NARLabs National Applied Research Laboratories
National Center for High-performance Computing

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Building a Thriving National AI Ecosystem: Insights from Taipei's Journey

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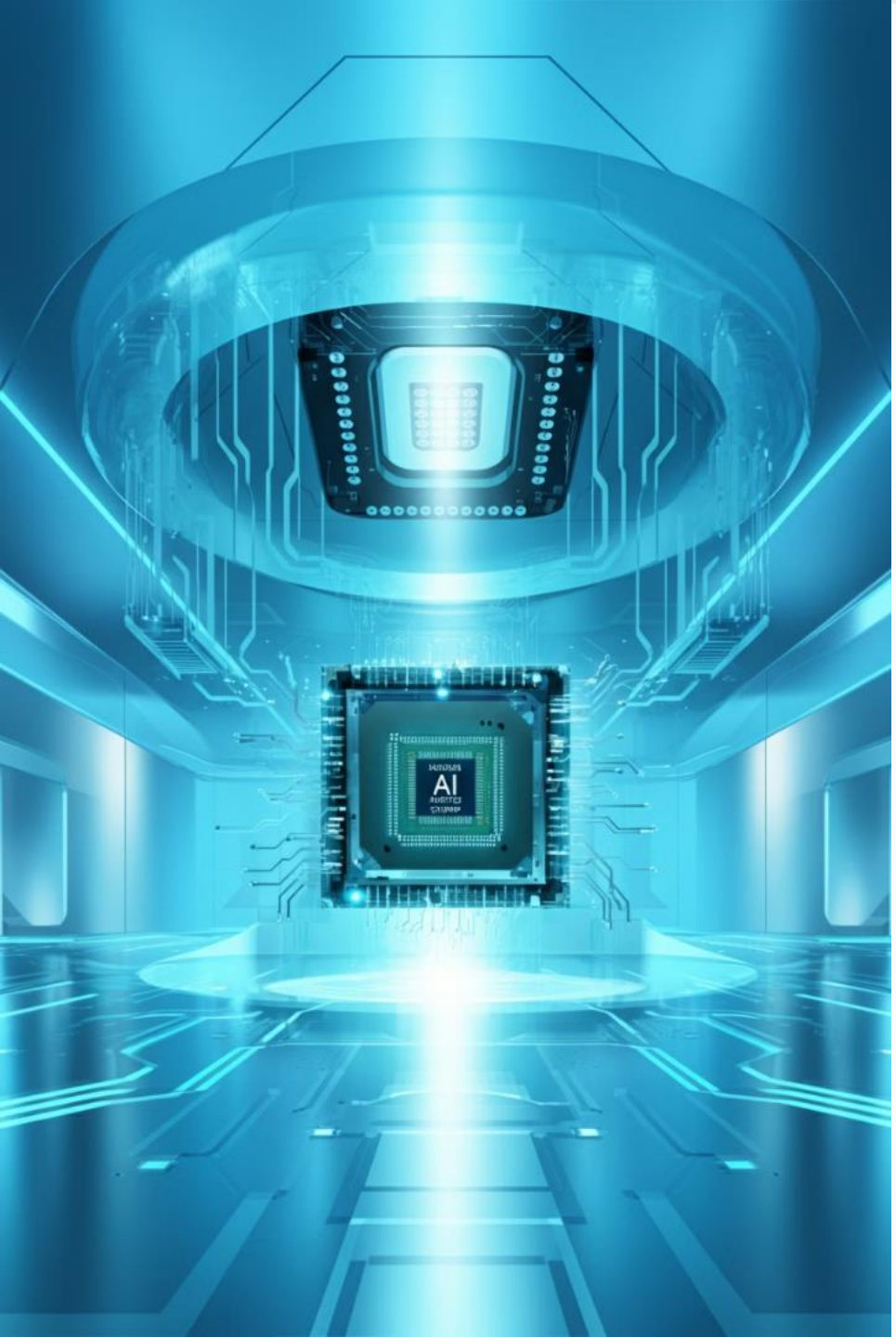
DRIVING TRANSFORMATION
FOR A BETTER FUTURE

National Center for High-performance Computing

- Background & Approach
- National Plan for 2025-2028
- Two Major Projects ~ USD 1.8 B
- Regulations
- Lessons Learned



Taiwan's Investment in AI: Background

- Taiwan is investing heavily in artificial intelligence (AI) development, driven by the recent **boom in its semiconductor industry**.
- This prosperity is largely due to the demand for **AI chips**.
- However, AI represents a **disruptive innovation** that could lead to significant industry changes.
- Recognizing both the current **prosperity and potential risks**, the Taiwanese government is taking strategic steps to prepare for the future of AI.

Taiwan's Strategic Approach to AI Development

- **Creating a Supportive and Fair Environment**
  - The government is focusing on providing the necessary software and hardware **infrastructure** for AI development and **cultivating relevant talent**.
- **Establishing Trust in AI**
  - **Drafting AI Basic Law**
    - To prevent the AI industry from becoming a bubble due to public distrust, Taiwan is implementing an **AI Basic Law** to build trustworthy AI systems.
  - **Developing TAIDE**
    - Taiwan is creating a **Trustworthy AI Dialogue Engine** (TAIDE) to promote reliable AI interactions.
  - **Establishing Evaluation Centers**
    - The government is setting up centers to **evaluate AI products and systems**, ensuring their reliability and trustworthiness.

Taiwan's National Development Plan 2025-2028

Taiwan's **National Development Council** has formulated the 19th National Development Plan for 2025-2028. It outlines strategies to promote sustainable prosperity and meet key challenges over the next four years.

Global Economic Outlook

1

2023-2024

Global economy steadily recovers, with soft landing expected in 2024.

2

2025-2028

Average global growth of 2.75%, higher than 2020-2024 but below 2010s.

3

Key Trends

Geo-economic fragmentation, AI revolution, net-zero transition, supply chain shifts.

Economic Development Strategy

Semiconductors

Increase output value by NT$2.66 trillion.

AI Industry

Exceed NT$1 trillion output by 2026.

Satellite Communications

Achieve NT$30 billion in output value.

Military Drones

Reach NT$30 billion in output value.

Innovation and Talent Development

Startup Investment

Achieve NT$150 billion annual investment by 2027.

Industry Transformation

Increase output 1.5x in at least 3 weak industries.

Talent Cultivation

Train 450,000+ in AI, digital humanities, and STEM fields.

Taiwan's AI Action Plan and Future Direction

Taiwan is advancing its AI capabilities through strategic planning and public-private partnerships. The government, especially **National Science and Technology Council (NSTC)** aims to make Taiwan an "AI island" by leveraging its semiconductor strengths and developing trustworthy AI systems.

Taiwan's AI Action Plan 2.0

The plan focuses on talent optimization, technology development, and international influence. It aims to deepen AI core technologies and accelerate industry adoption.

1 Talent Development

Optimize higher education and expand job training.

2 Industry Transformation

Promote AI adoption in various sectors.

3 International Collaboration

Enhance Taiwan's global AI contributions.

TAIDE: Taiwan's Trustworthy AI Dialogue Engine

TAIDE is a locally developed AI model focusing on Traditional Chinese. It aims to protect Taiwan's culture and strengthen autonomous technology development.

TAIDE Interface

User-friendly AI dialogue system in Traditional Chinese.

Development Team

Experts collaborating on TAIDE's advancement.

AI Infrastructure and Research

Taiwan is expanding its supercomputing capabilities to support AI development. It's also promoting international collaborations in AI research.

Supercomputing

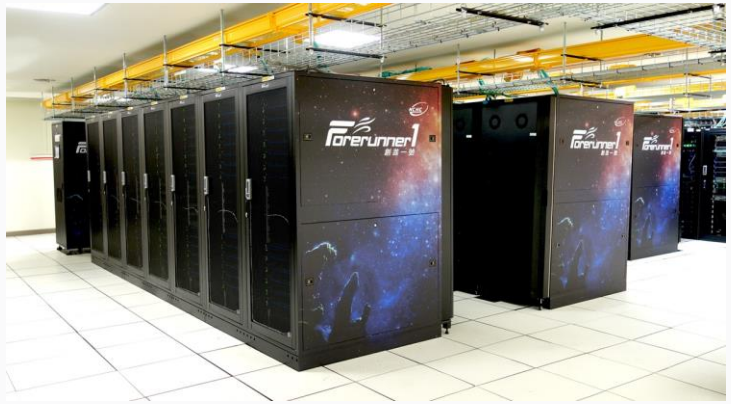
Expanding from 19 Petaflops to over 480 Petaflops by 2028.

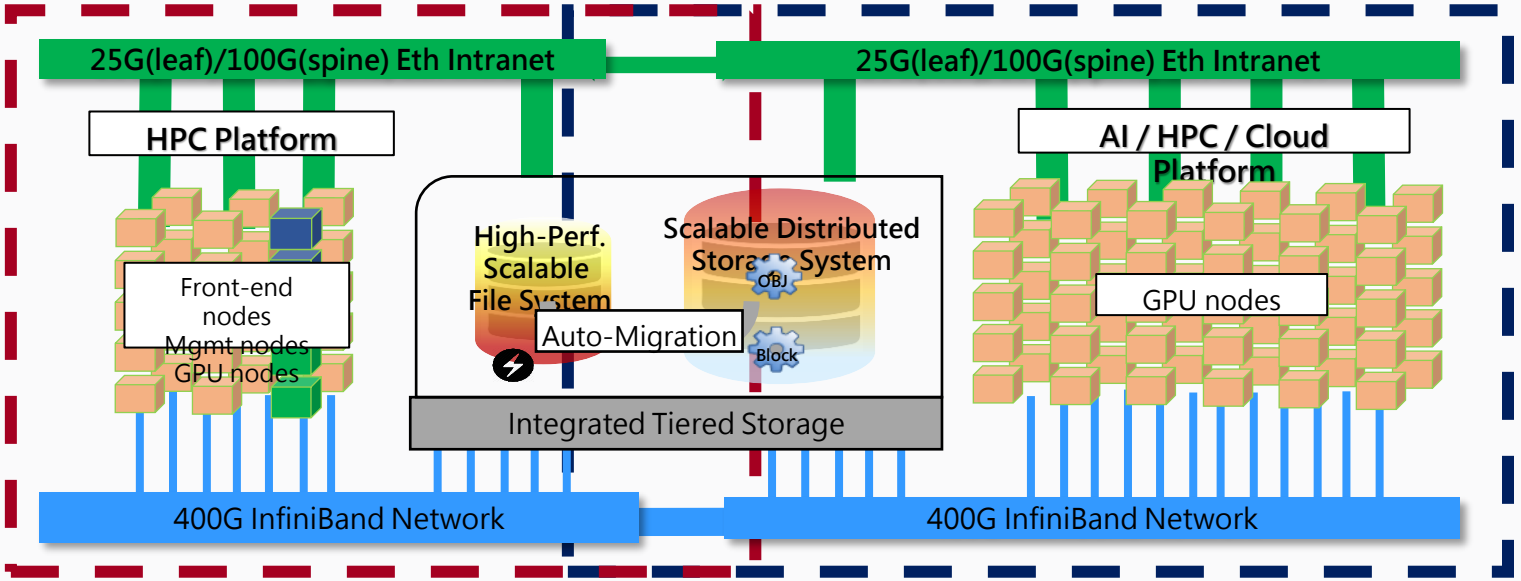
Research Focus

Semiconductors, healthcare, environment, and smart cities.

International Partnerships

Collaborations with other countries.





AI Legislation and Future Plans

Taiwan is developing an AI Basic Law to guide development. It aims to balance innovation with risk management and protect citizens' rights.

1

Draft AI Basic Law

Set national direction for AI development.

2

Industry-Specific Guidelines

Tailored regulations for different sectors.

3

International Alignment

Harmonize with global AI governance trends.

Taiwan Chip-based Industrial Innovation Program (Taiwan CbI)

Taiwan CbI (2024-2028), a comprehensive strategy to drive Taiwan's technological advancement and secure its future as a global leader in the semiconductor industry.

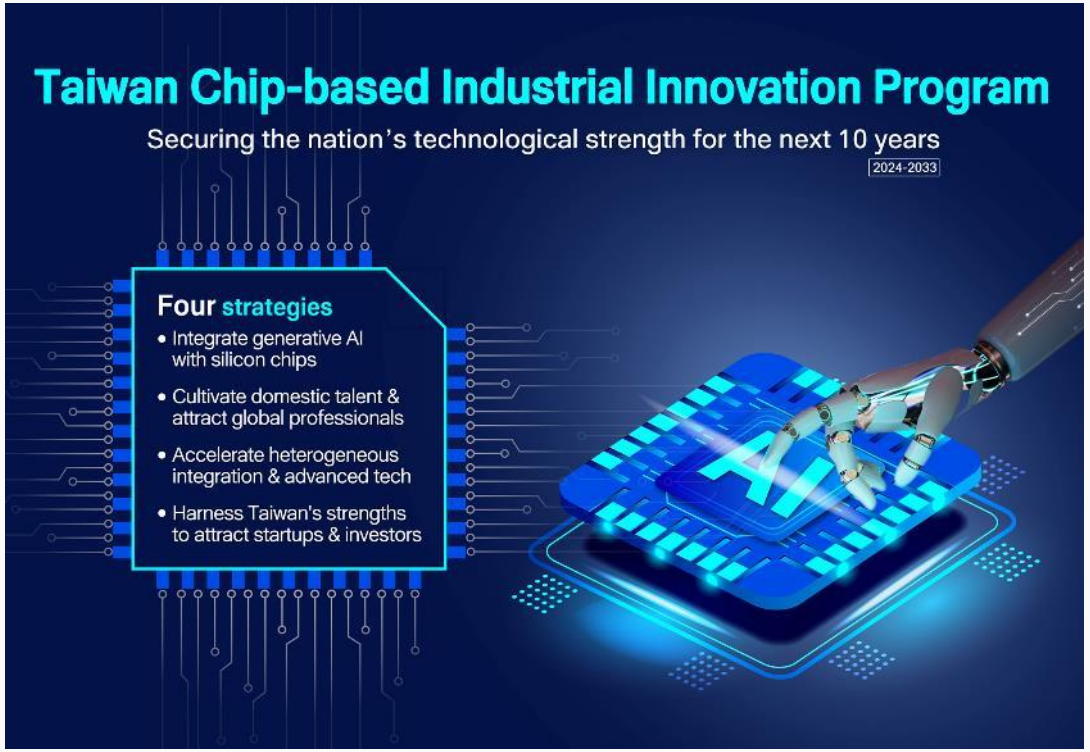


Image source: NSTC

Strategy 1:
Combining AI and Chips for Innovation Innovation

1 Industry Re-Innovation

The plan promotes collaborative research and development projects between academia, industry, and research institutions to develop integrated chip and AI solutions.

2 Breakthrough Innovation

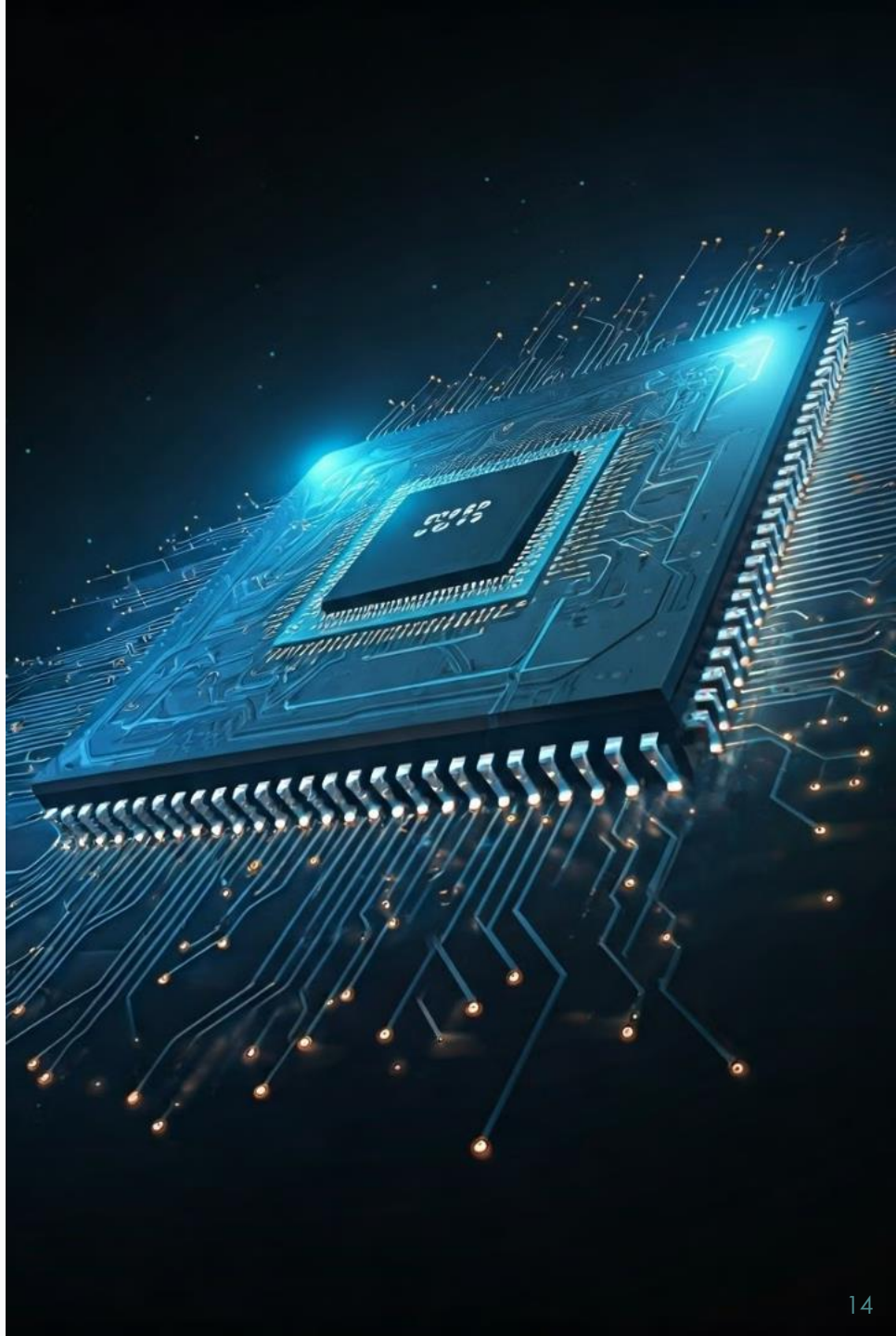
These projects aim to drive breakthrough innovation across various industries by combining chips, generative AI, systems, and applications.

3 Safety and Security

The plan emphasizes the importance of safety and security in the development and deployment of AI-powered chip solutions.

4 Foundation for Innovation

The plan aims to establish a strong foundation for future innovation by fostering collaboration and promoting the development of integrated chip and AI solutions.



Strategy 2:

Strengthening Domestic Talent Development and Attracting Global Research Talent

Attracting Global Research Talent

Domestic Talent Development

The plan emphasizes the importance of strengthening domestic talent development by upgrading research infrastructure, enhancing chip design education, and fostering collaboration between academia and industry.

Global Talent Acquisition

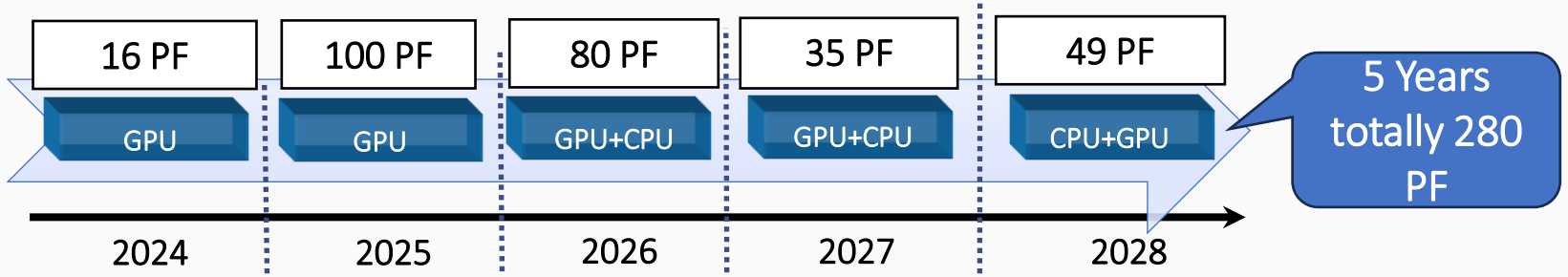
The plan aims to attract global talent by establishing overseas bases, collaborating with international research institutions, and offering attractive opportunities for international researchers.

International Collaboration

The plan promotes international collaboration by facilitating joint research projects, talent exchange programs, and the establishment of overseas research centers.

Infrastructure Upgrade

Upgrade equipment and software in academic institutions



Strategy 3:
Accelerating Advanced Technology and Heterogeneous Integration

Chip Design	Component Manufacturing & Packaging	Applications
Own Key Advanced Chip Design Software	3D Chip Stacking	High-Frequency Design
3D Chip Stacking	Sub-1nm Technology	High-Power Design
Heterogeneous Integration Design		High-Efficiency Design
		High-Performance Computing

Strategy 4:
Leveraging Taiwan's Semiconductor Strength to Attract International Startups Startups and Investment

1

Landing in Taiwan

The plan aims to attract **domestic and international startups** to establish operations in Taiwan by **providing access to key resources**, including tools, intellectual property, and manufacturing facilities.

2

Industry Support

The plan provides support for startups through collaboration with leading domestic companies, investment opportunities, and access to funding sources.

3

Joint Investment

The plan encourages joint investment opportunities between domestic and international companies to foster innovation and accelerate the growth of the semiconductor ecosystem.

Smart Technology Ecosystem for Southern Taiwan

The **NSTC** proposes a plan (2025-2029) to transform Southern Taiwan into an AI industry hub. This initiative aims to balance development across Taiwan and boost AI capabilities.

Image source: Wikipedia & NSTC

Four Key Strategies

Image source: NSTC

Expand Computing Power

Increase high-performance computing capabilities to accelerate AI industry development.

Link Fields

Connect existing sites and create new ones to form an integrated ecosystem.

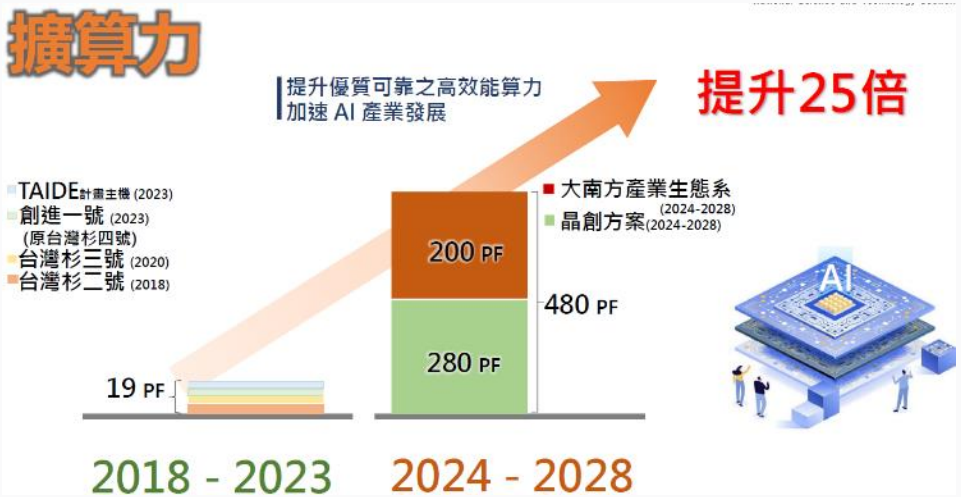
Attract Talent

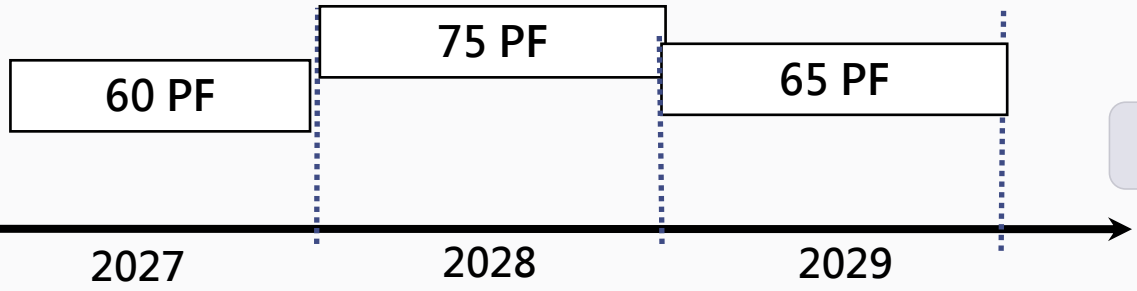
Cultivate and attract AI professionals to balance supply and demand.

Expand Applications

Promote AI adoption across various industries for digital transformation.

Expanding Computing Power





1 2018-2023

Deployment of Taiwan Computing Cloud and TAIDE project.

2 2024-2028

Implementation of Southern Taiwan Industrial Ecosystem and Chip-Driven Innovation Plan.

3 Goal

Increase computing power by 25 times to boost AI industry development.

Image source: NSTC

Linking Fields and Talent Development

Existing Sites

Shalun, Academia Sinica Southern Campus, and Green Energy Technology Demonstration Site.

New Initiatives

Cybersecurity base and compound semiconductor technology training center in Shalun.

Talent Cultivation

Focus on vocational transformation, cross-domain teaching, and student employment.

Image source: NSTC

AI Application and Industry Transformation

Image source: NSTC

Chip and System Integration Platform

Accelerate digital and AI transformation across industries.

Industry Collaboration

Partner with industry associations to develop AI solutions for various sectors.

Talent Pipeline

Provide industry-ready professionals to support AI adoption.

AI Basic Law Draft Overview

The AI Basic Law draft aims to promote human-centric AI development. It seeks to protect citizens' rights while enhancing national competitiveness. The law will establish governance principles for AI innovation.

Basic Principles for AI Development

The law outlines key principles for AI development. These include sustainable development, human autonomy, privacy protection, and fairness.

1 Sustainability

AI should promote social equity and environmental sustainability.

2 Human-Centric

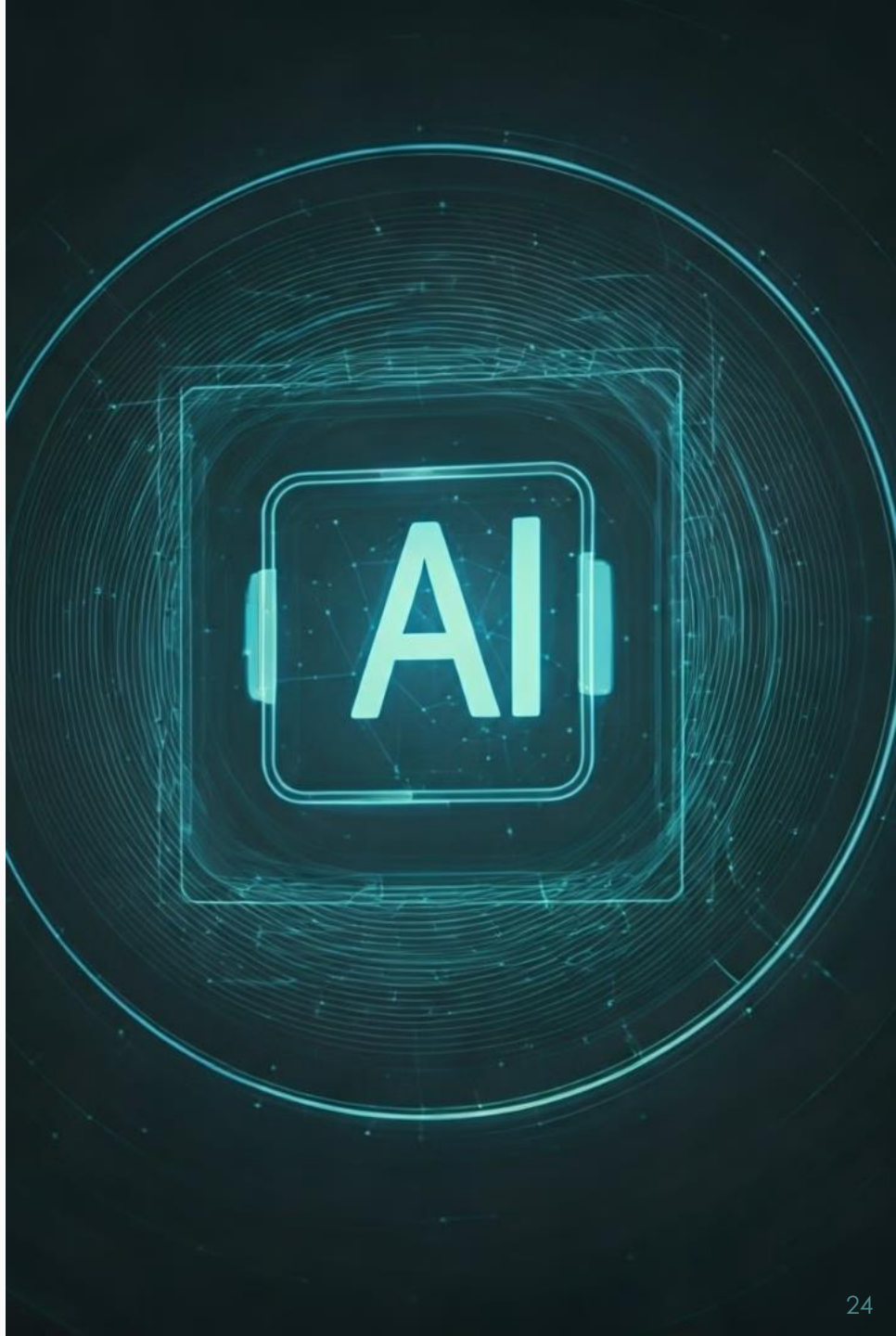
AI must respect human rights and cultural values.

3 Privacy

Proper protection of personal data and privacy is essential.

4 Fairness

AI should avoid algorithmic bias and discrimination.



Government Promotion of AI

The government will actively promote AI research, development, and infrastructure. It will provide funding, tax incentives, and other support for AI industries.

1

Research Support

Provide funding and resources for AI research initiatives.

2

Infrastructure Development

Invest in necessary technological infrastructure for AI growth.

3

Industry Incentives

Offer tax breaks and financial incentives to AI companies.

AI Innovation Environments

Relevant authorities will establish or improve innovation environments for AI. This will allow controlled testing of AI products and services.

Sandboxes

Create regulatory sandboxes for testing AI innovations safely.

Testbeds

Develop physical and virtual testbeds for AI system evaluation.

Collaboration

Foster public-private partnerships in AI innovation spaces.

AI Product and System Evaluation Center Guidelines

The **Ministry of Digital Affairs (MODA)** has established guidelines for an AI Product and System Evaluation Center. This center aims to develop evaluation mechanisms for AI products and systems that meet national and industry needs.

Center Tasks

1 Policy Coordination

Coordinate and plan AI product and system evaluation policies and major measures.

2 Supervision

Oversee AI verification institutions and testing laboratories.

3 Promotion

Coordinate and promote other AI product and system evaluation matters.

Regulation and Ethics in AI Development Development

AI Basic Law

Development of fundamental legal frameworks for AI governance (expected to be implemented this implemented this year)

MODA

Establishment of a dedicated ministry for overseeing digital and AI development

AI Product and System Evaluation

Implementation of rigorous testing and certification processes for AI technologies

Ethical Guidelines

Creation of comprehensive ethical guidelines to ensure responsible AI development and use

Building a National AI Ecosystem: Lessons from Taiwan

Taiwan has played a key role in the international IT industry supply chain for decades. When AI technology emerged, Taiwan quickly recognized it as a "disruptive innovation" that would fundamentally change the existing market ecosystem, and thus rapidly began building a national AI ecosystem.

Core Strategies for AI Development

Provide an "Environment"

The core of Taiwan's strategy is to provide an "environment" that enables different units (especially **startups**) to quickly enter AI and unleash their creativity and competitiveness.

Lower Entry Barriers

For example, AI resources provided by the National Center for High-performance Computing and free or low-cost resources provided by the Ministry of Digital Affairs allow **SMEs and researchers to quickly enter the field.**

Promote Trustworthy AI

Through the AI Basic Law, AI product and system evaluation programs, and indigenous LLMs, Taiwan is building trust and fairness in AI. Only by solving AI trust and security issues can various applications safely adopt AI technology, giving the AI industry a chance to survive or profit, forming a sustainable, self-sufficient AI ecosystem.

Developing Local AI Models

1

Recognize the Need

Although each country has a different local context, I believe that every country should develop its own AI, especially LLM models.

2

Address Local Challenges

For example, Taiwan developed the **TAIDE** model for Traditional Chinese to address the lack of **Traditional Chinese** corpus in LLMs.

3

Avoid Dependence

Relying on technology from international giants without developing local AI can lead to cultural dependence and even **"digital colonization"** risks. Therefore, Taiwan chose to develop its own AI technology to avoid this cultural and technological dependence.

Open Source and Collaboration Strategies

1 Embrace Open Source

Open source systems are a strategy worth considering. Taiwan extensively uses **open source software and open data** in AI development.

2 Rapid Development

For example, TAIDE was developed and launched within a year. The open strategy is an important method for Taiwan to rapidly develop its own AI models in a short period.

3 International Collaboration

In terms of computing resources, Taiwan centers on the National Center for High-performance Computing and actively cooperates with various countries to jointly establish an industry supply chain. The open system of the National Center for High-performance Computing warmly welcomes international cooperation, which is another important strategy for enhancing AI technology development.

Addressing AI Talent Shortage

Current Challenges

Taiwan actually faces the same problem of **AI talent shortage**, mainly because the salary and benefits in the semiconductor industry are very attractive, leading to a large number of talents flowing to these fields (such as the challenges faced by the National Center for High-performance Computing in hiring AI talents). However, Taiwan is actively solving this problem.

Talent Development Approach

Compared to many countries that choose to introduce talents through open immigration policies, Taiwanese society, in addition to introducing foreign talents, tends to expand its own talent base. AI talent needs are very diverse, ranging from computer science to interdisciplinary talents. It can be simply divided into two categories: **CS and interdisciplinary applications.**

Education and Training

AI CS: AI technology is not particularly complex compared to traditional scientific computing, so Taiwan is **expanding the cultivation of talents in the field of computer science.** For example, in my alma mater, National Tsing Hua University, the number of students admitted to the Department of Computer Science has exceeded that of the Department of Electrical Engineering, becoming the largest department. Various online courses are booming.

Nurturing Interdisciplinary AI Talent

1

Recognize Diverse Needs

The development of AI not only relies on computer science talents but also requires a large amount of **interdisciplinary expertise**, such as medical imaging, fintech, etc.

2

Expand Education

Therefore, in addition to expanding related disciplines in the higher education system, Taiwan is also actively promoting various **educational training and industry-academia cooperation** to promote knowledge integration between different fields.

3

Collaborate Internationally

If other countries want to cultivate and retain AI talents, they should pay attention to this diverse talent demand and establish suitable education and industry chains. The National Center for High-performance Computing is currently actively investing in AI technology and is willing to **conduct technical exchanges** with other countries to jointly solve the problem of AI talent shortage.