the-ground information from social media



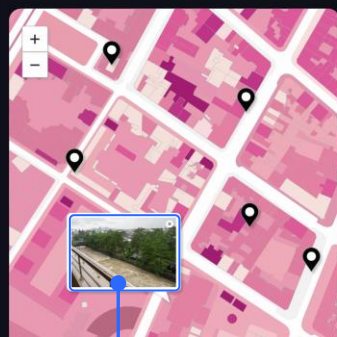
Present the hardest-hit areas, supported by evidence

SAR Demo

XX Town is the most damaged area because it has the highest numbers of changes detected.
District name : XX Town
Number of households : 20
Population : 50

Show images taken from social media of this area.

View SNS images of ZZ Town South.



Display social media images linked with geolocation data

Evaluate damage conditions

Provide details about damaged homes and the extent of damage

Generate a report detailing the damage



Detect damaged houses and rank them based on the extent of damage

Property Damage Analysis using Satellite Images

Image	Damage Information	Damage Assessment
	<p>Structure The part of the roof and walls are collapsed. Large sections of the roof are missing or destroyed. It is damaged by scattered materials.</p> <p>Roof Large sections of the roof are missing or destroyed. It is damaged by scattered materials.</p> <p>Lawn There are debris scattered around the property.</p>	<p>Damage - level: 5 Explanation: The house has significant roof and structure damage, with substantial debris. It shows that the house is not safe for occupancy.</p>
	<p>Structure The part of the walls are collapsed. It is damaged by scattered materials.</p> <p>Roof Large sections of the roof are missing or destroyed. It is damaged by scattered materials.</p> <p>Lawn There are debris scattered around the property.</p>	<p>Damage - level: 5 Explanation: The house has significant roof and Lawn damage, with extensive debris scattered. It shows that the house is not safe for occupancy.</p>
	<p>Structure The part of the walls are collapsed. It is damaged by scattered materials.</p> <p>Roof Large sections of the roof are missing or destroyed. It is damaged by scattered materials.</p> <p>Lawn There are debris scattered around the property.</p>	<p>Damage - level: 4 Explanation: The house has significant structure damage, with substantial debris. It shows that the house is not safe for occupancy.</p>

Query
Show detailed report of the damage

Response
Display the damage and assessment information (see below)

Generate textual reports from images

Examples of earth visualization applications

Value creation in diverse areas such as disaster prevention and mitigation and carbon neutrality is expected.



Creation of new growth businesses

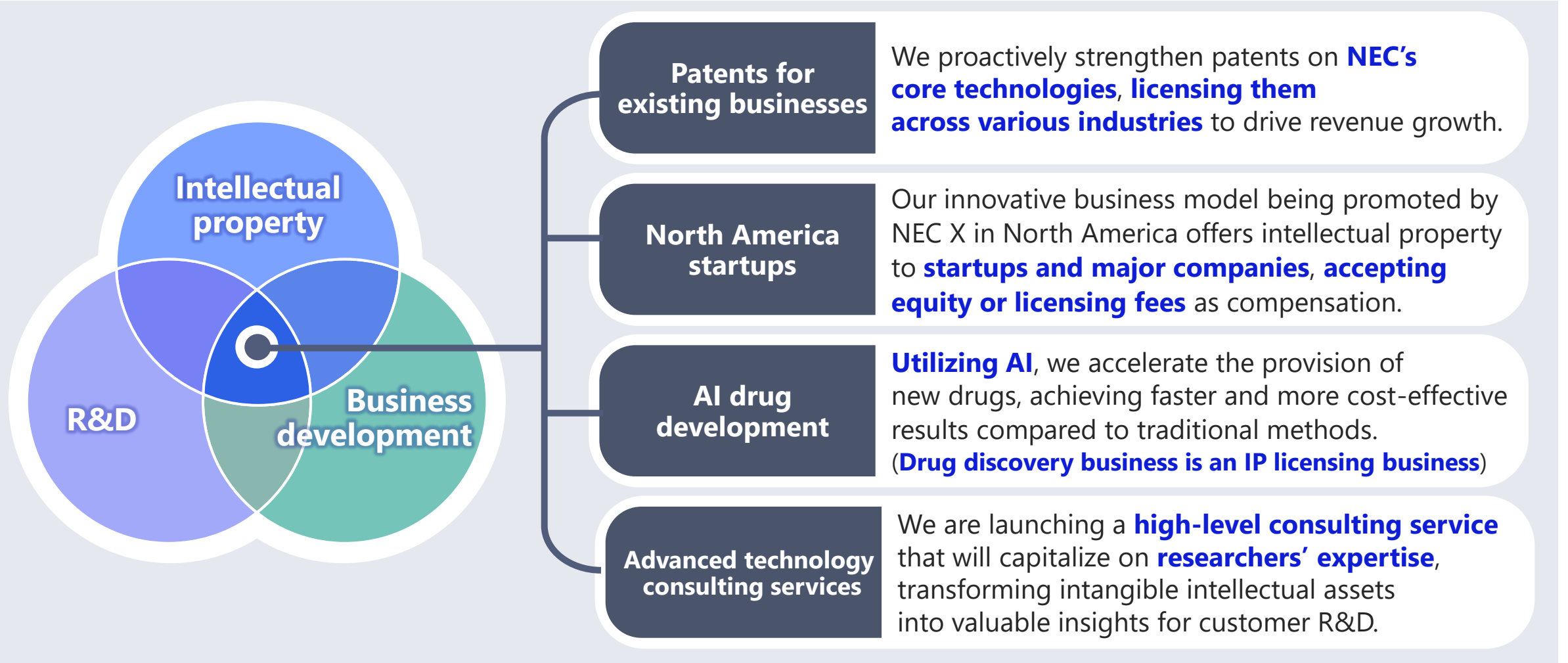
1. Expanding the intellectual property licensing business
(including AI drug development business)
2. Progress in various new businesses

Creation of new growth businesses

1. Expanding the intellectual property licensing business
(including AI drug development business)
2. Progress in various new businesses

Aiming to expand revenue opportunities from diverse intangible assets

Expand revenues by combining advanced technology x business development x intellectual property know-how



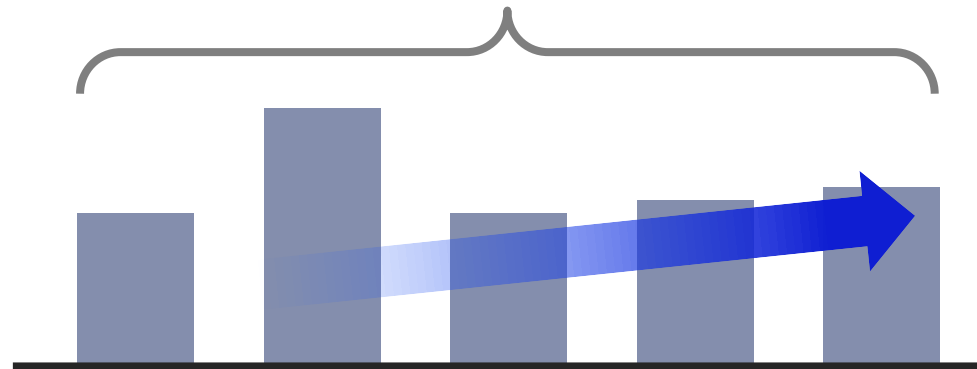
Toward sustainable and stable patent revenues

- The opportunities to utilize NEC patents have significantly increased, resulting in patent revenues more than doubling in the current mid-term plan (FY21-25) compared to the previous five years.
- The upcoming mid-term plan aims to stabilize revenues across fiscal years by Strengthening the external relations function and implementing patent pool subscriptions.

Patent revenue (The height of the bars in the graph height is just an image)

Ongoing mid-term plan period (FY21-25)

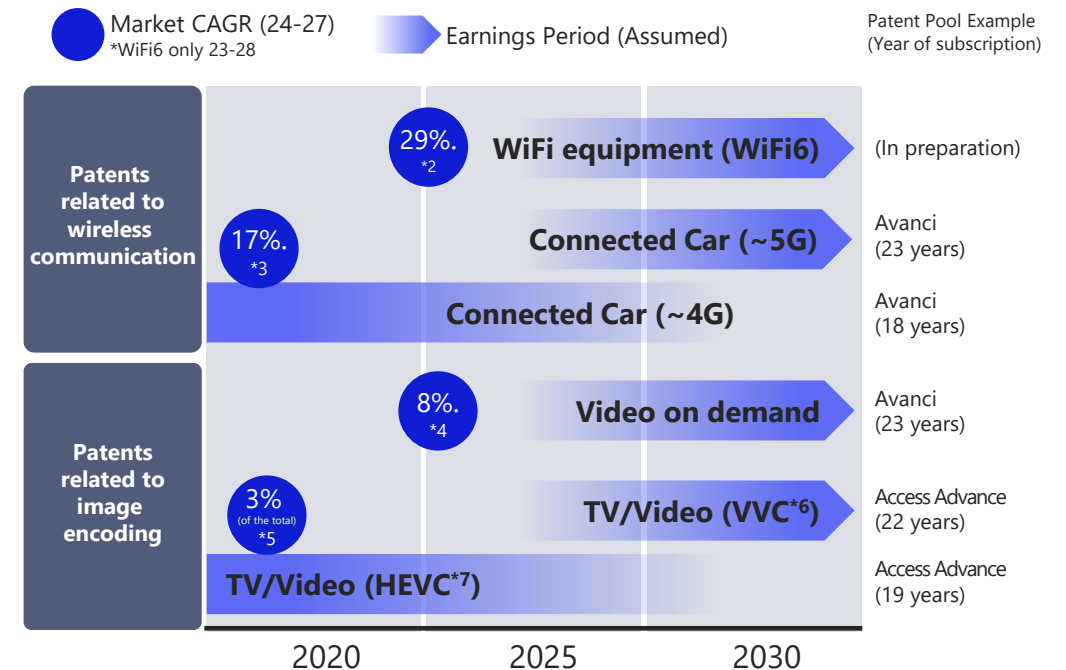
The cumulative progress over the past five years has more than doubled compared to the previous year.



To secure sustainable patent revenues during the upcoming mid-term plan period, we will continue strategic patent filings (5G SEP*1 market share)

*1 Standard Essential Patent

Expanding opportunities to utilize NEC patents (Example)



*2 Global Information, Inc.

*3 Statista <https://www.statista.com/statistics/725025/connected-cars-global-market-size-projection/>

*4 Statista <https://www.statista.com/outlook/dmo/digital-media/video-on-demand/worldwide>

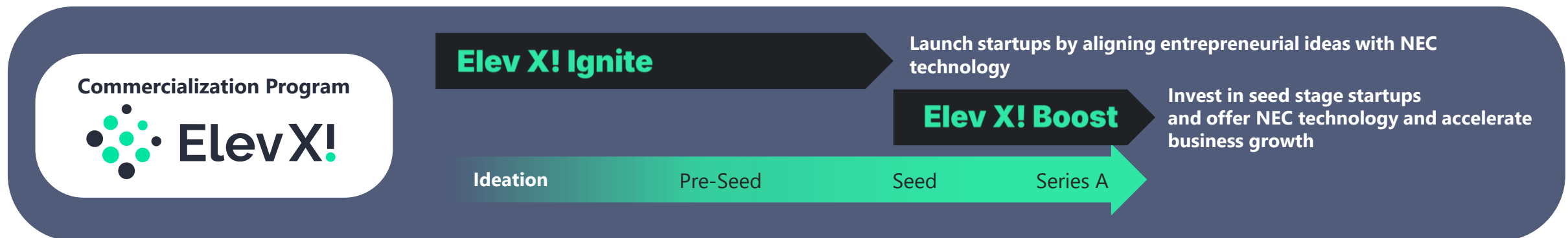
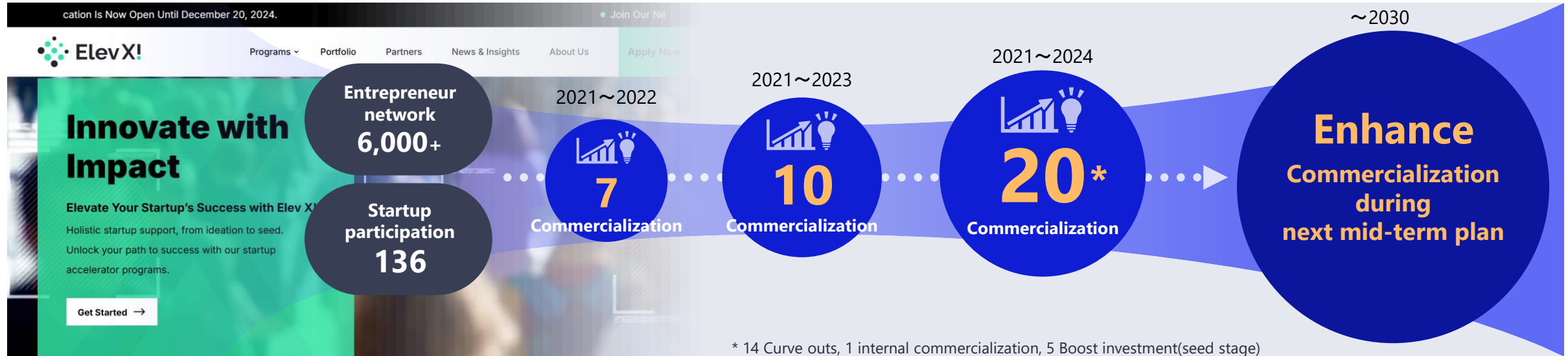
*5 Statista <https://www.statista.com/outlook/amo/media/tv-video/worldwide#revenue>

*6 Versatile Video Coding

*7 High Efficiency Video Coding

NEC X

We are establishing a business model that provides NEC's intellectual property licenses to North American startups and major companies, in exchange for equity and licensing fees. Our goal is to successfully launch this business and pursue further expansion.



AI drug development : New licensing business

Providing solid value through verification from AI-driven drug design to clinical trials. This approach has led to a sustainable licensing business model starting from the completion of pre-clinical trials or Phase II.

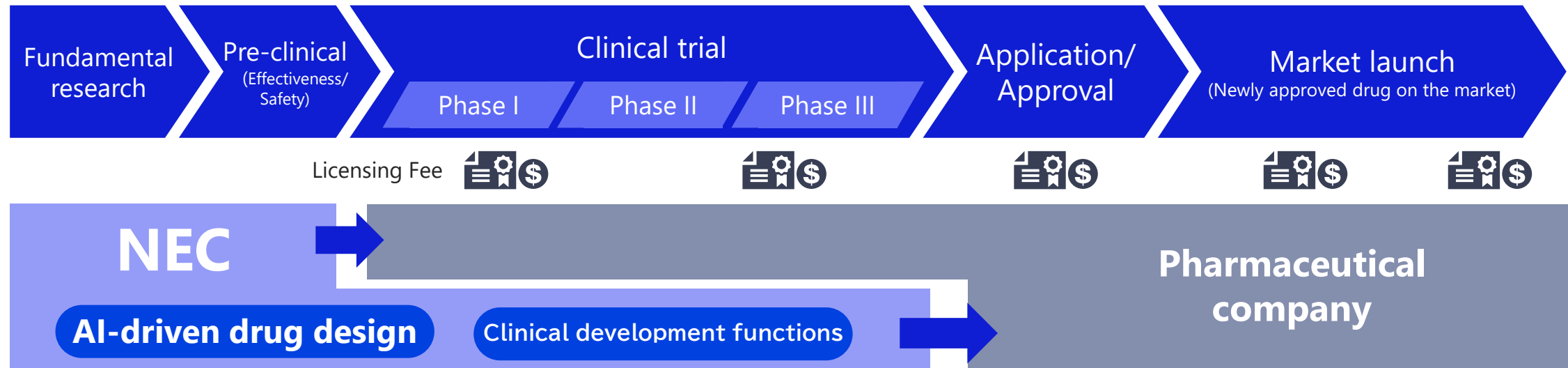
Drug discovery in NEC

Over 20 years of experience in AI-driven pharmaceutical R&D
(Amendment of Articles of Incorporation in 2019)

Acquisition of clinical development functions
(Acquired through M&A in 2019)

First IT company to secure funding from SCARDA*(2023)

Business potential of AI drug development



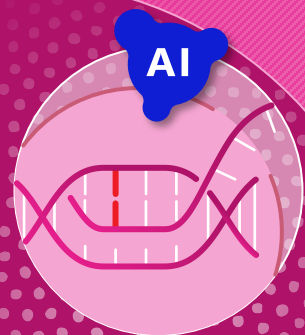
* Strategic Center of Biomedical Advanced Vaccine Research and Development for Preparedness and Response

AI drug development: NEC's strengths in cancer immunotherapy

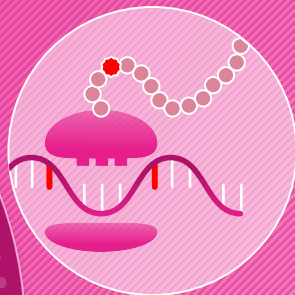
**NEC's uniqueness in using AI for the entire antigen presentation process.
We achieve unparalleled accuracy, as validated by clinical trials.**

NEC employs AI end-to-end (①⇒⑥)

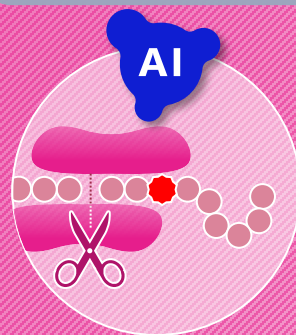
Advanced integration process utilizing Graph AI



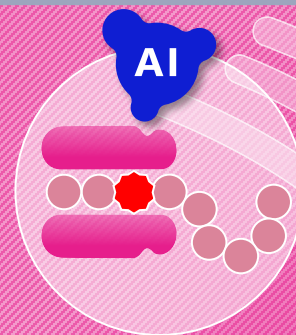
①Cancer-specific
gene expression



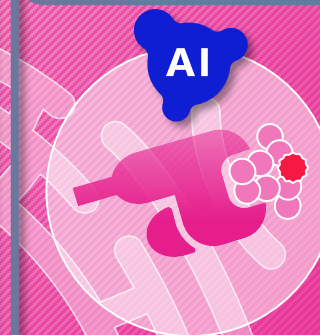
②Conversion of
genes into proteins



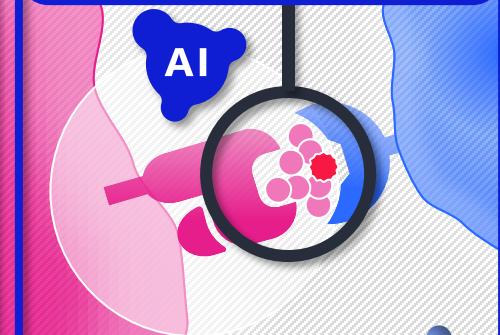
③Translocation of
peptide into
endoplasmic reticulum



④Transport of peptides
into the endoplasmic
reticulum



⑤Peptide and
HLA* binding



⑥Presentation of
peptides as
targets for attack

*HLA : Human leukocyte antigen

AI drug development : New results announced

NEC has demonstrated its capability in design personalized cancer vaccines by utilizing its proprietary, cutting-edge AI technology.

Announced on
November 8, 2024

Personalized neoantigen cancer vaccine TG4050 for head and neck cancer

Transgene and NEC presented 24-month median follow-up data from the ongoing randomized Phase I trial, at SITC 2024

Immune response to
head and neck
cancer

Without
treatment
A 30 %
recurrence rate
is expected

TG4050
Vaccinated
Remained
recurrence-free
for 24 months

The promising results from the Phase I clinical trial
have led to a transition into a Phase II clinical trial.

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Home > News Room >
Transgene and NEC Present New Data Confirming Clinical Proof of Principle for Neoantigen Cancer Vaccine, TG4050, in Head & Neck Cancer at SITC 2024

Transgene and NEC Present New Data Confirming Clinical Proof of Principle for Neoantigen Cancer Vaccine, TG4050, in Head & Neck Cancer at SITC 2024

Compelling 24.1 month median follow-up data presented at SITC 2024 showed that all patients treated with TG4050 after completion of an adjuvant standard of care remain disease-free

TG4050 induced specific and sustained immune responses. A Phase II part is now enrolling patients internationally to build on this promising outcome

Menu

Strasbourg, France & Tokyo, Japan, November 7, 2024, 5:45 p.m. CET — Transgene (Euronext Paris: TNG), a biotech company that designs and develops virus-based immunotherapies for the treatment of cancer, and **NEC Corporation (NEC; TSE: 6701)**, a leader in IT, network and AI technologies, today announced 24.1 month median follow-up data from the ongoing randomized Phase I trial of TG4050 in the adjuvant treatment of head and neck cancers. The data will be presented in a poster at the *Society for ImmunoTherapy of Cancer (SITC) 2024 Annual Meeting*, November 9.

TG4050 is an individualized immunotherapy being developed for solid tumors that is based on Transgene's *myvac*® platform and powered by NEC's cutting-edge AI capabilities designed to optimize antigen selection.

After a median follow up of 24.1 months, all 16 patients who received TG4050 as adjuvant immunotherapy after completion of an adjuvant standard of care remain disease-free and have not relapsed. Out of the 16 patients in the control observation arm, 3 patients have relapsed. There remains a high medical need for these head and neck cancer patients, as approximately 30% of them are expected to experience a relapse within 24 months after standard surgery and adjuvant chemoradiotherapy.

Immune responses targeting selected neoantigens were identified in 100% of patients who received TG4050, demonstrating the strong immunogenicity of the cancer vaccine, with both *de novo* and amplified responses. An analysis over 7 months also shows that immune responses are sustained, during the induction and boost periods.

Creation of new growth businesses

1. Expanding the intellectual property licensing business
(including AI drug development business)
2. Progress in various new businesses

New businesses to support next growth

Steady progress toward achieving the 2025 Mid-Term Management Plan

Exhibit

Data analysis

Data Driven DX/dotData

Providing dotData, human resource education services, consulting services, etc.

In the six years since its launch in 2018 through last fiscal year High growth of 88% CAGR

Healthcare and life sciences

Fornes Visuas

Visualize future disease risk and health status with AI technology, providing measurement and testing services to improve lifestyle habits

- Measurement service: Orders received from 9 major Japanese pharmaceutical companies
- Inspection services: Promote local government collaboration and overseas expansion

Digital finance

Financial Services

Asset formation advice and financial products brokerage and sales of financial products

Capital alliance with Japan Asset Management Co.

SaaS

SaaS Presto

Providing world-proven SaaS established through a strategic collaboration

Between NEC and Vista Equity Partners as an operating company specializing in SaaS

Agriculture

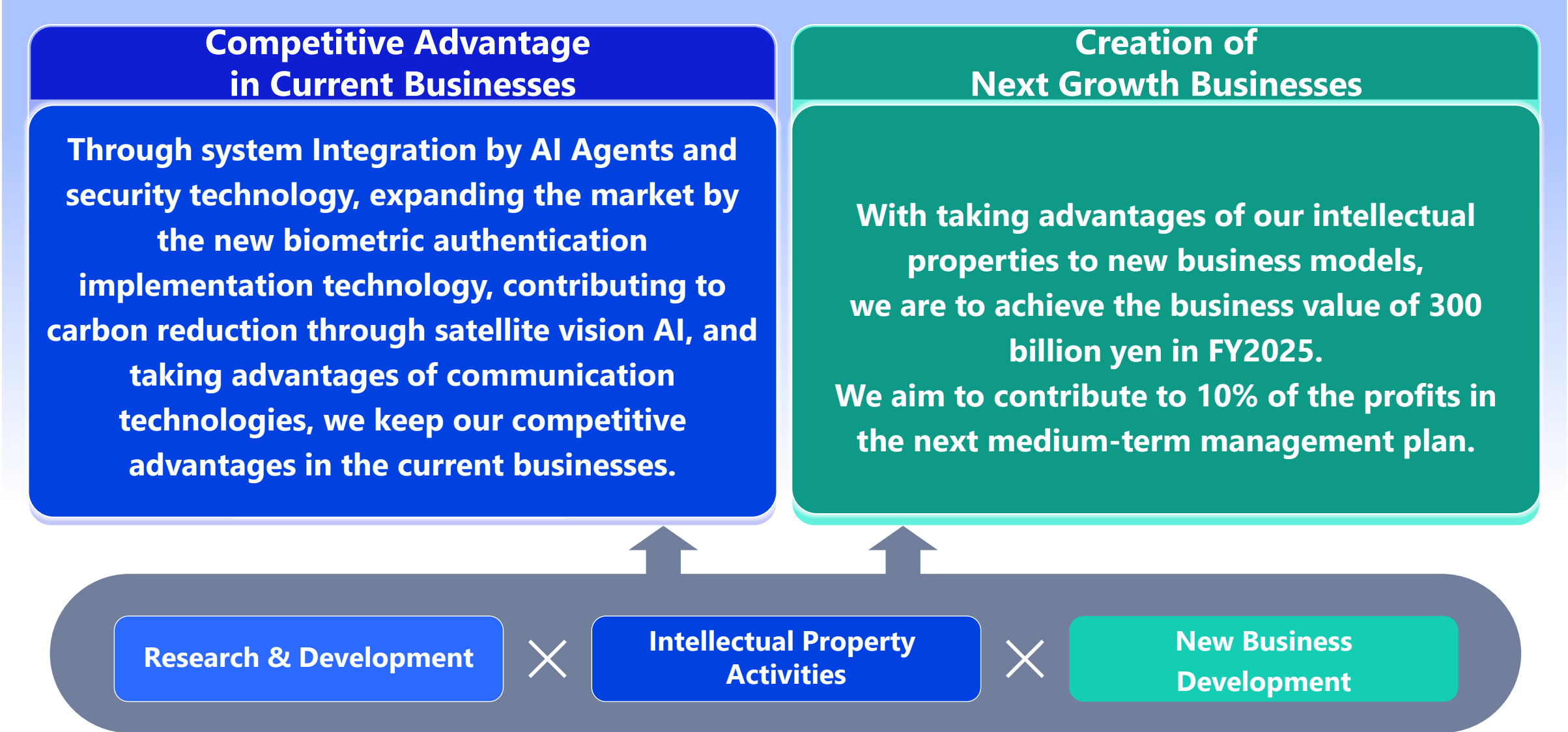
AgriTech

Achieving sustainable agriculture through AI farming

Developing global markets through a strategic partnership agreement with Sumitomo Corporation

Summary

Overview of NEC's innovation creation



A photograph of a modern urban park. In the foreground, there is a large, well-maintained green lawn with several young trees planted in individual mulch beds. A winding path leads from the bottom center towards the right, where a small pond is located. The pond reflects the surrounding greenery and the tall skyscrapers in the background. The sky is clear and blue. The overall scene represents a harmonious blend of nature and urban development.

**Guided by our technology vision,
we strive to identify technology breakthroughs,
and drive innovation through
research and development
intellectual property activities, and
new business development,
thereby creating new social value.**

NEC

\Orchestrating a brighter world

Cautionary Statement with Respect to Forward-Looking Statements

This material contains forward-looking statements regarding estimations, forecasts, targets and plans in relation to the results of operations, financial conditions and other overall management of the NEC Group (the "forward-looking statements"). The forward-looking statements are made based on information currently available to the Company and certain assumptions considered reasonable as of the date of this material. These determinations and assumptions are inherently subjective and uncertain. These forward-looking statements are not guarantees of future performance, and actual operating results may differ substantially due to a number of factors.

The factors that may influence the operating results include, but are not limited to, the following:

- adverse economic conditions in Japan or internationally;
- foreign currency exchange and interest rate risks;
- changes in the markets in which the NEC Group operates;
- impact from the outbreak of infections;
- potential inability to achieve the goals in the NEC Group's medium-term management plan;
- fluctuations in the NEC Group's revenue and profitability from period to period;
- difficulty achieving the benefits expected from acquisitions, business combinations, reorganizations and business withdrawals;
- potential deterioration in the NEC Group's relationships with strategic partners or problems relating to their products or services;
- difficulty achieving the NEC Group's growth strategies outside Japan;
- potential inability to keep pace with rapid technological advancements in the NEC Group's industry and to commercialize new technologies;
- intense competition in the markets in which the NEC Group operates;
- risks relating to the NEC Group's concentrated customer base;
- difficulties with respect to new businesses;
- potential failures in the products and services the NEC Group provides;
- potential failure to procure components, equipment or other supplies;
- difficulties protecting the NEC Group's intellectual property rights;
- potential inability to obtain certain intellectual property licenses;
- the NEC Group's customers may encounter financial difficulties;
- difficulty attracting, hiring and retaining skilled personnel;
- difficulty obtaining additional financing to meet the NEC Group's funding needs;
- potential failure of internal controls;
- potentially costly and time-consuming legal proceedings;
- risks related to regulatory change and uncertainty;
- risks related to environmental laws and regulations;
- information security and data protection concerns and restrictions;
- potential changes in effective tax rates or deferred tax assets, or adverse tax examinations;
- risks related to corporate governance and social responsibility requirements;
- risks related to natural disasters, public health issues, armed hostilities and terrorism;
- risks related to the NEC Group's pension assets and defined benefit obligations; and
- risks related to impairment losses with regard to goodwill.

The forward-looking statements contained in this material are based on information that the Company possesses as of the date hereof. New risks and uncertainties come up from time to time, and it is impossible for the Company to predict these events or how they may affect the NEC Group. The Company does not intend to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise..

Note: In this presentation, the accounting periods of the fiscal years for March 31, 2023, 2024, and 2025 were referred as FY23/3, FY24/3, and FY25/3, respectively. Any other fiscal years would be referred similarly.