Sustainability Briefing

NRI’s Approach to DX3.0
NRI’s commitment to solving social issues through implementation of Digital Social Capital

Nomura Research Institute, Ltd.

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Head of Digital Transformation (DX)

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DX Business Promotion Department

21 February 2024
I DX3.0 Approach - Background and Overview

1. Why the Social Problem Solving Business now?
2. What is the DX3.0 business that NRI is working on?
3. What is NRI's challenge to create "digital social capital"?
4. How to market solutions to social issues?
5. What is NRI's unique approach to commercialization?

II Introduction of Case Study "Forest Carbon Credit"
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II Introduction of Case Study "Forest Carbon Credit"
Growing "social costs"

Natural disaster losses due to economic activity increase every year

**Economic Losses and GDP due to Natural Disasters (Worldwide)**

- **Economic losses due to natural disasters (1980 = 1)**
  - 2005: 33 times
  - 2017: 9 times

- **World GDP (1980 = 1)**

Source: EM-DAT, CRED / UCLouvain (2023); GDP from World Bank (nominal values)

Note: Figures represent losses due to disasters considered to be related to economic activities (extreme climate, extreme temperatures, floods, droughts, wildfires, and landslides). (excluding earthquakes and volcanic activity)

The purpose of this material is to provide reference information for investment decisions, and is not intended as a solicitation to invest.
Global impact investment is also on the rise

Impact investment is investment aimed at creating social and environmental impact while pursuing financial returns.


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The Limits of Economic Rationality

Social challenges = an opportunity to break free from 'stuck at the limits of economic rationality'?

The Limits of Economic Rationality

Source: "The Future of Business: Restoring Humanity to the Economy" by Shu Yamaguchi, processed by NRI

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DX 3.0: Collaborating with clients to solve social issues

- **Core business**: We will further deepen value creation with clients via Con-solutions. We will also enhance competitiveness and added-value through the expansion of Business Platforms and productivity innovation.

- **DX**: Through DX 3.0, we will take on challenges to go beyond companies and industries, to make an impact to the society.

- **Global**: In addition to Asia and Oceania, we will also expand into North America, which is an enormous and fast-growing market.

Source: excerpt from NRI Group Vision 2030
### DX Business Expansion

**Accelerate transformation of enterprises, industry, and society**

<table>
<thead>
<tr>
<th><strong>Society transformation</strong></th>
<th><strong>DX 3.0</strong> Paradigm shift</th>
<th><strong>Creating “Digital Social Capital” in collaboration with various partners</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Social DX</td>
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<td></td>
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<td></td>
<td>• Infrastructure DX</td>
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<tr>
<th><strong>Enterprises and industry transformation</strong></th>
<th><strong>DX 2.0</strong> Business models</th>
<th><strong>Establishing never before seen digital services</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Developing new cross-industry platforms</td>
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<td></td>
<td></td>
<td>• Implementing new business models and ecosystems for clients</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>DX 1.0</strong> Processes</th>
<th><strong>DX 1.0</strong> Infrastructure</th>
<th><strong>Strengthening existing businesses for new opportunities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Consulting : Integration of management and digital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Financial IT : Restructuring the financial industry with BPF services</td>
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<td></td>
<td></td>
<td>• Industrial IT : Upgrading the digital IP to cross-industry services</td>
</tr>
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<td></td>
<td></td>
<td>• IT Platform : Creating new IT infrastructure services</td>
</tr>
</tbody>
</table>

Source: excerpt from NRI Group Vision 2030

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"Digital Social Capital" is a digital platform with an ecosystem of Value-Driven services leveraging the platform.

**What is Digital Social Capital?**

**Digital Social Capital**

- Travel
  - Automated driver assistance systems
  - Ridesharing
- Networking
  - Social media, metaverse
- Tourism
  - Private lodgings
  - Inducement to action
- Logistics
  - Optimal route search
  - 3D city model
- Security
  - Disaster monitoring systems

**Digital platforms**

- Visualization
  - Sensors, IoT, Digital twins
- Optimization, automation
  - AI, bots, simulators
- Safety & security
  - Cloud, Security

**Industry-Driven services**

- Taxi service
- ISP service
- Rental housing
- Railway service
- Telecoms. service
- Water service

**Equipment infrastructure**

- Transport
  - Roads, railways, ports
- Communication
  - Internet, telephones, mail
- Housing/Living
  - Houses, Water and sewer services

**Sources:** Prepared by NRI

1. Tangibles (hardware)
2. Function-specific applications
3. Large initial investment

1. Intangible services (software)
2. Value-specific applications
3. Small initial investment ⇒ Gradual increase

Source: Prepared by NRI

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Initiatives for Sustainability Management

Challenge to create digital social capital through DX 3.0

1. Social DX
   - Digital government
     - Improving convenience based on individual number platform
   - Regional revitalization
     - Promoting rural area DX, smart cities, and other social infrastructures
   - New financial services
     - Expanding the use of new financial assets such as digital assets

2. Value Chain DX
   - Value chain optimization / Tracing
     - Coexistence of environmental symbiosis and economic efficiency, visualization of CO₂
   - Circular economy platforms
     - Environmental symbiosis through effective use of natural resources

3. Infrastructure DX
   - Infrastructure lifecycle transformation
     - Realizing a sustainable and resilient social infrastructure
   - Financial infrastructure for Carbon Neutrality
     - Creating and sophisticating markets for decarbonization

Create a society where people can live with high aspirations
Create people and planet friendly industry
Provide a safe and secure social infrastructure
Social DX Initiatives

Social DX provides greater convenience for citizens by the My Number Card

Solving social issues: Procedures based on strict identification in the online space

[Ex] Insurance services
(online completion of procedures using specific medical checkup information)

- Submit your own information (results of specific medical checkups) on MyNumber Portal.
- Online completion of the contracting process with insurance companies.

My Number Platform

- Reproduce the person himself/herself in a digital space as part of the development of the infrastructure using the My Number Card.
- One-stop service for tax and social security

Improved convenience

Source: Prepared by NRI
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Value Chain DX Initiatives

Value Chain DX: facilitating corporate CO2 emissions management.

Solving social issues: Accurate and timely calculation and visualization of CO2 emissions

Image of the use of emissions information by companies

- Provide CO2 Free Merchandise
- Clean Mobility and Logistics
- Internal carbon price

Upstream CO2 emissions Tied to the company's products and deployed downstream

NRI-CTS: Solution that enables the timely sharing of highly accurate information based on actual greenhouse gas emissions measured by each company.

Carbon Emissions Traceability Platform

Source: Prepared by NRI

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What is Code Transformation?

Markets cannot be launched simply by developing Digital Social Capital; Code Transformation is required to nurture new markets

Social Issues

Code Transformation

Digital Social Capital

What is a “code”? A set of rules, legal frameworks, commercial practice, sense of values, etc. that govern how the general public perceives how businesses should operate

Establishment of new markets

Source: Prepared by NRI

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**Examples of Code Transformation**

**Airbnb creates new markets while actively engaging in Code Transformation**

### Social issues involving the private lodging market

- Increased inbound volume
- Increased vacant houses and rooms
- Diversified lodging experience needs

### Examples of Code Transformation by Airbnb

- Facilities for private lodging are limited due to the requirement for personnel to be stationed 24 hours in the lodging facility.
- Airbnb implements a harmonized approach with both hosts and government simultaneously.
  - Coordination of briefing sessions for hosts
  - Proposal of amendments to municipalities regulations

### New market creation (“Peer-to-peer lodging” market)

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified Facilities</td>
<td>1,915</td>
<td>3,300</td>
</tr>
<tr>
<td>Certified Rooms</td>
<td>5,735</td>
<td>9,725</td>
</tr>
<tr>
<td>Certified Operators</td>
<td>1,237</td>
<td>2,008</td>
</tr>
</tbody>
</table>

### Amendment of the Hotel Business Act

- Enforcement of special measures for exemption from the application of the Hotel Business Act, which requires the establishment of a front desk and on-site inspections at lodging facilities, if the local government approves.
- Ability to provide accommodations that meet diversifying lodging needs

Source: Prepared by NRI based on “Examples of Utilization of National Strategic Special Zones” (2023 edition), Cabinet Office, etc. The purpose of this material is to provide reference information for investment decisions, and is not intended as a solicitation to invest.
Examples of Code Transformation

Code Transformation and the use of Digital Social Capital has doubled the “peer-to-peer lodging” market

Social Issues

Establishment of new markets

Code Transformation

Digital Social Capital

- Active involvement in Kyoto City regulation revision
- Contribution to the revision of the Hotel Business Act

- Matching platform between hosts with vacant houses and rooms and tourists
- Service that allows users to experience novel lodging environments

Increased inbound volume

Increased vacant houses and rooms

Diversified lodging experience needs

※Peer-to-peer lodging includes vacation rentals, short- and long-term homestays and experiences, or short-term housing rentals

Source: Prepared by NRI based on “Examples of Utilization of National Strategic Special Zones” (2023 edition), Cabinet Office, etc.

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Areas in which NRI is engaged

NRI is focused on 4 areas to tackle the challenge of Code Transformation

① Declining population and labor force
   Code Transformation to promote industrial development in a society with a declining workforce

② Sustaining the global environment
   Code Transformation that converts maintaining environmental sustainability into economic development

③ Reforming the social systems
   Code Transformation to improve convenience, safety and security of citizens’ lives

④ Innovating urban & regional infrastructure
   Code Transformation to improve infrastructure sustainability and services

Source: AI image generation by Chat GPT (DALL-E3)
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## DX3.0 Initiatives

**DX3.0 Initiatives = Digital Social Capital x Code Transformation**

### Code Transformation

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<th>Value chain DX</th>
<th>Infrastructure DX</th>
<th>Innovation urban &amp; regional infrastructure</th>
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<td>- Support enhancement package for the “annual income barrier”</td>
<td>- Marketing of decarbonization values</td>
<td>- State-of-the-art and efficient private sector services through “My Number”</td>
<td>- Regional industrial development partnerships with regional banks</td>
</tr>
<tr>
<td>※ Annual income barrier: The threshold where the income tax rates are increased</td>
<td></td>
<td>※ My Number: A unified ID unified across various government agencies in Japan, e.g. taxes and pensions</td>
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<td>- Logistics &amp; labor optimization</td>
<td>- Promoting the creation and distribution of forest carbon credits</td>
<td>- Social implementation of digital collaboration infrastructure for business operators</td>
<td>- Securing supply chains for daily necessities in sparsely populated areas</td>
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<td>- Promotion of DX to focus on improving customer contact services</td>
<td>- Realization of a circular economy</td>
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II Introduction of Case Study "Forest Carbon Credit"
Commercialization in an ecosystem that unites multiple players

Four-tier ecosystem

- **Front player**
- **Platformer**
- **Code maker**
- **Enabler**

Serving Customers

Provision of Digital Society PF

Creation and penetration of new social codes

Ecosystem conception and realization
NRI leads a four-tier ecosystem with "platformers" and "enablers".

NRI’s four-tier ecosystem

- **Customers**
- **Front player**
- **Platformer**
- **Code maker**
- **Enabler**

Source: Prepared by NRI

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## DX3.0 Initiatives

### DX3.0 Initiatives = Digital Social Capital x Code Transformation

#### Code Transformation

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<th>Case2</th>
<th>Case3</th>
<th>Case4</th>
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<td><strong>Case1</strong></td>
<td><strong>Case2</strong></td>
<td><strong>Introduced as the case sample in the session</strong></td>
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<td><strong>Value chain DX</strong></td>
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<tr>
<td>• Labor-optimization in social infrastructure maintenance and management</td>
<td>• Promotion of a platform that ensures transparency and promotion of decarbonization</td>
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Case 1: GX League

NRI plays a central role as coordinator in the GX※ league

- GX League: A framework to encourage a group of companies to engage in GX under the leadership of METI.
- NRI serves as the secretariat of the GX League & the overall coordinator, reflects the diverse needs of companies in its policies (as of FY2023).

GX League Framework

- **Consumers**
  - Changing awareness
  - Provide value & create markets
  - Support / Purchase
  - Instill education

- **GX company groups**
  - 568 companies (number of participant companies as of Dec. 2023)
  - Companies implementing GX
  - Finance to promote GX
  - Companies generating innovations
  - Create supply infrastructure
  - Technological innovation
  - Government
  - Academia

We also participate

Source: Prepared by NRI
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Case 1: Four-tier ecosystem in the GX League

GX League showcases NRI's strengths as a platformer and enabler

Initiatives in the GX League

Solving social issues: Promote decarbonization of the domestic economy and industry

Front player

GX League Participating Companies

- Realization of own decarbonization
- Provision of decarbonization products and services

Platformer

METI+ (Ministry of Economy, Trade and Industry)

- Emissions trading platform
- Database of decarbonization strategies of GX participating companies

Code maker

METI +

GX League participating companies

- Public-private collaborative rule formation

Enabler

METI+

(Nomura Research Institute, Ltd.)

- Establishment of the GX League framework
- Involvement and traction of companies participating in the GX League

Source: Prepared by NRI

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Summary

DX3.0: Business for solving issues by “Code transformation” and “Digital social capital”
NRI’s “four-tier ecosystem”: Realize this project with a high level of reproducibility

Social Issues

Code Transformation

Digital Social Capital

Establishment of new markets

4Execution through a 4-tier ecosystem

(Think tank x consulting x solutions)

Source: Prepared by NRI
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Envision the value, Empower the change