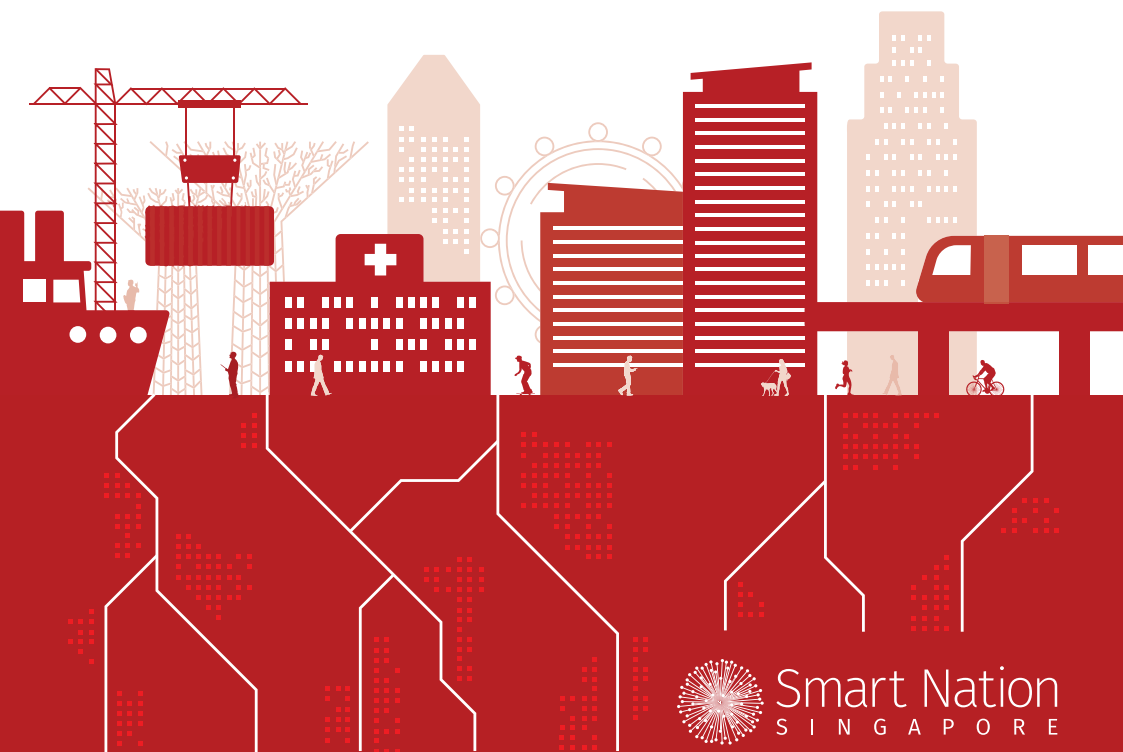


NATIONAL ARTIFICIAL INTELLIGENCE STRATEGY

SUMMARY

ADVANCING OUR SMART NATION JOURNEY



Smart Nation
SINGAPORE



NATIONAL ARTIFICIAL INTELLIGENCE STRATEGY

VISION

By 2030, Singapore will be a leader in developing and deploying scalable, impactful AI solutions, in key sectors of high value and relevance to our citizens and businesses.

NATIONAL AI PROJECTS

We will embark on an initial tranche of 5 National AI Projects to deliver strong social and/or economic impact for Singapore and Singaporeans.



INTELLIGENT
FREIGHT PLANNING



SEAMLESS & EFFICIENT
MUNICIPAL SERVICES



CHRONIC DISEASE
PREDICTION &
MANAGEMENT



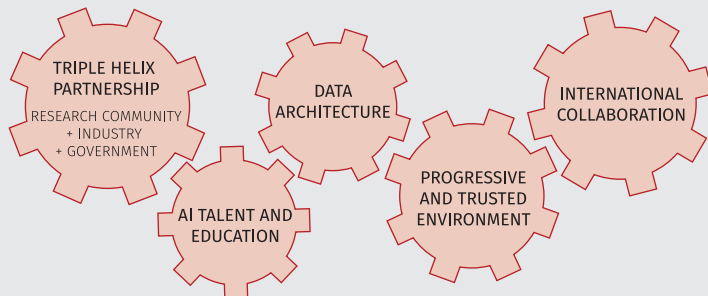
PERSONALISED EDUCATION
THROUGH ADAPTIVE
LEARNING & ASSESSMENT



BORDER CLEARANCE
OPERATIONS

ECOSYSTEM ENABLERS

To enjoy sustained benefits from AI, we will strengthen ecosystem enablers that drive AI innovation and adoption across the economy.



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Working Together

WHY A NATIONAL AI STRATEGY?

Artificial Intelligence (AI) is the capability to simulate intelligent, human-like behaviour in computers. As a general purpose technology, AI has applicability in any field, ranging from cancer diagnosis to urban planning and fraud detection. It has the potential to offer breakthrough solutions that are incomparably better than existing approaches.

The rise of applicable, deployable AI represents a golden opportunity for Singapore to open new frontiers of growth and transcend our geographical limits. For the nation, AI should transform national-level planning and significantly raise the quality of public goods like transport, education and healthcare. For the economy, AI should augment our workforce to raise productivity, and enable us to create valuable products and solutions for the Singapore market and beyond. For our people, AI should bring about greater convenience, safety and security, and most importantly, improve their lives.

We need a national strategy to fully harness the benefits of AI.

This strategy serves three purposes.

1. Identify areas to focus attention and resources at a national level.
2. Set out how Government, companies, and researchers can work together to realise positive impact from AI.
3. Address areas where attention is needed to manage change and/or manage new forms of risks that arise when AI becomes more pervasive.

The following factors give us a measure of confidence in being able to use AI well to succeed as a nation, even if we lack the sheer size and scale of other economies.

1. We have consistently invested in ICT technologies, most recently embarking on our Smart Nation journey to use digitalisation to transform our Government, economy and society.
2. We have already made significant and early investments into AI, both in the public R&D ecosystem and the private sector. We are also a leading nation in AI ethics and governance.
3. We are a small, advanced country with a highly educated population that understands the value and potential of technology. We can organise and coordinate well across public and private institutions. We are also able to make practical decisions, as a society, on how to adopt AI for social and economic good.

VISION

By 2030, Singapore will be a leader in developing and deploying scalable, impactful AI solutions, in key sectors of high value and relevance to our citizens and businesses.

Singaporeans will trust the use of AI in their lives. This confidence is borne out of a clear awareness of both the benefits and implications of the technology. Our workforce will have the necessary competencies to be part of the AI economy, and our engineers and entrepreneurs will innovate and create new AI solutions for the local and global markets.

Domestically, our private and public sectors will use AI decisively to generate economic gains and improve lives. Internationally, Singapore will be recognised as a global hub in innovating, piloting, test-bedding, deploying and scaling AI solutions for impact.

APPROACH

1. Emphasise deployment

We will work jointly across public, private and research institutions to enable effective deployment of AI solutions. The objective of effective deployment will anchor our efforts in R&D, regulatory review, and capability development.

2. Focus on key sectors

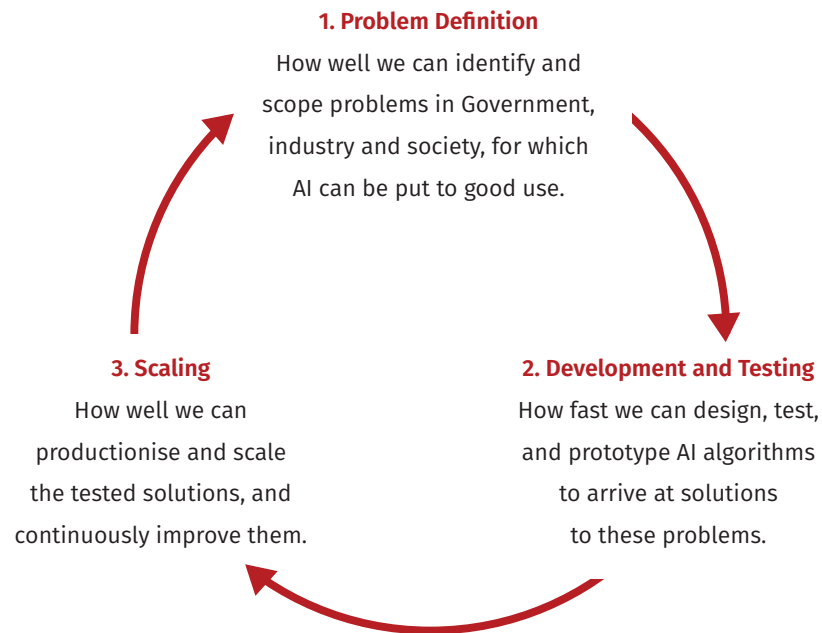
We will focus on driving AI deployment in key sectors with high social or economic value for Singapore, and for which we can build on existing strengths.

We have identified nine such sectors: Transport & Logistics, Manufacturing, Finance, Safety & Security, Cybersecurity, Smart Cities & Estates, Healthcare, Education and Government.

3. Strengthen the AI Deployment Loop

There are three aspects of effective deployment:

AI Deployment Loop



These three aspects mutually support one another in a virtuous cycle that we label the “AI deployment loop”.

Within each of the nine key sectors, we will identify and initiate impactful use cases to start collaborative AI projects. We call these the “National AI Projects”. Through these projects, we intend to create gains, draw lessons, and progressively tighten the feedback loop

between problem definition, development/testing and scaling. In this way, we will be able to innovate on AI in cycles that will be increasingly shorter.

4. Adopt a human-centric approach

First and foremost, we will focus on benefits to citizens and businesses, i.e. getting AI to serve human needs, rather than developing the technology for its own sake. This is aligned with our Smart Nation approach, and our focus on effective deployment in key sectors of high socio-economic value.

Second, we will be proactive in addressing the risks and governance issues that come with the increasing use of AI. In particular, we need to guard against the dilution of our societal and institutional responsibilities and accountabilities towards one another, even as we use AI more frequently to automate, detect, and predict.

Third, we will build an AI-ready population and workforce. At the societal level, as part of the overall promotion of digital literacy, we will raise awareness of AI, so that citizens are prepared for technological change, and are engaged in thinking about AI’s benefits and implications for the nation’s future. At the workforce level, we will prepare our professionals to adapt to new ways of working, in which workers are augmented by AI capabilities.

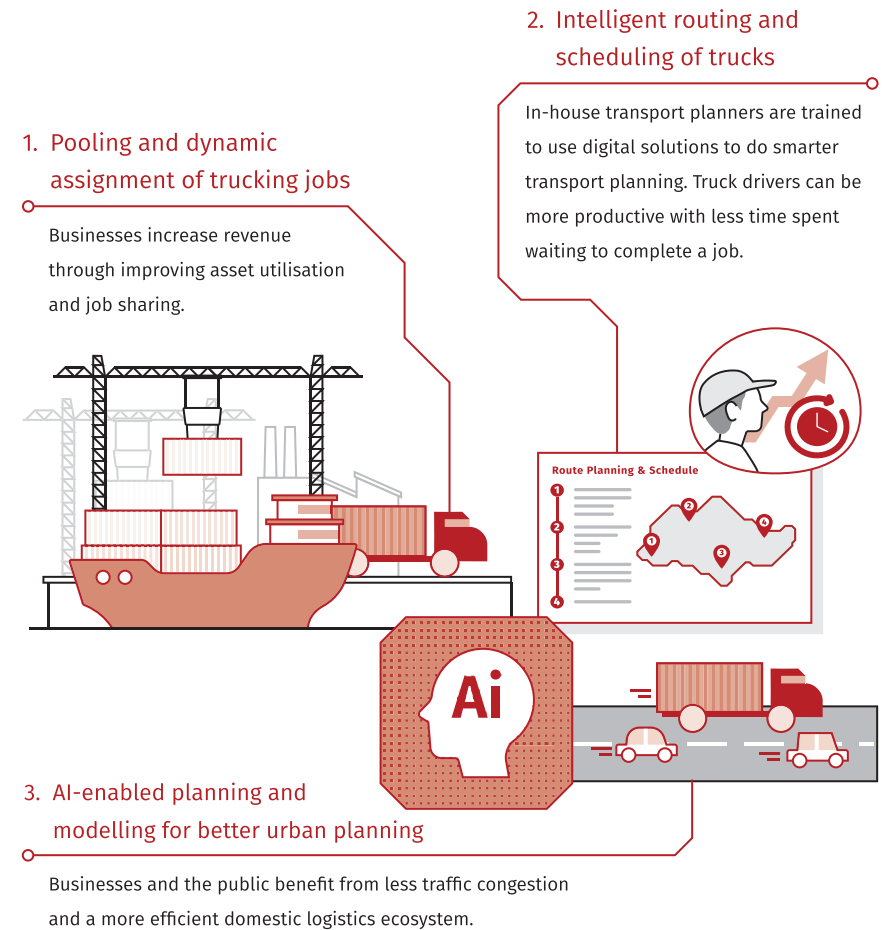
NATIONAL AI PROJECTS

Singapore will embark on an initial tranche of 5 National AI Projects, to deliver strong social and/or economic impact for Singapore and Singaporeans. These projects will guide investment in AI research, generate lead demand to anchor talent and capabilities in Singapore, and guide how Singapore builds up its supporting digital infrastructure. We will continue to identify other high impact National AI Projects to pursue.

1. Intelligent Freight Planning
2. Seamless and Efficient Municipal Services
3. Chronic Disease Prediction and Management
4. Personalised Education through Adaptive Learning and Assessment
5. Border Clearance Operations

1. INTELLIGENT FREIGHT PLANNING

How can we optimise the movement of freight to improve productivity for businesses, and traffic efficiency?



2. SEAMLESS AND EFFICIENT MUNICIPAL SERVICES

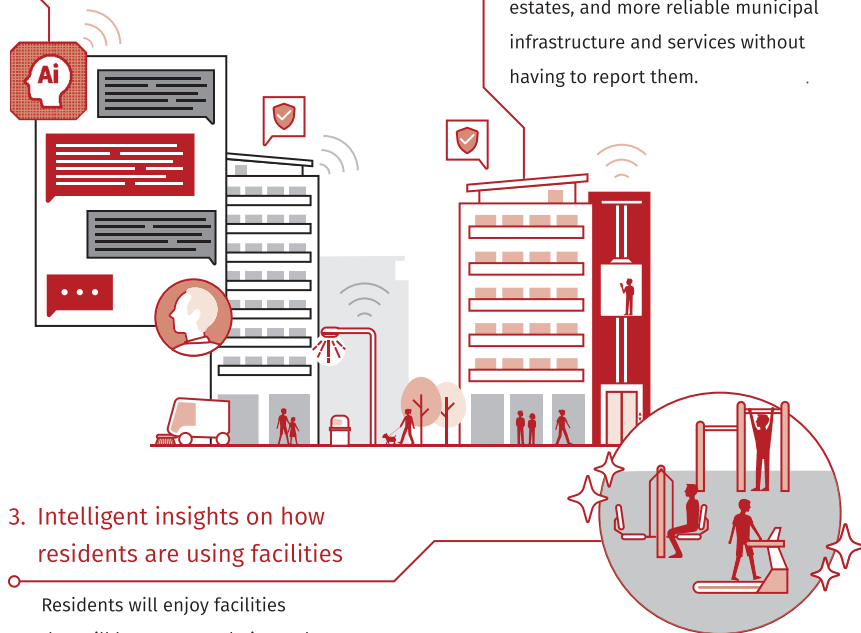
How can municipal services be more responsive, reliable and timely?

1. AI-powered chatbot for reporting municipal issues

Residents can report municipal issues more efficiently and seamlessly.

2. Pre-emptive estate maintenance with sensors and AI

Residents can enjoy better-maintained estates, and more reliable municipal infrastructure and services without having to report them.



3. Intelligent insights on how residents are using facilities

Residents will enjoy facilities that will better serve their needs.

3. CHRONIC DISEASE PREDICTION AND MANAGEMENT

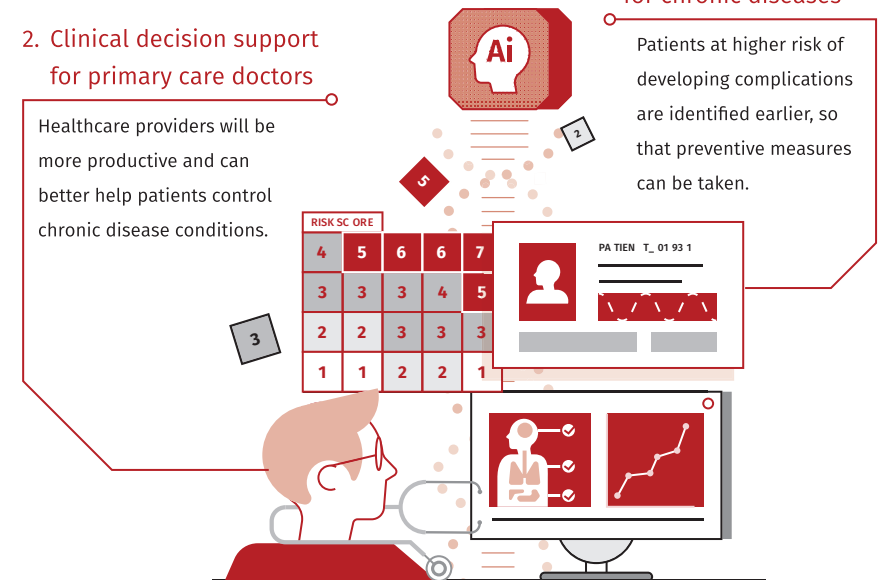
How can we help to prevent and better manage chronic diseases?

1. Personalised risk score for chronic diseases

Patients at higher risk of developing complications are identified earlier, so that preventive measures can be taken.

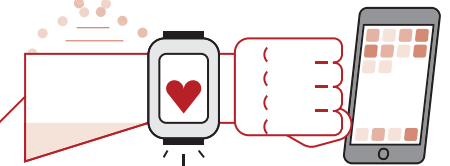
2. Clinical decision support for primary care doctors

Healthcare providers will be more productive and can better help patients control chronic disease conditions.



3. Personalised management of chronic diseases

Singaporeans will enjoy improved health outcomes, and will be empowered to better self-manage chronic diseases.

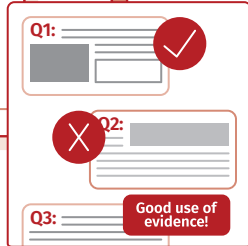
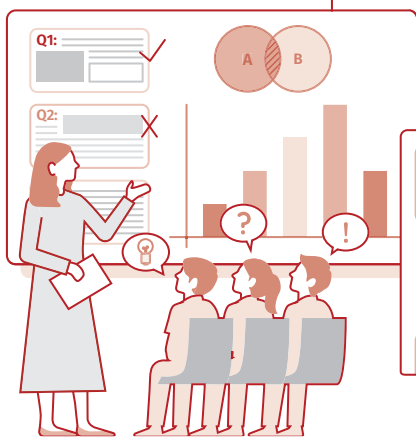


4. PERSONALISED EDUCATION THROUGH ADAPTIVE LEARNING AND ASSESSMENT

How can we help teachers to better customise and improve the learning experience for every student?

1. Adaptive Learning

Students will have a more personalised learning experience, tailored to their individual strengths and weaknesses.



2. Automated Marking System

Teachers will spend less time on routine assessment tasks, and can guide students' learning more effectively through data-driven insights.

3. AI Learning Companion

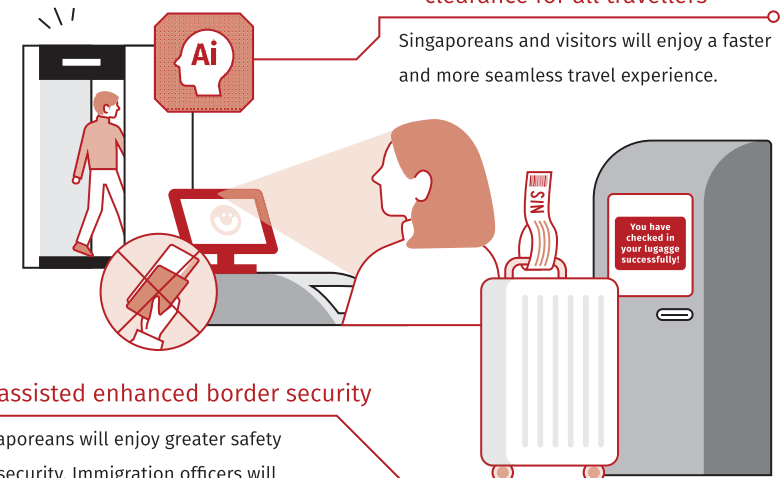
Each student will be guided by a virtual partner as they learn, helping them develop a growth mindset and nurture the joy of learning.

5. BORDER CLEARANCE OPERATIONS

How do we continue to strengthen border security while improving traveller experience?

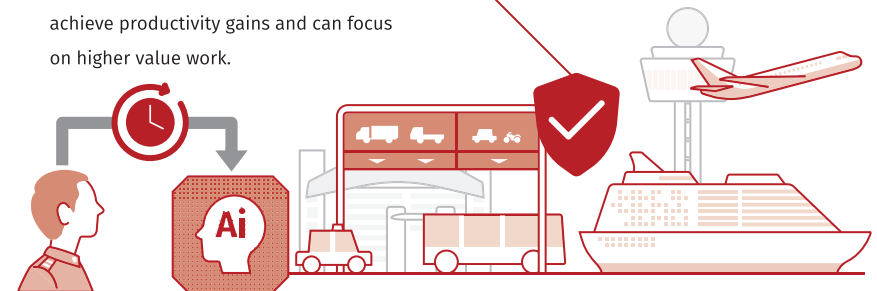
1. 100% automated immigration clearance for all travellers

Singaporeans and visitors will enjoy a faster and more seamless travel experience.



2. AI-assisted enhanced border security

Singaporeans will enjoy greater safety and security. Immigration officers will achieve productivity gains and can focus on higher value work.



Timeline & Milestones for National AI Projects

2022

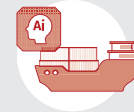
2025

2030

1. INTELLIGENT FREIGHT PLANNING



Develop a common and trusted data platform for the logistics ecosystem.



Deploy AI applications that facilitate freight planning and optimisation at the sea gateway.



Scale deployment of intelligent freight planning to air and land gateways.

2. SEAMLESS AND EFFICIENT MUNICIPAL SERVICES



Launch of chatbots for reporting of municipal issues.



Sensors and AI are deployed for predictive maintenance of public housing estates.



Use of AI to improve planning of our living environment.

3. CHRONIC DISEASE PREDICTION AND MANAGEMENT



Deploy SELENA+* for diabetes retinopathy screening across the nation.



Development of retina-based risk score for 3H* related cardiovascular diseases.



Collaborate with industry to co-develop novel AI models for 3H patients.

4. PERSONALISED EDUCATION THROUGH ADAPTIVE LEARNING AND ASSESSMENT



Launch automated marking systems for Primary/Secondary English Language.



Launch adaptive learning systems for Primary/Lower Secondary Maths and Learning Companion.



Expand adaptive learning systems and automated marking systems to more subjects.

5. BORDER CLEARANCE OPERATIONS



AI-supported forward risk-assessment capability ready for operational deployment.



Transformed border clearance concept for all travellers to enjoy self-clear immigration.

* SELENA+: Singapore Eye LESioN Analyser

* 3H: High glucose, High blood pressure, High cholesterol

BUILDING THE AI ECOSYSTEM

Our National AI Projects will generate momentum for AI deployment and demonstrate the value of AI. To enjoy sustained benefits from AI, we will strengthen ecosystem enablers to drive AI innovation and adoption across the economy. Our strategy identifies 5 critical ecosystem enablers:

1. **Triple Helix Partnership between the Research Community, Industry and Government** – enable the rapid commercialisation of fundamental AI research and deployment of AI solutions, through harnessing stakeholder synergies through collaboration
 - Key Thrust 1.1** Deepen investments in AI-related R&D across the research ecosystem
 - Key Thrust 1.2** Drive partnerships between the research community and industry
 - Key Thrust 1.3** Accelerate AI adoption in companies
 - Key Thrust 1.4** Establish AI innovation testbeds
2. **AI Talent and Education** – address the shortfall in the quantity and quality of talent across the entire range of AI-related job roles
 - Key Thrust 2.1** Train more Singaporeans for high-quality AI jobs
 - Key Thrust 2.2** Teach basic computing skills and computational thinking to all
 - Key Thrust 2.3** Attract top-tier global AI talent

3. **Data Architecture** – enable quick and secure access to high-quality, cross-sectoral datasets
 - Key Thrust 3.1** Establish frameworks for public-private data collaboration
 - Key Thrust 3.2** Establish trusted data intermediaries for public-private data exchange
4. **Progressive and Trusted Environment** – strengthen trust in AI technologies to enable an environment for test-bedding, developing, and deploying AI solutions
 - Key Thrust 4.1** Establish citizens' trust on the responsible use of AI
 - Key Thrust 4.2** Provide a top-class IP regime and accelerated patent initiatives for AI
5. **International Collaboration** – work with international partners to shape the international AI discourse and develop the other horizontal enablers
 - Key Thrust 5.1** Contribute to global standards for AI-related policies and guidelines
 - Key Thrust 5.2** Collaborate on multi-national AI projects

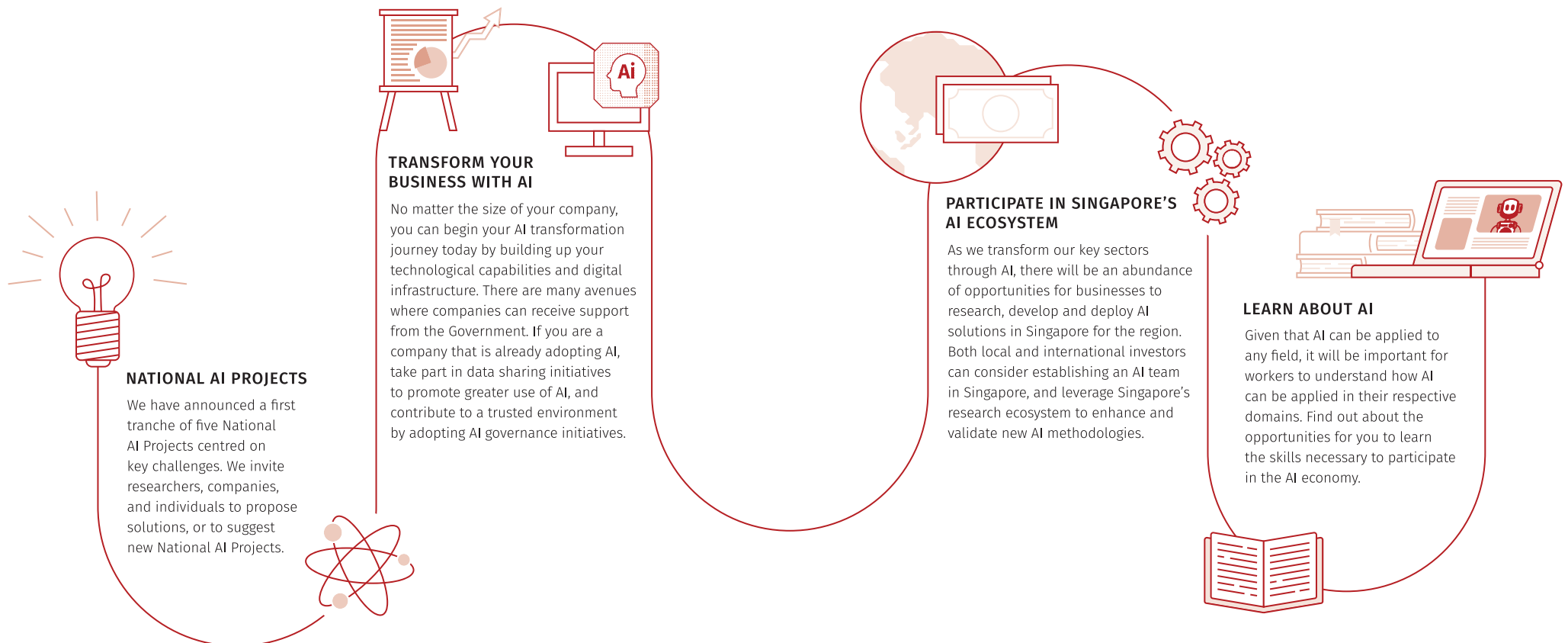
WORKING TOGETHER

Organising Ourselves for Sustainable Success

We have established a **National AI Office** under the Smart Nation and Digital Government Office. The National AI Office will set the national agenda for AI and catalyse efforts across research, industry, and Government stakeholders to work on national AI priorities.

The National AI Strategy requires a whole-of-nation effort, with Singaporeans, businesses, researchers and the Government working closely together. Singapore will also need to work with international partners to advance the deployment of AI in Singapore.

For more information on how to be involved in the National AI Strategy, visit go.gov.sg/AIStrategy



Conclusion

We will develop and implement the National AI Strategy iteratively, to respond to the rapidly changing technology landscape and to seize new opportunities. The 5 National AI Projects and 5 ecosystem enablers are but a first step in our multi-year AI journey. We will continue to embark on more National AI Projects and adjust the enablers as we learn through implementation. This is a whole-of-nation effort, and we welcome ideas and action from individuals and companies to help deliver our AI vision for Singapore. Let us work together to build a Smart Nation, to improve lives and make Singapore an outstanding place to live, work and play.

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