RISK BEYOND 2025

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Risk Odyssey:
Engineering Momentum,
Building a Resillient Risk DNA

Unpacking Indonesia Artificial Intelligence Roadmap To Build Intelligent Risk Capabilities

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Research Interest:
AI, Computer Vision, Biomedical Image Analysis, Responsible AI, AI & Data Governance.

Education

- Ph.D: University of Science and Technology, Daejeon, Korea, 2015–2020
- Master: Kumoh National Institute of Technology, Gumi, Korea, 2011–2013
- Bachelor: Telkom University, Indonesia, 2006–2011

Previous Work

- Principal AI Engineer, DDH Inc. Korea, Sep 2020 - April 2023
- Research Student, ETRI Korea, Mar 2015 - Aug 2020

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Current Status

- Principal AI Researcher, DDH Inc., Korea
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- AI Consultant

Others

AI Kemenkes Committee, Member of the Indonesian AI Roadmap Task Force, Lead Author, National AI Roadmap White Paper, Indonesian Delegate in the Indonesia–US Bilateral Technology Dialogue 2024, Speaker at Conferences, etc

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National AI Roadmap

Multi-stakeholders

AI Ethics Guideline

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Global Economic

Potential Economic

According to PwC, AI technologies can contribute up to;

$15,7 trillion

To the global economy by 2030

- **$6,6 trillion** — Productivity and efficiency gains
- **$9,1 trillion** — *Consumption-related multiplier effects*

Economic Value

Contribution of **Artificial Intelligence (AI)** to Indonesia's GDP **growth up to**

$366 billion

Year 2030

Aspirations for Economic Transformation from AI

(1) Economic growth up to **8%** by **2029**

(2) Become a **high-income country by 2038**

National Artificial Intelligence Strategy 2020-2045

Developments In AI Technology

- *Multimodal Generative AI*
- *More Accurate AI Reasoning Model*
- *Model Context Protocol (MCP)*
- *Multimodal Retrieval Augmented Generation*
- *Agentic AI & AI Agents, Multi Agent Systems*
- *Quantum AI, Quantum Machine Learning*
- *World Language Model*
- *AI Chip Hardware*
- *AI Safety, Security & Guardrail*

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Application of AI
Indonesia Ranking

TOP **10** TOP
BCG, 2023

Daily active users of Generative AI worldwide.

Top industries driving AI search interest
#1 MARKETING
#2 GAMING
#3 EDUCATION
Google, Temasek, and Bain & Company, 2024

More than **70%**

All organizations in Indonesia utilize Generative AI in content creation, customer engagement, and marketing assistance.

UNESCO Indonesia AI Readiness Assesment Report, 2024

Government Readiness

188 Countries

40 Indicators

10 Dimensions

3 Main Pillar

Government	79,86
Data & Infrastructure	69,64
Technology	48,06

Government **KA Readiness Index** dari Oxford Insights,

Of the three pillars measured, Indonesia scored highest on the **governance pillar** at **79.86**.

After **Singapore** (84.25), **Malaysia** (71.40), and **Thailand** (66.17).

*Government **AI Readiness Index** from Oxford Insights,*

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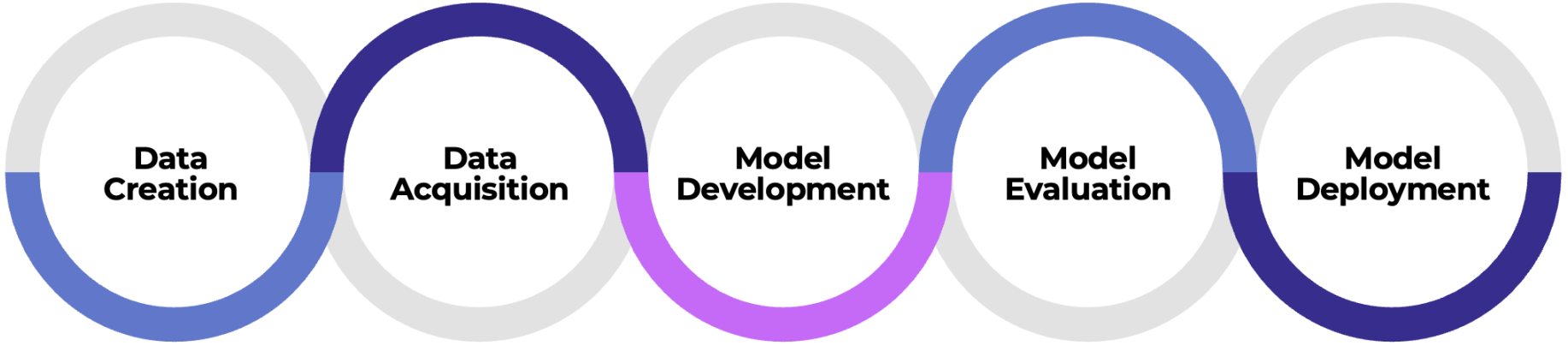
Bias Through AI Lifecycle

Problem Formulation: Only 26% of computer scientist are women, 8% are Black, 8% are Hispani

Data acquisition: low quality or missing data

Model Evaluation: evaluation often excludes subpopulation analysis or fairness



Data Creation: Real world data may not be representative of the target population

Model Development: bias can be amplified or introduced by modeling decisions, such as labeling error

Model Deployment: the decisions made during, and post deployment may introduce biased decision making

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AI Ecosystem Framework

Vision:

"To adopt and develop ethical and responsible Artificial Intelligence ecosystem to strengthen global competitiveness towards Golden Indonesia 2045"

AI Indonesia's vision is **elaborated into the missions** of each **Focus Area,** namely **Ethics**, **Policy**, **Talent Development**, **Infrastructure** and **Data**, **Research** and **Industry Innovation**, **Investment and Financing, and Use Cases**.

Target 2029

- **Supporting economic growth through the development and utilization** of Artificial Intelligence in the President's priority programs and the best quick-win programs in Asta Cita.
- **Enhancing the competitiveness** of Indonesia's development and **utilization of Artificial Intelligence globally**

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Priority Sectors

1. Food Security
2. Health
3. Education
4. Economy & Finance
5. Bureaucratic Reform
6. Politics, Law & Security
7. Energy, Resources & Environment
8. Housing
9. Logistics Transportation & Infrastructure
10. Arts, Culture & Creative Economy

AI Sector Priorities

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Priority Areas	Use Case	
Food Security	AI for Free Nutritious Meals (MBG)	• AI for healthy and varied MBG menus tailored to the local food resources of each region (Tabular Data) • Monitoring the implementation of MBG kitchens to ensure food hygiene and quality (Computer Vision)
	AI for Food Self-Sufficiency	• Harvest Prediction (Weather and Soil Data Sensors) • Land Productivity (Satellite Imagery and Weather)
Health	AI for TB Screening	• Skrining TBC (*Multimodal Data: chest XRay, Genomic*)
	AI for Free Health Checkups	• Use of LLM for conclusions and recommendations based on health check results
	AI for Mapping Areas Prone to Stunting	• Integrating multisectoral data (infants, pregnant women, regional access conditions, economy, availability of local food and clean water, education levels, health services) (Machine Learning, NLP)
Economics and Finance	AI for the Koperasi Merah Putih	• Monitoring the operational performance of Koperasi with data integration such as the number of customers and financial reports. (Machine learning)
Education	AI to support Adaptive Learning in Public Schools	• Learning materials tailored to students' needs in accordance with the concept of multi-entry multi-exit public schools (personalized learning)
Politics, Law, and Security	AI for Detecting Hoaxes and Disinformation	• Detect hoax information in the form of text, images, and videos to increase public trust (deep learning)

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Policy, Strategy, and Program

Quick Win Programs

- **Establish** a National Coordination Task Force
- **Develop AI Ethics** Guidelines that include safeguard frameworks
- **Develop a Cross-Ministry Coordination** Mechanism for infrastructure and data integration within the National Railway Ecosystem.

Mitigating Risks: *5 Strategies, 6 Programs, 28 Activities*

1. Ethics Guidelines
2. National Railway Observatory
3. Protection of National Strategic Technology Infrastructure
4. Railway Digital Platform

Improving Technology, Research, and Innovation Capability and Capacity

6 Strategies, 11 Programs, 21 Activities

1. Improved Connectivity and Quality of Telecommunications Networks
2. Shared Infrastructure
3. New and Renewable Energy Transition for Data Centers
4. Curated Research Data Platform and National Model Repository
5. International Collaboration Research and Innovation Network Hub

Nurturing Innovation

9 Strategies, 14 Programs, 38 Activities

1. AI Talent Factory
2. Digital Talent Center
3. Digital Talent Scholarship
4. Open Innovation
5. AI Sandbox
6. Digital Innovation Hub
7. Sovereign AI Fund
8. Strengthening the Involvement of Vulnerable Groups in AI Development and Utilization

Empowering Multi Stakeholders & Whole of Government

7 Strategies, 8 Programs, 20 Activities

1. National Railway Coordination Task Force
2. Data Interoperability
3. Expansion of Access, International Cooperation and Collaboration
4. Strengthening Railway Learning Curricula for Primary, Secondary, and Higher Education

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4. Mitigating Risks

4.1	**Promoting ethical and responsible AI governance framework in** development and utilization
4.2	**Building a responsible, open, and inclusive national framework ecosystem through stakeholder collaboration forums, and strengthening accountability** by providing a recovery/redressal scheme mechanism for communities affected by the system.
4.3	**Developing policies for the protection of national strategic technology infrastructure to support and accelerate the achievement of national innovation and technology program objectives,** as well as conducting ethical audits and evaluations through voluntary declaration mechanisms and transparency of the AI ecosystem, supported by public involvement as part of participation and accountability.
4.4	**Building a National Framework Talent Ecosystem to strengthen Indonesia's competitiveness**
4.5	**Developing an integrated system to manage, connect, and monitor the implementation** of artificial intelligence use cases to encourage strategic, efficient, and data-driven adoption at the national level.

Strategy Mitigating Risks

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Ethics Principles

1. Inclusivity
2. Humanity
3. Safety
4. Accessibility
5. Transpency
6. Credibility and Accountability
7. Data Privacy Protection
8. Development and Environment Sustainability
9. Intellectual Property

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Thank You!

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