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R&D and IP Strategy Briefing

Research & Development Strategy
For global innovation leadership

5 December 2022

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General Manager of the Research & Development Group,
Hitachi, Ltd.**

1 | **Increased investment in R&D
& expanding global R&D network**

2 | **Accelerating R&D to expand Lumada business**

3 | **Driving innovation by backcasting from 2050**

R&D strategy

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R&D strategy

Contents

1. **Research & Development Group vision**

2. Accelerating research & development to expand Lumada business

3. Driving innovation by backcasting from 2050

4. Summary

Support people's quality of life with data and technology that fosters a sustainable society

Growth

Co-creation for Society

Planetary boundaries

Protect the earth while maintaining social infrastructure

Society

Green

Digital

Innovation

LUMADA

Wellbeing

A society where every individual is comfortable and active

People

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Planetary boundaries

Wellbeing

Customers

(Power, Transport)
(Financial, Public services)
(Industry, Urban)
(Vehicles)

Energy, Railway/Transport services		Financial/Public services		Manufacturing/Logistics services		
Grid management	Battery management	IoT platform	Sustainable finance	AR/VR×5G	Traceability	Trust	Web3 Metaverse

OT×IT   ○LUMADA   GlobalLogic

Hitachi Energy

Products

HVDC | Transformers | Energy storage | EV infrastructure | Electrification systems | Quantum computing | Data storage

AR/VR: Augmented Reality/Virtual Reality, EV: Electric Vehicle, IoT: Internet of Things, OT: Operational Technology

1-3. Contribute to Hitachi Group's transformation

2013-2015 MMP 2015	2016-2018 MMP 2018	2019-2021 MMP 2021	2022-2024 MMP 2024

Hitachi Group

| Shift to Social Innovation Business Establish foundations for growth | Implement growth through Social Innovation | Global deployment of Social Innovation Business | Accelerate growth with Green, Digital & Innovation |

- Launched Lumada business (2016)
- Est. joint venture with ABB (2015)
- Acquired Ansaldo STS (2015)
- Acquired JR Automation (2019)
- Est. Lumada Alliance Program (2020)
- Acquired ABB power grids business (2020)
- Acquired GlobalLogic (2021)
- Launched Hitachi Astemo (2021)

R&D Group

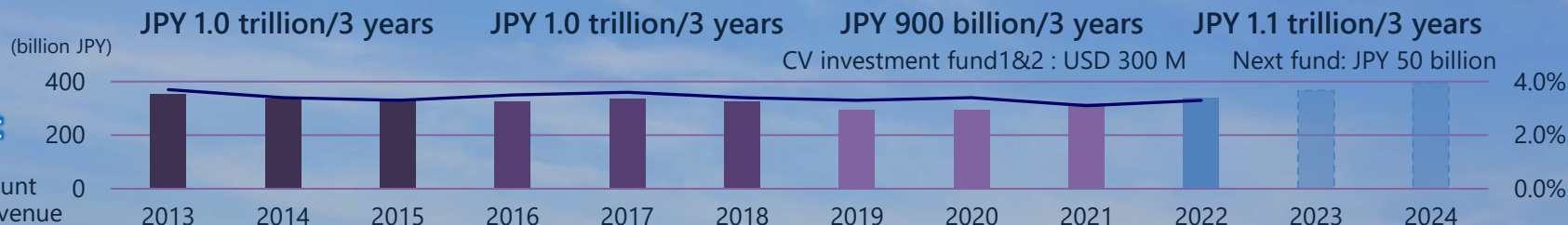| Shift from addressing a broad business portfolio to focusing R&D on Social Innovation areas | Promote customer co-creation for Social Innovation | Accelerate digital research to create Lumada solutions | Strengthen initiatives to drive innovation contributing to global business growth |

- Realigned as CSI, CTI & CER (2015)
- NEXPERIENCE (2015)
- Set up Akasaka co-creation site (2015)
- Set up co-creation sites worldwide: Santa Clara (2016), London, Beijing (2017)
- Set up CV Office (2019)
- Launched Kyōsō-no-Mori (2019)
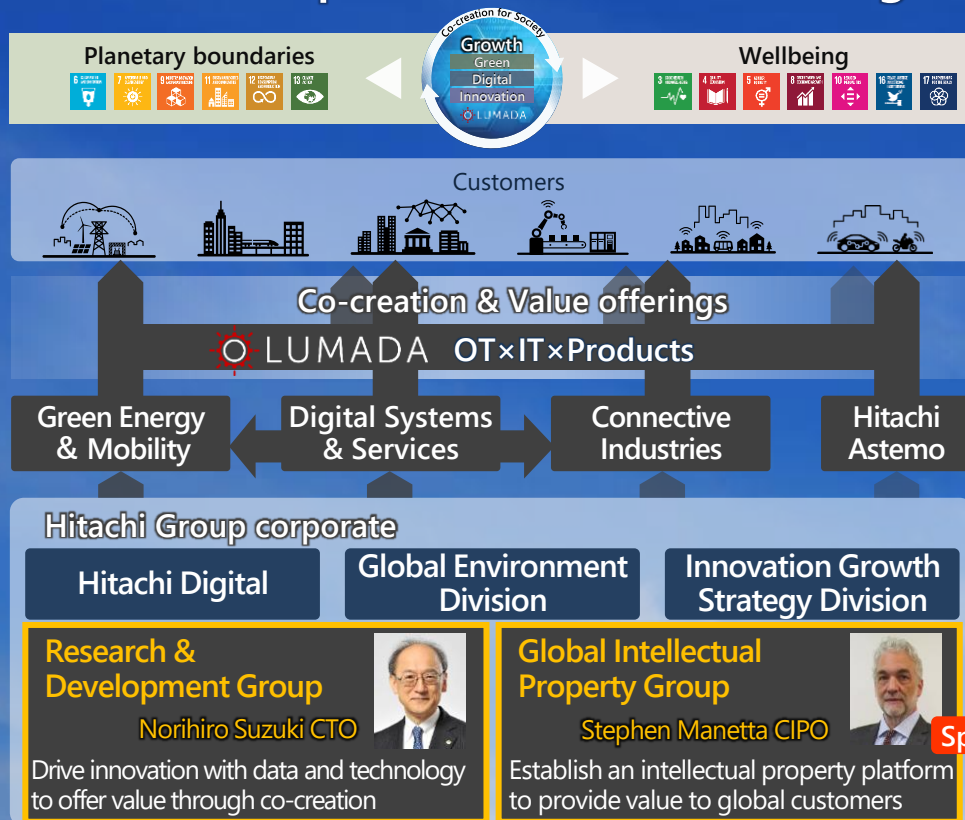- Set up Innovation Growth Strategy Division (2022)

R&D investment

JPY 1.0 trillion/3 years   JPY 1.0 trillion/3 years   JPY 900 billion/3 years   JPY 1.1 trillion/3 years

CV investment fund1&2 : USD 300 M   Next fund: JPY 50 billion

(billion JPY) 400 / 200 / 0 ; 4.0% / 2.0% / 0.0%

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Left axis: Amount
Right axis: % revenue

Transform the promotion structure for global business growth through DX & GX

Co-creation for society

Planetary boundaries ← Growth / Green / Digital / Innovation / LUMADA → Wellbeing

Customers

Co-creation & Value offerings

LUMADA OT×IT×Products

Green Energy & Mobility	Digital Systems & Services	Connective Industries	Hitachi Astemo

Hitachi Group corporate

Hitachi Digital	Global Environment Division	Innovation Growth Strategy Division

Research & Development Group
Norihiro Suzuki CTO
Drive innovation with data and technology to offer value through co-creation

Global Intellectual Property Group
Stephen Manetta CIPO
Establish an intellectual property platform to provide value to global customers

Speaker

MMP 2024 key directives for the innovation strategy

Focus on digital to drive innovation for global business growth

Establish the Innovation Growth Strategy Division
Develop innovation investment strategies to "inspire" our customers' next growth

Generate digital service business
Provide value through OT×IT×Products that support our customers' growth

Drive radical innovation
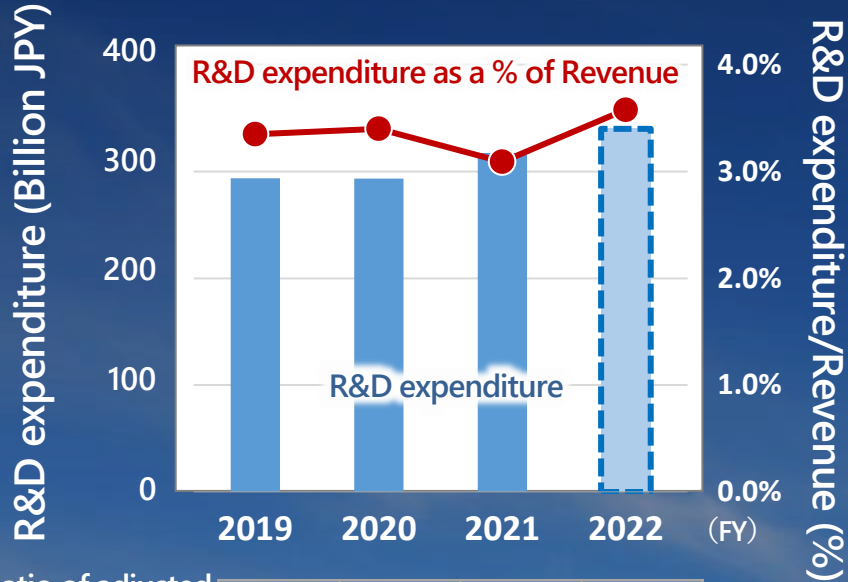Solve customers' future management challenges by backcasting from 2050

Strengthen "global IP strategy"
Globally increase the value of intangible assets and contribute to global business growth

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DX: Digital transformation, GX: Green transformation, CTO: Chief Technology Officer, CIPO: Chief Intellectual Property Officer

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Forecast to support current business and backcast from 2050 to drive innovation

Hitachi Group R&D investment breakdown

Publicly-listed affiliated companies
5.8%

Corporate, miscellaneous*
8.4%

R&D Group

Hitachi Astemo
24.0%

Digital Systems & Services
17.4%

Hitachi Group
338 billion JPY
R&D Group
74 billion JPY
[FY2022 forecast]

Connective Industries
26.6%

Green Energy & Mobility
(inc. Hitachi Energy)
17.8%

Innovation target

Business unit-led	Business roadmap
Sponsored & Adv. sponsored research	Current / Next-generation / Linked

Corporate-led	Innovation growth strategy
Frontier & Platform Research	Co-creation with customers, common digital platforms, Product & Core technology, Exploratory research

2050 Project (new)	Backcasting / Radical innovation

Corporate venturing	Technology/Business model/Sourcing by outside-in / Collaboration projects with startups

*Includes Japanese national projects (As of FY2022, research in the "Green" area is being reinforced through the Green Innovation Fund)

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Drive innovation through synergy fully leveraging
Hitachi Group technology platforms, talented teams, and customer channels

GlobalLogic
Singh CTO

Video message
Synergy with R&D Group

Hitachi Energy
Salge CTO

Presentation
R&D strategy for the energy sector

Europe R&D
Sugimura GM

Europe 60*

Focus efforts to create Environment business through closer collaboration with Hitachi Energy and Hitachi Rail. Participate in the European Environment ecosystem

China R&D
Chen GM

Hitachi China
Harada CTO

China 90*

Expand industrial GX/DX business together with local group companies. Reinforce efforts for decarbonization

America R&D
Nakaya GM   Dayal CCR

North America 90*

Enhance creation of digital service businesses through collaboration with GlobalLogic/Hitachi Vantara/Hitachi Digital

India R&D
Banerjee GM

APAC R&D
Kitagawa GM

South & Southeast Asia 60*

India: Enhance digital engineering
Asia: Focus on green building and smart city

Japan R&D
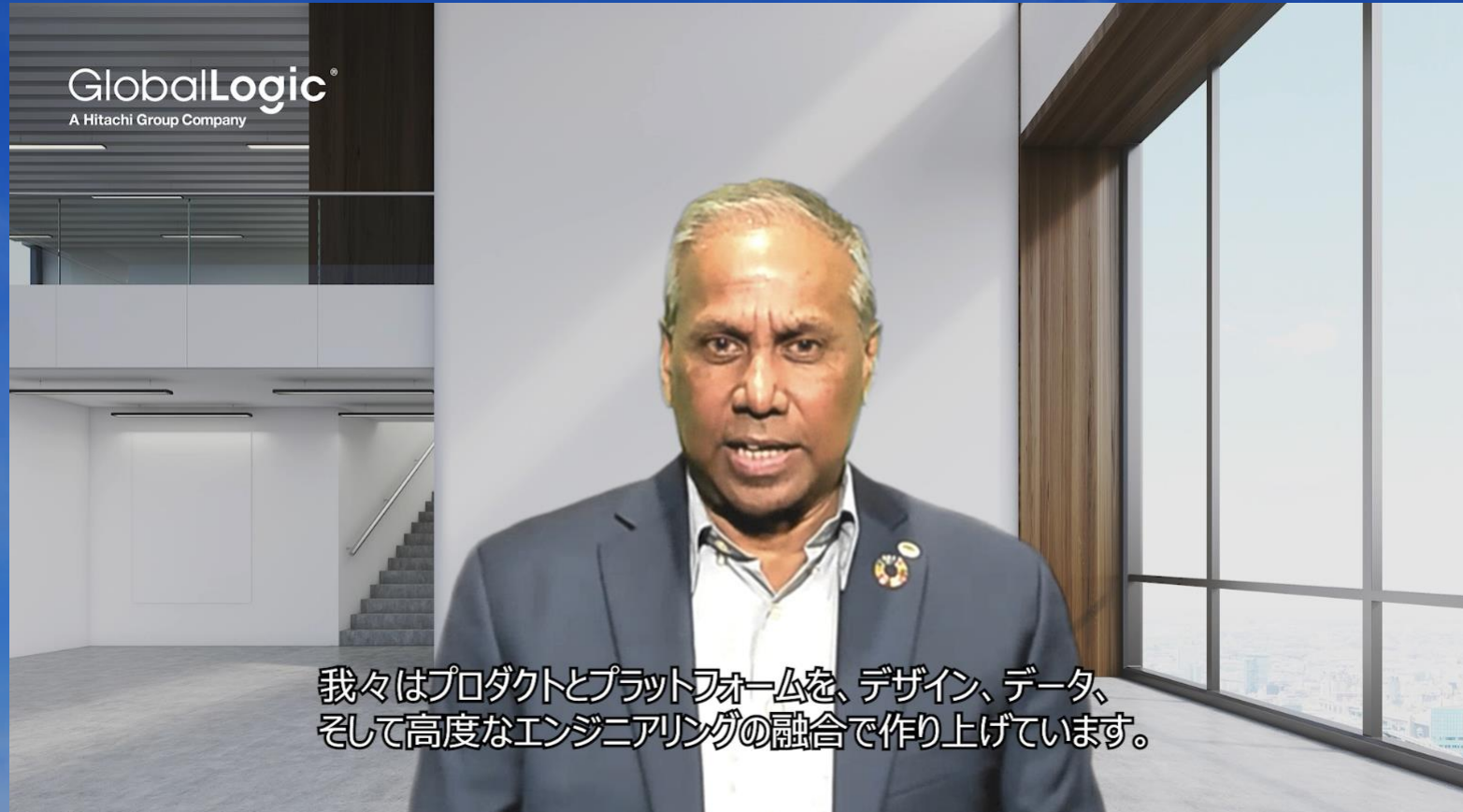Sameshima GM   Nishizawa GM   Kusumi GM   Nishimura GM   Suzuki CCR   Kashimura CCD

Japan 2,100*

Promote customer co-creation for DX/GX.
Establish world-leading technology platforms.
Create radical innovation addressing planetary boundaries and wellbeing
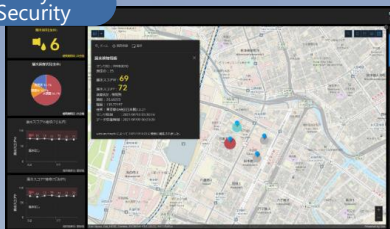
*Number of researchers in FY2021   GM: General Manager, CCR/D: Corporate Chief Researcher/Designer

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我々はプロダクトとプラットフォームを、デザイン、データ、
そして高度なエンジニアリングの融合で作り上げています。

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Highly sensitive MEMS vibration sensors to detect water leakage

Safety & Security

Japan Industrial Technology Awards 2022, Minister of Education, Culture, Sports, Science and Technology Award

High-voltage, high-power inverters for EVs and PHVs

Environment   Resilience

2021 The Ichimura Prize in Industry against Global Warming
2022 National Commendation for Invention "The Prime Minister's Invention Prize"

Video analysis solution for public place
(X-ray baggage inspection, human flow visualization)

Safety & Security   Resilience

2022 JSAI Field Innovation Award
2022 SSII Takagi Prize

Noise reduction tech. for EV inverters

Environment

Inverter

Chief Researcher Hoda & co-recipients

2022 JEMA
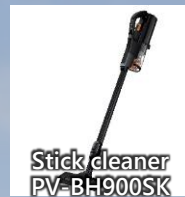Electrical Industry Technical Achievement Award "Grand Prize"

Design

Environment   Safety & Security

Carbon offset charger

Stick cleaner PV-BH900SK

2022 iF Design Award (5)
2022 Good Design Award (Total 6, Gold 2)

International AI competitions

2022 Kaggle Gold Medal (2)
2022 NeurIPS CDML (2ⁿᵈ, 3ʳᵈ place)
2022 Global AI Challenge for Building E&M Facilities Grand prize, etc.

MEMS: Micro Electro Mechanical Systems, JEMA: The Japan Electrical Manufacturers' Association, PHV: Plug-in Hybrid Vehicle,
SSII: Symposium on Sensing via Image Information, JSAI: The Japanese Society for Artificial Intelligence

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Increase Lumada revenue by CX/DX/GX co-creation for customers' next growth

	FY2021	FY2022[*]	FY2024[*]
Lumada business revenue (Trillion JPY) R&D Group/Hitachi Group	0.45 / 1.39	1.12 / 1.90	1.41 / 2.70

* Forecast or Target value

CX × Lumada

Create experiential value for customers with GlobalLogic Method** and NEXPERIENCE

DX × Lumada

Sekisui Chemical Co., Ltd.
In-depth knowledge & track record in material development

Co-creation

Hitachi, Ltd.
Advanced digital technology & knowledge

Accelerate promotion of material informatics in material development
Realization of a digital platform for data-driven material development

Material development

CMOS annealing | Optimize conditions | Automate data collection | Facility & equipment control

Cyber
Digital twin
Knowledge base

Realize operational excellence with Process knowledge ×
Cutting-edge digital technology

GX × Lumada

Integrate & expand
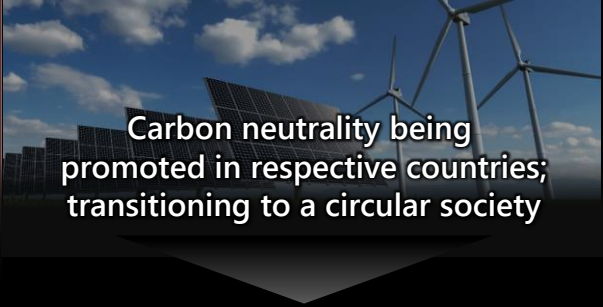Hitachi Energy and Hitachi Vantara's digital solutions in Lumada

CX: Customer transformation   ** Strategic design firm of GlobalLogic

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R&D strategy

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The transformation of society and industry, and behavioral changes in people are being accelerated by digital in response to dramatic changes in the environment

Sustainable society

Carbon neutrality being promoted in respective countries; transitioning to a circular society
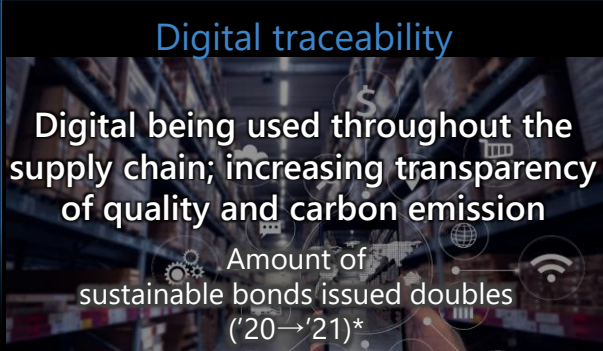
Industrial structure change

Value chain restructuring due to pandemic and geopolitical risks

Human behavioral change

Diversification of values, individualization of needs; consumption increasing due to e-commerce

Digital traceability

Digital being used throughout the supply chain; increasing transparency of quality and carbon emission

Amount of sustainable bonds issued doubles ('20→'21)*

Token economy

Blockchain-based Web3 era

NFT market over JPY 9 trillion ('25)*

Metaverse

Progress in economic activity in the virtual space
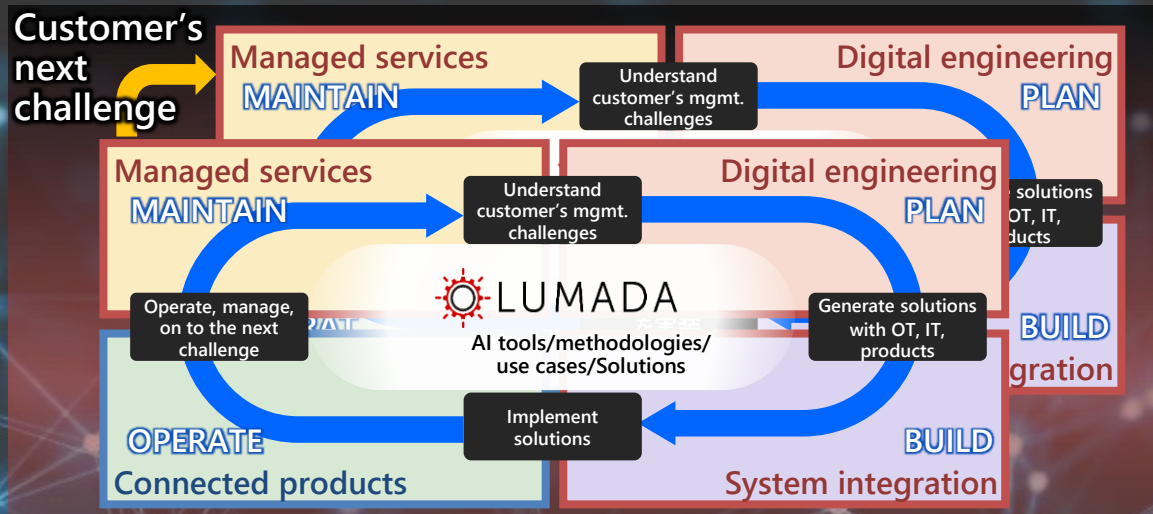
North America market growth CAGR: 40% ('22-'30)*

Accelerating digital transformation

*Based on various survey reports   NFT: Non-Fungible Token, CAGR: Compound Average Growth Rate

Promote innovative co-creation and digital services for the customers' next challenge

Customer's next challenge

Managed services
MAINTAIN
Understand customer's mgmt. challenges

Digital engineering
PLAN

Managed services
MAINTAIN
Understand customer's mgmt. challenges

Digital engineering
PLAN
Generate solutions with OT, IT, products

Operate, manage, on to the next challenge

LUMADA
AI tools/methodologies/
use cases/Solutions

Generate solutions with OT, IT, products

BUILD

Implement solutions

OPERATE
Connected products

BUILD
System integration

Understand *kizashi* of change in society/customer & offer innovation

NEXPERIENCE Co-creation methodologies & tools

Future insights / *Kizashi*

Ethnography

Business valuation

Technology platforms
AI

Strengthen global front line and marketing operations. Realize growth cycle through co-creation.

Financial/Public services area
Offer customer service content providing economic inclusion

Energy, Railway/Transport area
Offer asset-linked services aimed at decarbonization and regional revitalization

Manufacturing/Logistics area
Offer value through improved resilience, high added value and circular economy

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Collaboration between financial services using knowledge from various industries is accelerating to realize financial inclusion

Operational excellence	Creating new demand
Customer: Financial organizations	Customer: Financial organizations, manufacturers, distributors, etc.

PLAN

Optimize work processes with design thinking

Design new financial/public services based on engagement with a broad range of industry experts

BUILD

Increase efficiency in work systems with "AI (RPA/dialogue/automatic response)"

Awarded first place in the international competition (SemEval2020)
Launch of Chatbot service with machine learning [June 2018 news release]
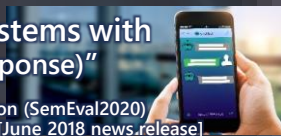
Build a sustainable finance platform using "OT knowledge" and "IoT"

Collaboration for Japan's first digitally-structured environmental bond, "Green Digital Track Bonds for the wholesale industry" [April 2022 news release, in Japanese]

OPERATE

Analyze & evaluate operation data using "Explainable AI"

Launch of AI implementation and operation support service using explainable AI [Jan. 2020 news release]

Data analysis with assured security in Blockchain/NFT and DFFT base
PBI was awarded Best Ten New Products Award "Masuda Prize.
WEF C4IR published a white paper, announced at GTGS 2021.
Launched demonstration using digital currency in distribution SC [May 2022 news release]
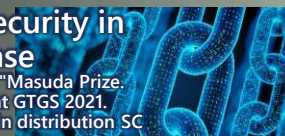
MAINTAIN

Offer improved customer service by automatically analyzing "customer voice"
Launch of voice-to-text cloud service [News Release October 2021]
Launch of sensitivity analysis service with additional perspectives of morality and unexpectedness [Oct. 2021 news release]

Offer value distribution service leveraging metaverse/Web3

AI: Artificial Intelligence, DFFT: Data Free Flow with Trust, C4IR: Centre for the Fourth Industrial Revolution Network, GTGS: Global Technology Governance Summit,
PBI: Public Biometrics Infrastructure, RPA: Robotics Process Automation, WEF: World Economic Forum

Share data on green assets with a range of stakeholders to accelerate investments in the environment

Insufficient investment funding for green energy development projects ▶ **Issues in project planning, reporting and auditing environmental benefit**

Efficient reporting & aggregation
Significantly reduced workload in monitoring, reporting and third-party verification
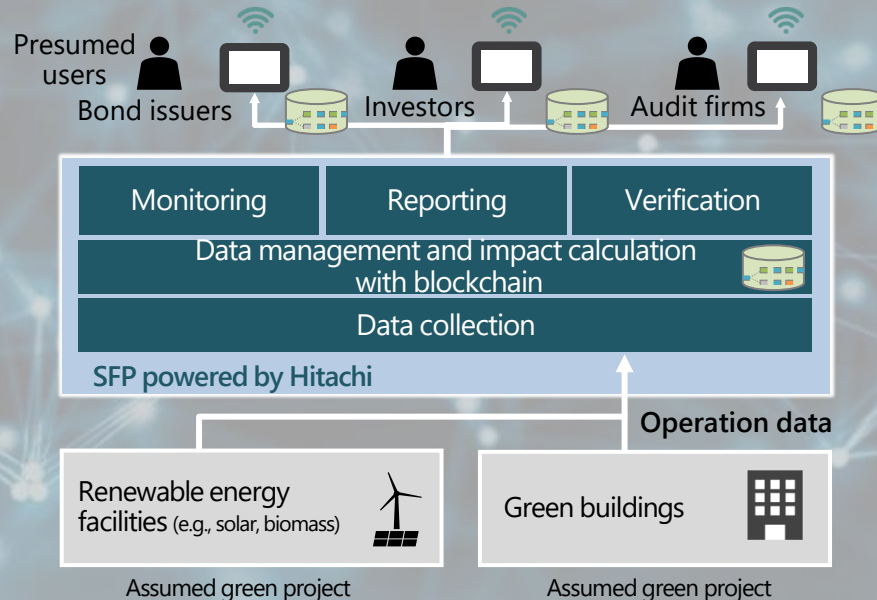
Sophisticated decision-making for investments
Increased transparency using blockchain and digital third-party verification, and at the same time improving KPI comparison

Smooth creation of green projects
Smooth structuring of projects from project proposal to funding scheme by facilitating dialogue between investors, issuers and financial institutions on the SFP

▼

Collaborate with new financial instruments using Web3 technology

Collect raw data on facility operations and automatically create an impact report

Presumed users
Bond issuers   Investors   Audit firms

Monitoring	Reporting	Verification
Data management and impact calculation with blockchain		
Data collection		

SFP powered by Hitachi

Operation data

Renewable energy facilities (e.g., solar, biomass)   Green buildings

Assumed green project   Assumed green project

Collaboration on the issues of "Digital Track Bonds for wholesale," Japan's first environment bonds using a digital mechanism [News Release, April 2022.]
KPI: Key Performance Indicator, SFP: Sustainable Finance Platform

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Progress optimized control of distributed multi energy/transport systems to contribute to decarbonization

Operational excellence, APM transformation	Promote demand-side transition to carbon neutrality
Customers: Power utilities, factories, railway companies	Customers: Large-scale consumers, energy and transport providers

PLAN

Optimize facility costs with "design thinking"

Plan transition scenarios to a sustainable society

Hitachi U.Tokyo Lab. proposal "Towards the realization of an energy system supporting Society 5.0" [March 2022, 4th edition]

BUILD

Implement equipment diagnosis / management system with "digital twin"

Launch of operation and maintenance optimization service for societal infrastructure facilities using machine learning [Jan 2022 news release]

Validation of multi-site energy management system service

Hitachi launches multi-site energy management service business [October 2022 news release]

OPERATE

Implement remote & automated equipment inspection with "image diagnosis AI"

Achieved the top level in the international competition (TRECVID2020) Launch of Lumada Inspection Insights [May 2022 news release]

Implement "grid-edge control" system using DERMS

Enhanced grid edge solutions for distributed energy sources [Nov 2021 news release]

MAINTAIN

Transform operational excellence using "metaverse"

Provide "Green EaaS" & "Green MaaS" optimization service for demand fluctuations

World first as entire city's transport network is digi new Smart Mobility suite [July 2022 news release]

APM: Asset Performance Management, DERMS: Distributed Energy Resource Management System, EaaS: Energy-as-a-Service, MaaS: Mobility-as-a-Service

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Digitally connect city transport networks improving wellbeing and contributing to carbon neutrality

Green mobility solutions that enable both smooth in-city mobility and lower environmental impact

Digital ticketing, Digital twin

Determine the mobility for "hands-free" travelers and optimize transport operations based on passenger demand to improve mobility
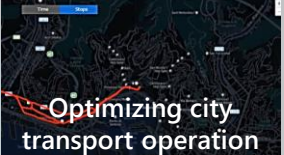
Under trial operation in Genoa, Italy

EV fleet-life extending operation

Extend the service life of EVs through remote diagnosis of EV battery deterioration and battery capacity recovery control, using EV operation data.

Co-creation with First Bus (UK)

Green mobility solution

Labor-saving Equity

Increase zone value
Create travel demand

City-wide CN

Lumada Intelligent Mobility Management

Service	Operation	Maintenance
Smart ticketing	Green MaaS digital twin	EV fleet life extending technology
Gateless & hands-free usage	Optimizing city-transport operation	Operation data / Optimal management plan

World first as entire city's transport network is digitally connected with Hitachi's new Smart Mobility suite [July 2022 news release]
First Bus and Hitachi Europe to drive zero emission agenda forward via strategic partnership [Nov. 2021 news release]

CN: Carbon Neutrality

Enable a new workstyle through training and work-support by building a metaverse operation & maintenance site

Accumulate OT knowledge from the field in a metaverse, to enable a new workstyle that would be difficult to realize in the real-world

▼

Railway: Metaverse rolling stock
Transfer knowhow and skills by storing productization, operation and maintenance logs in a metaverse

Factory: Metaverse consensus-building
Facilitate agile consensus of multiple stakeholders such as workers, supervisors, customer, etc.

Utility: Condition management
Prevent procedural mistakes by structuring facility data

Realize operational excellence

Education & skill transfer | Work procedures & Safety precautions | Consensus-building

OT knowledge aggregation and maintenance on metaverse

Work history Inspection log

Design blueprints Incidents reports

Intuitive data access through media search
AI

OT knowledge structuring by AI
AI

Asset condition management

Abnormality detection (e.g., heat, rust, leaks, etc.)

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Apply Monozukuri knowhow towards process automation of manufacturing, operation, and reuse for a circular economy

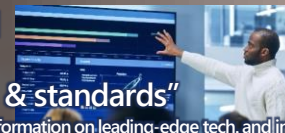|	Manufacturing process innovation Customer: Manufacturers	Addressing the circular economy Customer: Manufacturers, logistics providers
PLAN	Investigate optimization of facility costs with "design thinking"	Design carbon neutrality and circular economy scenarios based on "international rules & standards" Principal Partner of COP26; globally disseminated information on leading-edge tech. and initiatives
BUILD	Implement manufacturing process solutions with "robotics SI" Reinforce with JR Automation and other M&As	Implement "certification and tracing of things and related data" over the entire life cycle Collaboration with ServiceNow Japan on product security measures [March 2022 news release, in Japanese]
OPERATE	Visualize and analyze production facility data with "IoT Compass*". Launch of IoT Compass [Oct. 2018 news release, in Japanese]	Upcycling with "SC re-design," "MI," and "bio-utilization" using digital technology [Demonstration test with Mitsui Chemicals, Inc. on practical application of MI technology [June 2021 news release], [AI tech. developed to expand use of recycled plastic materials [March 2022 R&D topics]
MAINTAIN	Reduce maintenance costs with "remote monitoring and predictive maintenance" Global e-Service on TWX-21／M2M service [Oct. 2013 news release, in Japanese]	Provide circular economy supply chain services Launch of Global SCM Simulation Service for CO_2 emissions across the supply chain [April 2022 news release by Hitachi Solutions, Ltd., in Japanese]

*Digital twin for Hitachi production site   MI: Materials Informatics, SC: Supply Chain

Build IoT infrastructure to realize advanced traceability, DX of factory management & workstyle

Building a next-generation factory that continues to evolve based on findings from "Insights into a Future Society of 2050" co-creation workshop, and knowledge & knowhow on OT×IT×Products

Traceability of each individual product

Record the state of each product as digital data, link the huge volume of different types of data, and realize traceability through ultra-large-scale, high-speed data processing technology

Vision design by design thinking experts

CX designers use NEXPERIENCE to merge insights into society, Hitachi and customer product, OT and IT knowledge, to design a vision that all parties can agree on

"IoT infrastructure" enabling integration & display of diverse data

Increased safety and reassurance through traceability of each individual product

Continuously evolving factory with a dashboard displaying various types of information

Workshop "Insights into a Future Society of 2050"

Pursuit of reassurance & safety, and workstyle transformation in a society with a deminishing workforce

OT

Customer × Hitachi co-creation

Kizashi for a sustainable society

Suntory Beverage & Food and Hitachi collaboratively create IoT platform to realize precision traceability, and the digital transformation of factory management and work styles at the Suntory Kita-Alps Shinano-no-Mori Water Plant [May 2021 news release]

Lead the realization of a circular economy society by demonstrating with products and through open innovation

Solutions to quantify and control environmental impact, and expand the use of recycled material

Integration of UX design & MI

Realize a high-quality texture with no noticeable foreign material by using different surface treatment for each type of recycled material

Stick cleaner:
40% recycled material utilization rate*
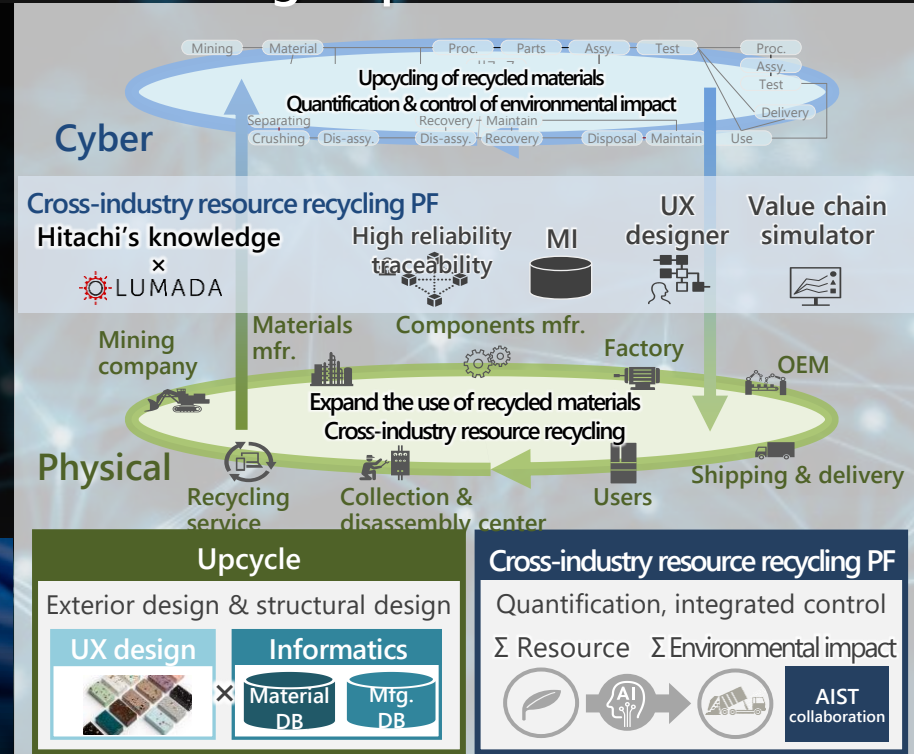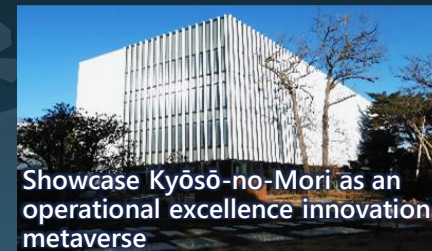
GOOD DESIGN AWARD 2022
グッドデザイン金賞

PV-BH900SK

Cross-industry resource recycling PF

Develop digital solutions for use cases such as production scheduling for lower environmental impact and optimal resource recycling methods based on usage history

*At least 40% of the plastic materials used for the product's handle cover and accessories, such as the stand-type charging stand, are made from recycled plastic by weight.

Mining — Material — Proc. — Parts — Assy. — Test — Proc. Assy. Test — Delivery

Upcycling of recycled materials
Quantification & control of environmental impact

Separating Crushing — Dis-assy. — Recovery + Maintain Dis-assy. + Recovery — Disposal + Maintain — Use

Cyber

Cross-industry resource recycling PF
Hitachi's knowledge
× LUMADA

High reliability traceability   MI   UX designer   Value chain simulator

Mining company   Materials mfr.   Components mfr.   Factory   OEM

Expand the use of recycled materials
Cross-industry resource recycling

Physical

Recycling service   Collection & disassembly center   Users   Shipping & delivery

Upcycle	Cross-industry resource recycling PF
Exterior design & structural design	Quantification, integrated control
UX design × Informatics (Material DB, Mfg. DB)	Σ Resource Σ Environmental impact AIST collaboration

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Promote jointly with
Hitachi Digital, Global Environment Division and Global Marketing & Sales

Offer value distribution service leveraging metaverse/Web3

Implement an inter-industry coordinated IoT information distribution system

Showcase Kyōsō-no-Mori as an operational excellence innovation metaverse

Provide security assured data analytics with "blockchain/NFT" and "DFFT platform"

Provide multi-energy optimization services with EaaS and MaaS

Co-creation with "Common Ground Living Lab" consortium for future urban services

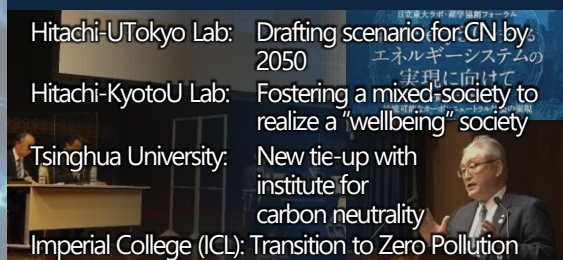# R&D strategy

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Explore future societal and customer issues through discussion with stakeholders

Society in 2050

International conferences

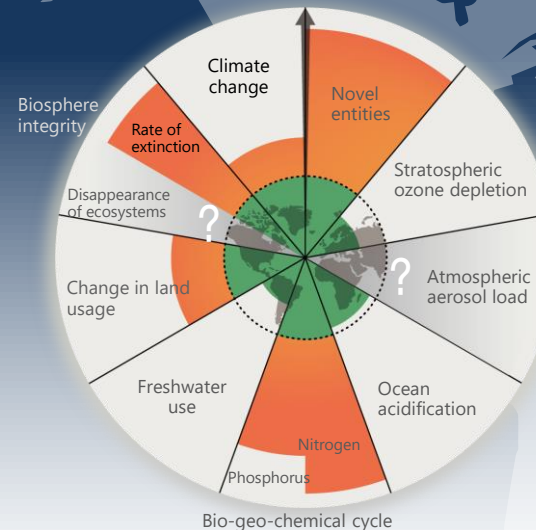Innovation for Cool Earth Forum @ COP26

WEF-C4IR DFFT@GTGS2021

Academia

Hitachi-UTokyo Lab: Drafting scenario for CN by 2050

Hitachi-KyotoU Lab: Fostering a mixed-society to realize a "wellbeing" society

Tsinghua University: New tie-up with institute for carbon neutrality

Imperial College (ICL): Transition to Zero Pollution

Customer, Startup

Webinar: Innovation starting from questioning

Reverse pitches by startups

Societal & business trends

High impact

Technology / Solution (Innovation)

- Achieve carbon neutrality
- Upcycling circular economy
- Overcome dementia / Active throughout lifetime
- Super-aging society / overcoming cancer
- Petroleum-derived materials regulation
- Expanding digital economic zone
- Cyber democracy
- CO_2 regulation
- Hydrogen, NH_3 utility
- Rapid decline in workforce
- Limits of social security
- Data capitalism
- Digital-based life
- Rules preventing the spread of modified genes
- Microplastic marine pollution
- CoVID-19
- Increased carbon pricing
- Water quality, noise & vibration regulation
- Urbanization
- Decline in number of people requiring nursing care

- Quantum computers
- Cell therapy
- Artificial photosynthesis
- Security automation
- Beyond human avatar
- Synthetic biotech.
- Quantum-based cryptography
- CCUS, Bio CCS
- Small reactors
- Zero trust
- DFFT
- Deep fake measures
- Web3
- Green certification
- Metaverse
- Nucleic acid therapy
- RPA
- Health & food integrated DB
- ZE homes/ buildings
- Improved immunity
- Restoring agricultural land

Now

2030   2030
2040   2040
2050   2050

Low impact

Customer & Hitachi

Low impact

CCS: Carbon dioxide Capture and Storage, CCUS: Carbon dioxide Capture, Utilization and Storage,
ICL: Imperial College London, ZE: Zero Emission

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Form ecosystems & solve global issues to resolve decarbonization & resource recycling challenges

Climate change

Biosphere integrity

Novel entities

Rate of extinction

Stratospheric ozone depletion

Disappearance of ecosystems

Atmospheric aerosol load

Change in land usage

Freshwater use

Ocean acidification

Nitrogen

Phosphorus

Bio-geo-chemical cycle

Hitachi-ICL joint laboratory

Hitachi-Imperial Centre for Decarbonisation and Natural Climate Solutions

Established 11 July 2022

Development of natural climate solutions such as for decarbonization and biodiversity, to realize a Net Zero society

Hitachi-AIST joint laboratory

Hitachi-AIST Circular Economy Cooperative Research Laboratory

© AIST

Established 11 October 2022

Grand design, rule-making, and societal implementation to realize a circular economy

Supply chain models that include Scope 3, and carbon credit market research through startup collaborations

ICL: Imperial College London, AIST: National Institute of Advanced Industrial Science and Technology

HITACHI
Inspire the Next

Realize low-burden on patient treatment methods with biomedical technologies with a goal to overcome intractable diseases such as cancer

Hitachi Kobe Laboratory established in Kobe Biomedical Innovation Cluster (2017) *1

Regenerative medicine

Applied in clinical trials for Parkinson's Disease treatment *2 [2021]

iPS cell

Automated cell culturing equipment*3

Next-generation cell therapy

Designed cell

Genetic design

Gene transfection

Correlation between cell function and DNA sequence

Cell function test

*1   Photo of the Kobe Medical Innovation Center where the Hitachi Kobe Laboratory is based.
*2   Sumitomo Pharma used cells produced by Hitachi's automated cell culturing equipment in a clinical trial conducted by Kyoto University.
*3   This work was supported in part by the Japan Agency for Medical Research and Development, AMED (JP18be0104016).

Development of designed cell processing technology through start-up and overseas university collaboration

HITACHI
Inspire the Next

Develop quantum computers & quantum applications to solve large-scale and increasingly complex societal issues, and create new industries
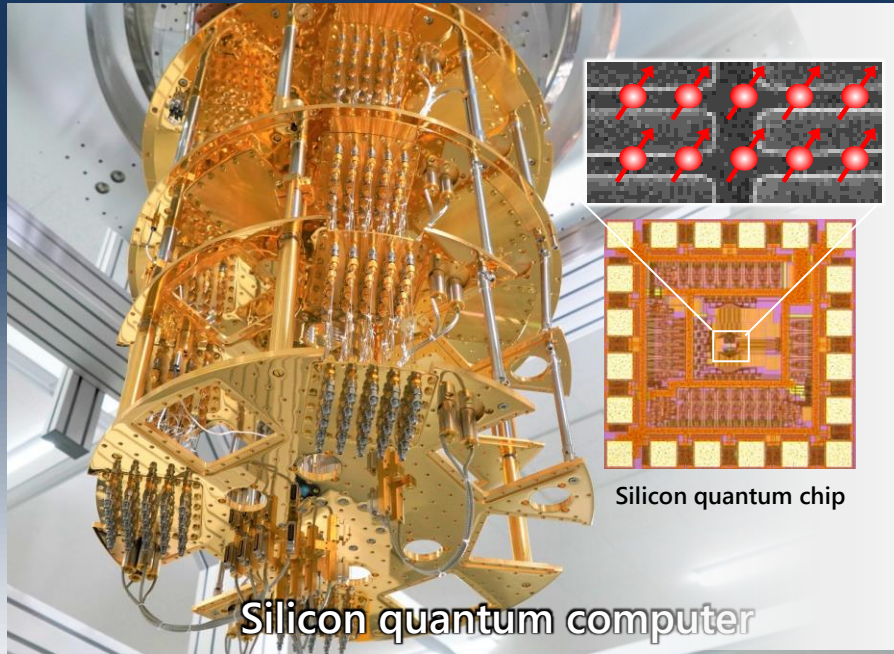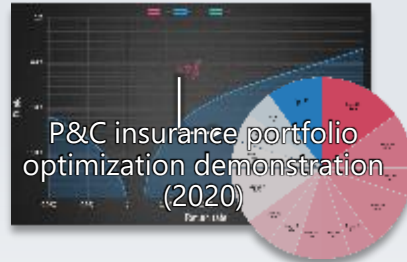
Silicon quantum chip

Silicon quantum computer

CMOS annealing for early societal implementation (2015) ⚛ LUMADA

P&C insurance portfolio optimization demonstration (2020)

Start cloud services (2022)

Global user survey and middleware development through startup collaboration (Strangeworks Inc.)

Quantum applications to solve societal challenges

Climate change

Resource recycling
Supply chain

Healthy longevity
Food problem

Contribute to solving large scale complex societal issues by developing and advancing quantum chemistry, quantum AI, quantum finance, etc.

Participate in QII、Q-STAR, accelerate implementation in society

CMOS: Complementary Metal Oxide Semiconductor, P&C: Property & Casualty, QII: Quantum Innovation Initiative Consortium, Q-STAR: Quantum STrategic industry Alliance for Revolution

R&D strategy

Contents

Planetary boundaries

Wellbeing

Society 5.0

Stakeholders

- Investors
- Environmental NGOs
- Customers
- Communities
- Citizens, Consumers
- Employees

NGO: Non-governmental organization

Connected Laboratories

Support people's quality of life with data and technology that fosters a sustainable society

Academia

- University of Tokyo, Kyoto University, Hokkaido University
- AIST
- Stanford University
- Imperial College London
- University of Cambridge
- Tsinghua University

Public-private initiatives

- Society 5.0
- WEF C4IR
- SDGs
- NSW (Australia)

NSW: New South Wales

Startup communities

- Hitachi Ventures (Munich, Boston)
- Silicon Valley
- Zhongguancun (China)

LUMADA

Hitachi Social Innovation is POWERING GOOD

Cautionary Statement

Certain statements found in this document may constitute "forward-looking statements" as defined in the U.S. Private Securities Litigation Reform Act of 1995. Such "forward-looking statements" reflect management's current views with respect to certain future events and financial performance and include any statement that does not directly relate to any historical or current fact. Words such as "anticipate," "believe," "expect," "estimate," "forecast," "intend," "plan," "project" and similar expressions which indicate future events and trends may identify "forward-looking statements." Such statements are based on currently available information and are subject to various risks and uncertainties that could cause actual results to differ materially from those projected or implied in the "forward-looking statements" and from historical trends. Certain "forward-looking statements" are based upon current assumptions of future events which may not prove to be accurate. Undue reliance should not be placed on "forward-looking statements," as such statements speak only as of the date of this report.

Factors that could cause actual results to differ materially from those projected or implied in any "forward-looking statement" and from historical trends include, but are not limited to:

- economic conditions, including consumer spending and plant and equipment investment in Hitachi's major markets, as well as levels of demand in the major industrial sectors Hitachi serves;
- exchange rate fluctuations of the yen against other currencies in which Hitachi makes significant sales or in which Hitachi's assets and liabilities are denominated;
- uncertainty as to Hitachi's ability to access, or access on favorable terms, liquidity or long-term financing;
- uncertainty as to general market price levels for equity securities, declines in which may require Hitachi to write down equity securities that it holds;
- fluctuations in the price of raw materials including, without limitation, petroleum and other materials, such as copper, steel, aluminum, synthetic resins, rare metals and rare-earth minerals, or shortages of materials, parts and components;
- credit conditions of Hitachi's customers and suppliers;
- general socioeconomic and political conditions and the regulatory and trade environment of countries where Hitachi conducts business, particularly Japan, Asia, the United States and Europe, including, without limitation, direct or indirect restrictions by other nations on imports and differences in commercial and business customs including, without limitation, contract terms and conditions and labor relations;
- uncertainty as to Hitachi's ability to response to tightening of regulations to prevent climate change
- uncertainty as to Hitachi's ability to maintain the integrity of its information systems, as well as Hitachi's ability to protect its confidential information or that of its customers;
- uncertainty as to Hitachi's ability to attract and retain skilled personnel;
- uncertainty as to Hitachi's ability to continue to develop and market products that incorporate new technologies on a timely and cost-effective basis and to achieve market acceptance for such products;
- exacerbation of social and economic impacts of the spread of COVID-19;
- the possibility of disruption of Hitachi's operations by natural disasters such as earthquakes and tsunamis, the spread of infectious diseases, and geopolitical and social instability such as terrorism and conflict;
- estimates, fluctuations in cost and cancellation of long-term projects for which Hitachi uses the percentage-of-completion method to recognize revenue from sales;
- increased commoditization of and intensifying price competition for products;
- fluctuations in demand of products, etc. and industry capacity;
- uncertainty as to Hitachi's ability to implement measures to reduce the potential negative impact of fluctuations in demand of products, etc., exchange rates and/or price of raw materials or shortages of materials, parts and components;
- uncertainty as to the success of cost structure overhaul;
- uncertainty as to Hitachi's ability to achieve the anticipated benefits of its strategy to strengthen its Social Innovation Business;
- uncertainty as to the success of acquisitions of other companies, joint ventures and strategic alliances and the possibility of incurring related expenses;
- uncertainty as to the success of restructuring efforts to improve management efficiency by divesting or otherwise exiting underperforming businesses and to strengthen competitiveness;
- the potential for significant losses on Hitachi's investments in equity-method associates and joint ventures;
- uncertainty as to the outcome of litigation, regulatory investigations and other legal proceedings of which the Company, its subsidiaries or its equity-method associates and joint ventures have become or may become parties;
- the possibility of incurring expenses resulting from any defects in products or services of Hitachi;
- uncertainty as to Hitachi's access to, or ability to protect, certain intellectual property; and
- uncertainty as to the accuracy of key assumptions Hitachi uses to evaluate its employee benefit-related costs.

The factors listed above are not all-inclusive and are in addition to other factors contained elsewhere in this report and in other materials published by Hitachi.