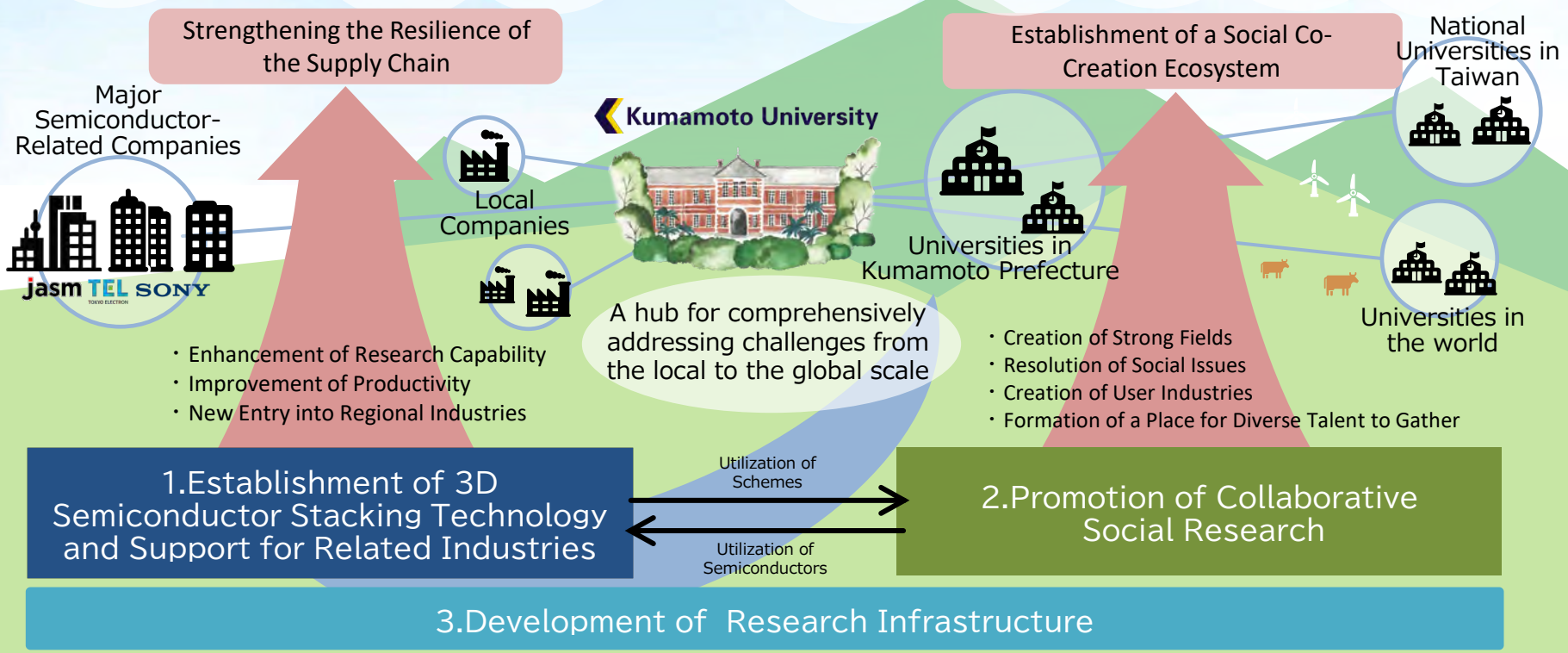
Kumamoto University (University Functions to be Enhanced: 2. Generate innovation than can help solve global issues and advance societal reform, 3. Take a lead in resolving regional issues through collaboration with regional communities.)

Participators : University of Tokyo, Tohoku University, Kyushu University, Kyushu Institute of Technology, Prefectural University of Kumamoto, Tokai University, National Taiwan University, National Yang Ming Jiao Tung University, National Tsinghua University, National Cheng Kung University, Kumamoto Industrial Research Institute

Summary

Vision: Leading the development of a model city for semiconductor clusters, we aim to become a research and education hub university that attracts diverse talent from around the world.

Aiming to achieve regional innovation and build a sustainable industrial city through semiconductor implementation and collaborative social research.



1. Establishment of 3D Semiconductor Stacking Technology and Support for Related Industries

Accelerating Research
- Strengthening the university's core: Semiconductor and Digital Research and Education Organization
- Promoting joint research and practical implementation with other institutions and companies
- Encouraging researchers from other fields to engage in semiconductor research
- Introducing research sabbaticals

Human Resource Development
- Flexible personnel system
- Educational programs in collaboration with domestic and international institutions
- Reskilling initiatives

Implementation Support
- Solving manufacturing challenges faced by companies
- Comprehensive analytical support
- Enhancing the semiconductor core facility
- Training maintenance and technical managers

2. Promotion of Collaborative Social Research

Convergence of Knowledge
- Establishment of a Social Co-Creation Unit
- Participation of academia, industry, and government organizations led by partner institutions in solving social issues
- Leveraging integrated knowledge through the promotion of interdisciplinary research
- Unit composed of diverse human resources

Providing a Platform
- Utilization of SOIL (DX Innovation Building) and the OIC Center
- Kikuyō Town "Knowledge Hub Area"

Booster
- Progress management through the "R&D Strategy Council" comprising industry, government, and academia
- Strategic assignment of project managers and support personnel
- Introduction of research sabbaticals
- Incorporating social contributions into faculty evaluations

3. Development of Research Infrastructure

Enhancement of Research Support Systems
- Establishment of a Headquarters for Research and Development Strategy
- Seamless research support through organizational integration
- Securing support personnel through flexible personnel and training systems

Environmental Improvements
- Digital transformation and operational efficiency through the introduction of new systems
- Strengthening the functions of technical departments through training and collaboration with other institutions

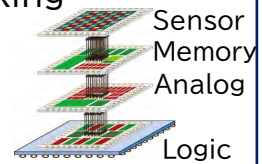
Reinforcement of Funding
- Establishment of a new venture division
- Strengthening intellectual property management
- Reskilling and monetization of core facilities

1. Establishment of 3D Semiconductor Stacking Technology and Support for Related Industries

3D Stacking

The only university in Japan conducting research on semiconductor stacking technology using chip stacking.

Technologies for producing high-performance and low-cost products (3D stacking) include Chip on Chip, Chip on Wafer, and Wafer on Wafer. Kumamoto University aims to achieve implementation and mass production of Chip on Chip stacking, which offers high yield rates and design flexibility.



Domestic

Establishing Branch Offices for Strong Collaboration

Full-Time officer

UTokyo

TOHOKU UNIVERSITY 東北大学

KYUSHU UNIVERSITY

Collaboration

Kumamoto University

Research and Education Institution for Semiconductor and Info r matics

Securing outstanding researchers through flexible employment and salary system

- Cross-appointed researchers from companies and research institutes
- Researchers from corporate alumni.

Prioritizing faculty positions by centralizing personnel management within the university.

Ensuring research time through a research sabbatical system

Increase in faculty members from 24 to **60**

Interdisciplinary Integration

Social Co-Creation Unit

User Industry Creation and Implementation Unit

Foreign

Dispatch

Research collaboration

IMEC (Belgium)

Dispatch of 2 early-career researchers/Year

Brain Circulation

Research and Educational Collaboration

Full-Time officer

NYCU NATIONAL YANG MING CHIAO TUNG UNIVERSITY

NCKU National Cheng Kung University 1931

國立清華大學 NATIONAL TSING HUA UNIVERSITY

participation

National Taiwan University 國立臺灣大學

Dispatch of 5 researchers and Acceptance of 5 researchers /Year

2. Promotion of Collaborative Social Research

Organize a “Social Co-Creation Unit” composed of diverse talents, including researchers from inside and outside the university, corporate professionals, local government officials, and doctoral students, focusing on social issues ranging from local to global scales.

Robotics and EV Field
Kyutech Kyushu Institute of Technology
TOKAI UNIVERSITY
Prefectural University of Kumamoto

MEMS and Sensor Field
UTokyo
National Taiwan University 國立臺灣大學

DX, DS, AI Field
TOHOKU UNIVERSITY 東北大学

participation

User Industry Creation and Implementation Unit

Through joint research with universities and companies, we conduct various technological developments on the utilization side of semiconductors.

- Robot Project
- Smart Agriculture Project
- Electric Vehicle Project
- VR / AR PJ
- …

Collaboration and Implementation

Establishment of Innovation Ecosystem

Industry-Academia Collaboration

- New Business
- New User Companies

- Technology Transfer
- University Spin-Off Ventures
- University Startups

PM leads research on social problem-solving and interdisciplinary integration
Each unit consists of 20 to 30 diverse members
Research sabbaticals are used to ensure dedicated research time

Regional Issues
Prefectural University of Kumamoto
TOKAI UNIVERSITY

Industrial Cluster Issues
National Universities in Taiwan

participation

Environmental Impact and Infrastructure Measures Unit

Conducting joint research to solve issues related to industrial clusters, contributing to the creation of sustainable industrial communities.

- Water Environment Project
- Energy Project
- Transportation Policy Project
- People and Health Project
- …

participation

KU-ALL Fostering Project Candidates that Can Respond to New Social Needs

Research Field

Foundation for Regional Co-Creation (Tentative Name)

Participating in the ’Knowledge Accumulation Area’ Concept

- Kikuyo Town, Kumamoto Prefecture
- Collecting corporate needs and issues
- Providing expertise centered around community development
- A base for practical implementation in social applications

KU & TSMC fund
Health and Longevity Studio (Tentative Name)

Collaboration

School of Social innovation (Tentative Name)

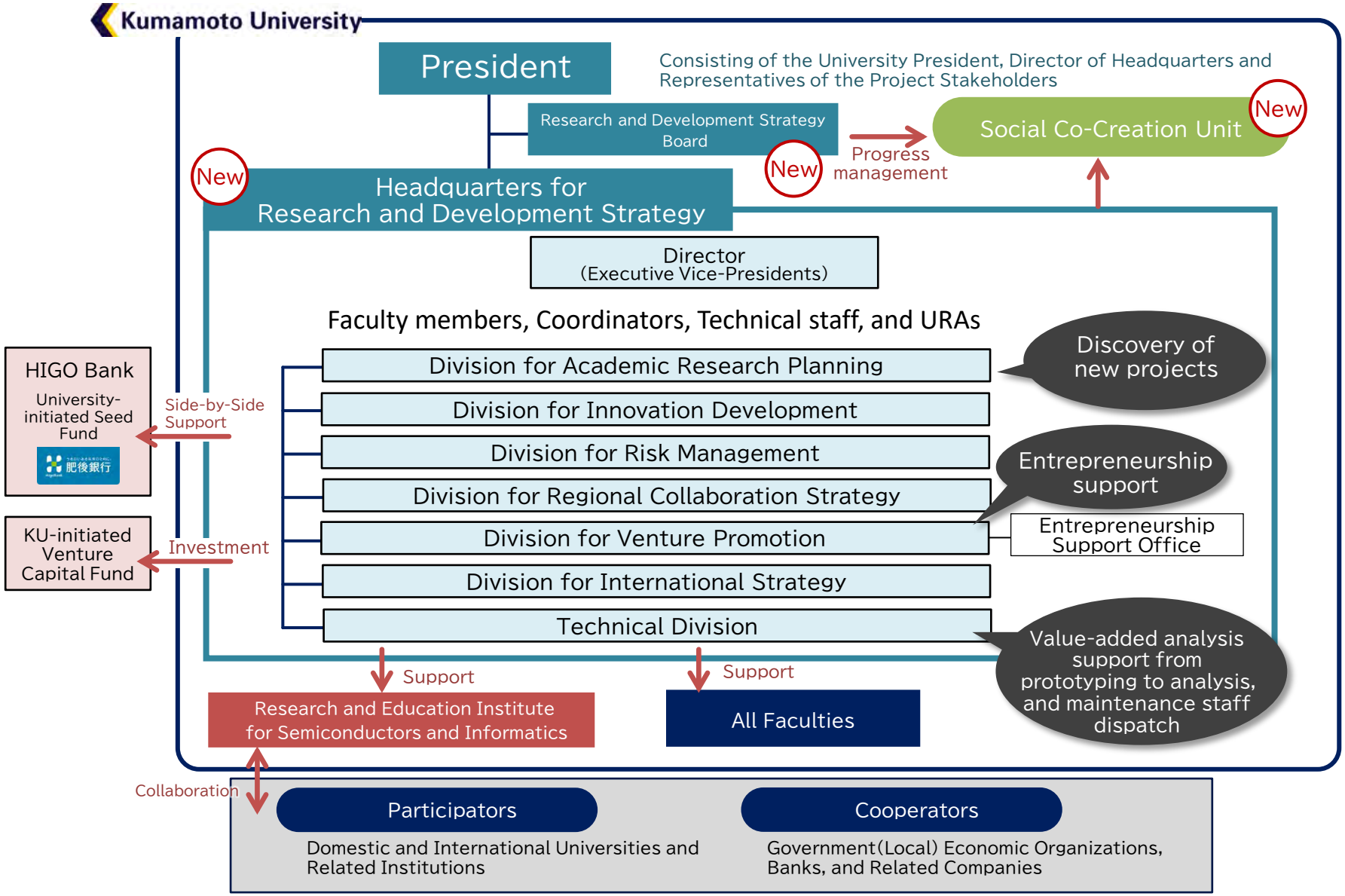
Developing problem-solving and innovation-oriented talent capable of designing regional development.

Scheduled to be established in 2026

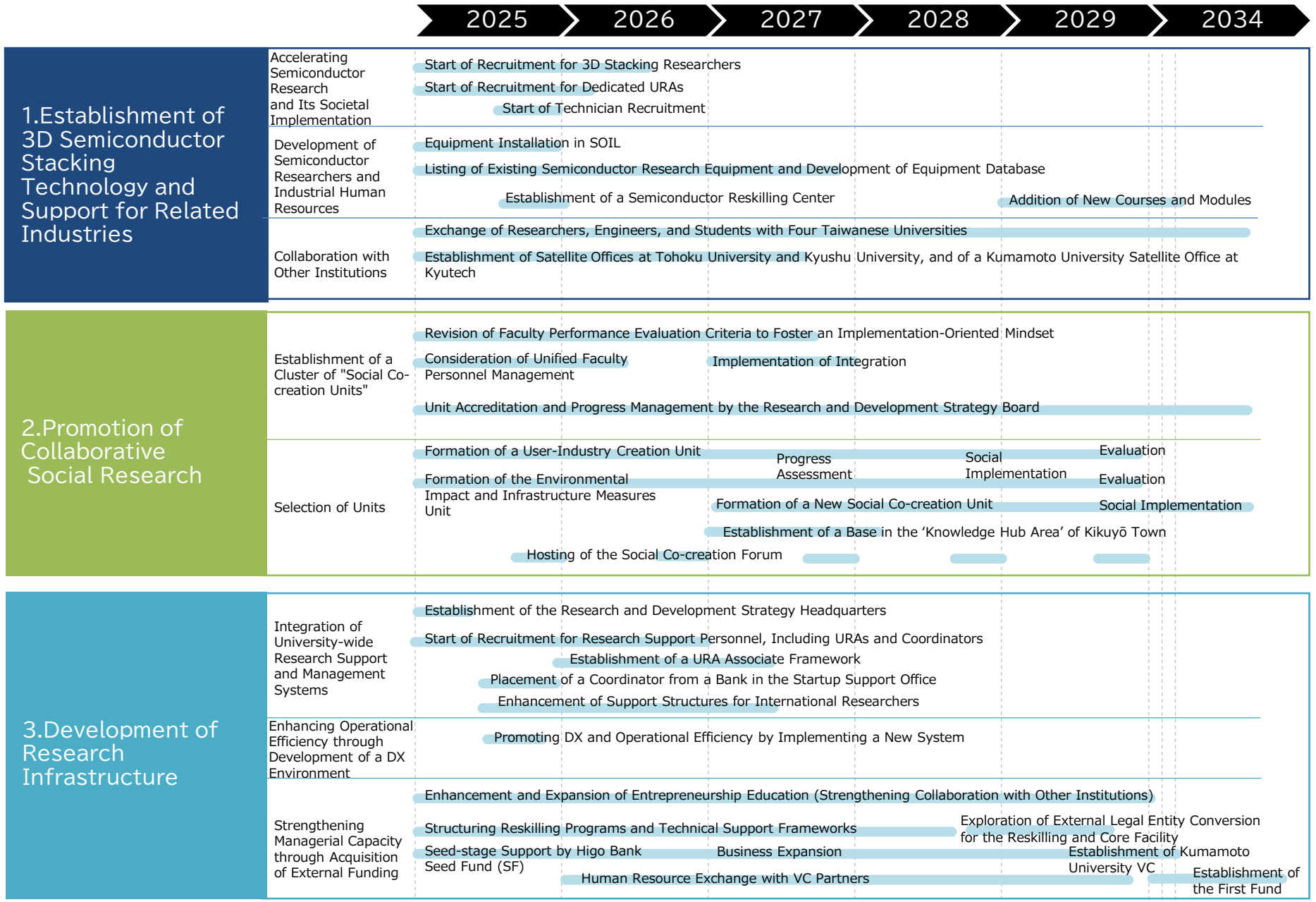
Program for Forming Japan’s Peak Research Universities （J-PEAKS）

3.Development of Research Infrastructure

Provide research support and management across the university to assist research at all phases
Ensure sufficient research time and enhance research capacity through robust pre- and post-award support and management by URAs and related staff:



Timeline


2025
2026
2027
2028
2029
2034
1.Establishment of 3D Semiconductor Stacking Technology and Support for Related Industries
Accelerating Semiconductor Research and Its Societal Implementation
Start of Recruitment for 3D Stacking Researchers
Start of Recruitment for Dedicated URAs
Start of Technician Recruitment
Development of Semiconductor Researchers and Industrial Human Resources
Equipment Installation in SOIL
Listing of Existing Semiconductor Research Equipment and Development of Equipment Database
Establishment of a Semiconductor Reskilling Center
Addition of New Courses and Modules
Collaboration with Other Institutions
Exchange of Researchers, Engineers, and Students with Four Taiwanese Universities
Establishment of Satellite Offices at Tohoku University and Kyushu University, and of a Kumamoto University Satellite Office at Kyutech
2.Promotion of Collaborative Social Research
Establishment of a Cluster of "Social Co-creation Units"
Revision of Faculty Performance Evaluation Criteria to Foster an Implementation-Oriented Mindset
Consideration of Unified Faculty Personnel Management
Implementation of Integration
Unit Accreditation and Progress Management by the Research and Development Strategy Board
Selection of Units
Formation of a User-Industry Creation Unit
Progress Assessment
Social Implementation
Evaluation
Formation of the Environmental Impact and Infrastructure Measures Unit
Evaluation
Formation of a New Social Co-creation Unit
Social Implementation
Establishment of a Base in the 'Knowledge Hub Area' of Kikuyō Town
Hosting of the Social Co-creation Forum
3.Development of Research Infrastructure
Integration of University-wide Research Support and Management Systems
Establishment of the Research and Development Strategy Headquarters
Start of Recruitment for Research Support Personnel, Including URAs and Coordinators
Establishment of a URA Associate Framework
Placement of a Coordinator from a Bank in the Startup Support Office
Enhancement of Support Structures for International Researchers
Enhancing Operational Efficiency through Development of a DX Environment
Promoting DX and Operational Efficiency by Implementing a New System
Strengthening Managerial Capacity through Acquisition of External Funding
Enhancement and Expansion of Entrepreneurship Education (Strengthening Collaboration with Other Institutions)
Structuring Reskilling Programs and Technical Support Frameworks
Exploration of External Legal Entity Conversion for the Reskilling and Core Facility
Seed-stage Support by Higo Bank Seed Fund (SF)
Business Expansion
Establishment of Kumamoto University VC
Human Resource Exchange with VC Partners
Establishment of the First Fund