# An AI Market Survey – Singapore – October 2020

**Remark:** Pls note that underlined words or groups of words are active links to our sources.

## Introduction

Singapore has seen its push for Artificial Intelligence (AI) developments fruitful, and the impact can be seen and felt during this period of fight against COVID-19. This can be attributed to the Government leading the early adoption of AI, transformation that has been planned and carried out extensively in the past few years.

With the rise in importance of AI technology in daily living, Singapore is planning to further step up its momentum in using data analytics, AI and sensors to improve living conditions that advance the country towards its Smart Nation goals. The Government will invest over $710 million in infocomm technology projects that involve the use of data analytics, AI and sensors to improve government services in 2020.

Some of the areas where results are already beginning to show in real time are in:

- Using AI and robots in the fight against Covid-19
- Using analysis for better Covid-19 contact tracing
- Using smart robots for patrol and surveillance
- Using smart sensors and meters to save water
- Using data analytics for tourism insights

## AI During COVID-19

The pandemic has accelerated adoption of digital infrastructure and has seen AI take up an ever more important role with many of the newly developed tools. These include a smarter chatbot that uses machine learning and data analytics to address queries on Government agency websites, AI-driven automated temperature screening, cleaning robots and contact tracing apps.



The Government has also recently announced a $20 million Advanced Digital Solutions fund that local construction companies can access to offset costs of adopting advanced digital solutions to keep work sites safe. The digital equipment that could be subsidised includes thermal scanners, biometric facial recognition systems, AI cameras and Bluetooth-enabled wearables.

**AI Use Cases**

These are some of the AI use cases in Singapore.

- Fintech –Singapore is widely regarded as the regional fintech hub in Southeast Asia. Chatbot is one of the key uses of AI in fintech and a variation of them are used in the banks here. DBS Bank uses Job Intelligence Maestro (JIM) to access job candidates which has improved the recruitment time and also reduce the bias compared to previous human-led system. There is also the shift to digital customer experience for the bank where chatbot JOY is deployed. JOY is designed as the corporate banking virtual assistant to assist SMEs on corporate banking enquiries, and one that delivers personalised experience with empathy. The bank will also be adding predictive technology to its mobile app that will offer suggestions on managing money effectively or cutting losses on investments.

  OCBC and Standard Chartered Banks are using technology from local AI start-up Silent Eight to keep themselves away from suspicious and risky deals. Silent Eight's software collects and analyses data from thousands of documents and other sources to hunt for suspicious individuals or entities, helping financial institutions enhance their regulatory processes.

  Credit scoring AI technology is also changing the future of lending and local fintech company CredoLab's technology can anonymously track consumer's mobile behaviour to determine credit score. This results in a faster credit approval from banks and retailers.

  Rely, another local company provides shoppers with interest-free payment installments for online shopping. An AI engine is used to determine shoppers' repayment capabilities and their spending limits. This allows retailers to experience higher sales conversion rates.



Singapore's Fintech + AI Start-up Landscape

- Healthcare – There are AI tools and assistants that are able to detect skin cancers, analyse chest x-rays and perform diabetes screens from retina scans. It is also used to filter from papers and reports to help doctors make best decision when choosing new treatments. By using robotics in surgeries, it could reduce the patients' recovery period and free up beds.

- Transport – Autonomous vehicles look to be playing a part in the future of Singapore's public transportation system. Ride hailing service Grab had partnered start-up nuTonomy for it on-demand driverless car trial in 2016. While other trials had taken place in smaller areas such as Jurong Innovation District (JID) and Jurong Island, there are plans to involve all of western Singapore. Grab has also announced plans to launch self-driving taxis in Southeast Asia before 2022.

- Infrastructure – AI is used to manage solar power installation on the rooftops of apartment blocks. AI helps to schedule charge and discharge cycles in sync with weather forecasts and usage patterns. Surbana Jurong, which monitors about 26,000 lifts in Singapore, partners with Microsoft to enhance its predictive maintenance system with machine learning and AI capabilities. The solution provides real-time monitoring and addresses small issues before they become bigger problems.

- Manufacturing – The groundbreaking ceremony for Hyundai's new electric vehicle factory took place on 13 October 2020. The seven-storey facility will employ advanced manufacturing and logistical system that includes AI, IOT and robotics. Hyundai is partnering Nanyang Technological University to find ways to facilitate "smart customising" functions that customers can tailor-make their cars.

- Retail – An unmanned Cheers convenience store first opened in 2017 uses data and video analytics to study purchasing behaviour and customise the inventory needs. Now, there are Octobox, OMO Store and Pick &Go that runs AI-enabled stores. The AI features includes smart entry, systems that can charge the customer accordingly once item is taken off the smart shelf, tracking movement of the store items and shoppers' movements.

  Telco Singtel last year also launched an unmanned pop-up shop that opens 24/7 and has a roving live bot that customers could consult with. It is powered by facial recognition technology and customers could receive personalised recommendations, try out phones, sign up for mobile plans at video-assisted self-serve kiosks and collect their purchases.

  There is ELLA – an AI powered robot barrister deployed at Crown Coffee cafe which can whip up 200 cups of customised coffee orders in an hour.

- Emergency Services – Singapore Civil Defence Force (SCDF) is working with AI Singapore on a unique speech recognition system that could transcribe and log each call received in real time. The system is able to do so for English, Mandarin, Hokkien, Malay and even in Singlish.

- Logistics Services – Singapore Post Limited (SingPost) partnered with San Francisco-based LogiNext to integrate machine learning and AI route-planning software into its new LastMile Platform (LaMP) that serves Southeast Asia. The software will be able to alert stakeholders including customers on courier movements, offer estimated arrival times due to variety of factor such as traffic and weather conditions.

Wallonia Export & Investment Agency
(AWEX - Agence Wallonne à l'Exportation et aux Investissements étrangers)
Embassy of Belgium, #14-01 AXA Tower, 8 Shenton Way, 068811 Singapore
Tel.: +65 9271 3420
Email: singapore@awex-wallonia.com
Websites: www.investinwallonia.be; www.wallonia.sg

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**National Agencies and Programmes**

Multiple government agencies work together to push for AI developments in the country and we highlight their involvement below.

Going back to 2016, Government Technology Agency (GovTech) and Microsoft co-organised the inaugural Botfest 2016 which saw nine government agencies competed to generate ideas on usage of AI and machine learning to solve challenges in their domain areas.

The National Research Foundation (NRF) set up AI Singapore (AISG) to bring research institutions and start-ups in this field together back in 2017.

In 2018, AISG announced two new initiatives in partnership with Infocomm Media Development Authority (IMDA), targeting to enable 12,000 more people in acquiring AI knowledge. The announced AI for Everyone (AI4E) programme aims to teach the basics of the technology to 10,000 Singaporeans ranging from secondary students to working adults, while a more industry-centric AI for Industry (AI4I) programme targets about 2,000 working adults. The Government can be seen leading proactively through the Digital Government Blueprint released in the same year, where one of the key performance indicators was for all ministries and their related agencies to have at least one AI project by 2023.

Deputy Prime Minister and Minister for Finance Heng Swee Keat launched the National AI Strategy at the Singapore FinTech Festival in November 2019. The strategy focuses on five key areas – healthcare, security, smart estates, education and logistics. It aims to develop and deploy impactful AI solutions in these areas by 2030. The National AI Office (NAIO) under the Smart Nation and Digital Government Office was also established to set the national agenda for AI and catalyse efforts across research, industry, and government stakeholders to work on national AI priorities.

At the recent World Artificial Intelligence Conference (WAIC), Chng ZhenZhi, Director of the National AI Office explained further on how AI-related technology will be put to use in these five initial projects.

1. Logistics: e.g. intelligent freight planning

2. Municipal services: e.g. a chatbot for reporting local issues

3. Healthcare: e.g. applications include personalized risk scores to help with early detection

4. Education: e.g. creating personal syllabi personalized to each child's strengths

5. Border clearance: e.g. supporting completely automated immigration points

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**Private Sector & Collaborations**

There are notable private sector projects involving AI development and some of these are in collaborations with various government agencies. AI was used to improve business workflow processes across a broad spectrum of industries.

Microsoft's new regional headquarters hosts its first experience center worldwide where it showcases a confluence of technology and partners. It demonstrates a working model of the future workplaces where it is based on a foundation of cloud computing, data analytics and artificial intelligence. This new office incorporates AI enabled cameras for frictionless access to maintain secure spaces, smart lockers and IT vending machines that automates distribution of IT peripherals replacement for employees.

SAP had chosen Singapore for its global Innovation Center for Machine Learning, where they found the highest number of people with Machine Learning expertise in Singapore after looking internally. This came together after four to five years of working together with the Government, specifically the NRF and EDB. SAP also have a success story with Medical Research Insights (MRI) that its team of 10 in Singapore contributed using Machine Learning to help oncologists come up with personalized treatment for cancer patients. The research resulted in a new SAP business unit, Connect Health, which went on to have further research partnership with National Cancer Centre Singapore (NCCS) for cancer treatment and care.

In a joint project with IBM, the Maritime and Port Authority of Singapore (MPA) aimed to improve maritime and port operations to support the increasing growth of vessel traffic with the use of analytics based technologies.

National University of Singapore (NUS) has partnered GRAB to set up an AI laboratory, aiming to develop solutions for real-world challenges of urban transportation and leading to smarter cities in Southeast Asia.

A new set of guidelines, Singapore Smart Industry Readiness Index (SIRI), was launched by the Singapore Economic Development Board (EDB) in partnership with German manufacturing firm TUV SUD. The index serves as a diagnostic tool that companies can use to evaluate the state of their facilities and develop an Industry 4.0 transformation plan to build smart factories.

Jurong Innovation District was first announced in 2016 to integrate digitalisation and automation into manufacturing as with Industry 4.0 transformation. It is an advanced manufacturing hub housing research, innovation and production activities within one district.

It was also announced by Deputy Prime Minister Heng Swee Keat in October 2019 that JID would be welcoming 6 new entrants, ranging from industry giants to research instituitions such as German engineering firm Bosch Rexroth and Agency for Science, Technology and Research's (A*Star) Singapore Institute of Manufacturing Technology.

Siemens just opened its Advanced Manufacturing Transformation Centre in the JID in September 2020, to showcase digital solutions and house its first Additive Manufacturing Experience Centre outside Germany, where companies can experience the product line.

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**Education and Support for Individuals**

Singapore is making a lot of investments for the development of talents in AI capabilities. Other than the earlier mentioned AI4E and AI4I programs from AISG and IMDA, there is also an AI Apprenticeship Programme (AIAP) aimed to train fresh graduates with programming experience to become AI professionals.

It was also only recently announced that starting this year all new ITE students will be taking a module for basics of AI. ITE have also partnered with National Supercomputing Centre (NSCC) Singapore so that their students can leverage the power of high performance computing for use in applied AI learnings and projects.

Major local universities are also offering AI related degree and short-term courses. There are also various types of scholarship and fellowship programmes from AISG, IMDA, GOVTECH, SG Innovate and various universities that an individual could look into.

Programs for mid-career upgrade or switch are available either through government related agencies or private learning institutes such as General Assembly. Driven by the pandemic crisis, the Government has launched a $2 billion jobs and training package for affected workers. IBM is one of the companies who have signed up and they will train about 800 mid-career professionals over the year in AI and cyber security.

**Support for Businesses**

Under its AI for Business initiatives, IMDA has released open-source AI libraries to spur the growth and innovation of AI-related apps in Singapore. There is also a Digital Services Lab (DSL) that comprises an engineering team which includes coders, data scientists and other specialists to work with government agencies, learning and research institutes to deploy tech capabilities for the industry. DSL works with multiple industry partners to support them in their development and deployment of new market ready solutions.
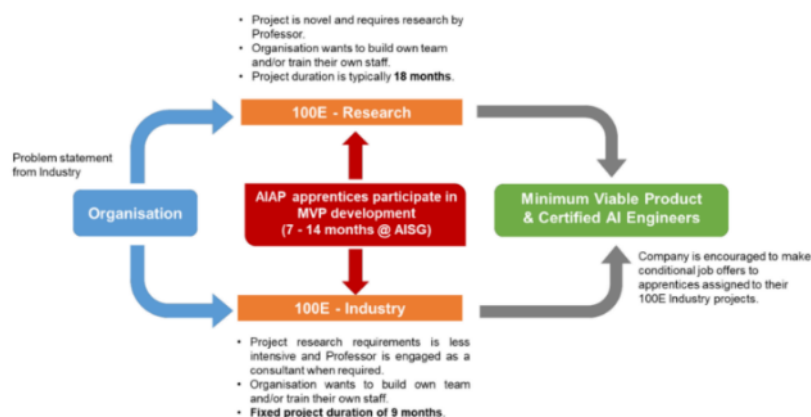


Seen in the chart above is the 100 Experiments (100E) – AI Singapore's flagship program to solve industries' AI problem statements and help them build their own AI teams.

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Embassy of Belgium, #14-01 AXA Tower, 8 Shenton Way, 068811 Singapore
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**Research Funding**

There are many funding opportunities available from multiple agencies for AI related researches, development and deployment – A*Star, AISG, SG Innovate, Enterprises Singapore (ESG), Monetary Authority of Singapore (MAS), and many others from different industry sectors. More funding opportunities can be expected due to increased adoption of digitalization and transformation to smart technology.

**Foreign Companies Participation**

While there are various ways to get support and funding for local companies, there are also opportunities for foreign companies to collaborate on joint projects and in the process take their business a step towards Singapore or even the Southeast Asia region.

ESG has in place various international co-innovation programmes from EUREKA, Germany, France, Israel and Shanghai.

There is A*STAR Collaborative Commerce Marketplace (ACCM) where companies could look for local partners such as for distributions or solution providers.

Intellectual Property Intermediary (IPI) offers an online marketplace where technology offers and needs are posted by both seekers and providers.

There are also ongoing national challenges from the Open Innovation Network (OIN) that are open to both local and international companies.

**Trade Events**

Singapore is host to a few major AI technology related trade events such as the Singapore Fintech Festival (SFF) x Singapore Week of Innovation & Technology (SWITCH), Connectech Asia and Industrial Transformation Asia-Pacific (ITAP).

Other than these mainly tech themed events, there are other industry specific events in Singapore such as Internationals Built Environment Week (IBEW) where AI could also be one of the key topics.

**Governance and Data Protection**

Singapore released its [Model Artificial Intelligence (AI) Governance Framework for public consultation, pilot adoption and feedback in January 2019](#). The framework is the first in Asia to provide detailed and readily implementable guidance to private sector organisations. It addresses key ethical and governance issues when deploying AI solutions. A [second edition was released on 21 January 2020](#).

Complementing the Model Framework is the [Implementation and Self-Assessment Guide for Organisations (ISAGO)](#), which was jointly developed by IMDA, Personal Data Protection Commission(PDPC) and World Economic Forum Centre. The ISAGO is intended to help organisations access the alignment of their AI governance practices with the Model Framework. It provides an extensive list of useful industry examples and practices.

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**Key Websites**

A*STAR AI, Analytics and Informatics ($AI^3$) Horizontal Technology Centre - www.a-star.edu.sg/About-A-STAR/horizontal-technology-centres/artificial-intelligence

AI Singapore - www.aisingapore.org

ConnecTechAsia - www.connectechasia.com

Enterprise Singapore - www.enterprisesg.gov.sg

Infocomm Media Development Authority (Model AI Governance Framework and ISAGO) - www.imda.gov.sg/infocomm-media-landscape/SGDigital/tech-pillars/Artificial-Intelligence

Intellectual Property Intermediary - www.ipi-singapore.org/

ITAP - www.industrial-transformation.com

Jurong Innovation District - https://estates.jtc.gov.sg/jid

Microsoft AI Research - www.microsoft.com/en-us/research/research-area/artificial-intelligence/

Monetary Authority of Singapore AI in Finance - www.mas.gov.sg/development/ai-in-finance

Nanyang Technological University Data Science & AI Research Centre - https://dsair.ntu.edu.sg/

National AI Strategy - www.smartnation.gov.sg/why-Smart-Nation/NationalAIStrategy

National Innovation Challenge - www.nrf.gov.sg/programmes/national-innovation-challenges

National University of Singapore AI Department - www.comp.nus.edu.sg/about/depts/cs/research/ai/

National University of Singapore AI Lab – https://ai.nus.edu.sg/

NUS – GRAB AI Lab - http://ids.nus.edu.sg/Grab-NUS-AI-Lab.html

SAP Innovation Center Network - https://icn.sap.com/

SFF X SWITCH - www.sffxswitch.com

SGInnovate - www.sginnovate.com

Siemens Healthineers AI - www.siemens-healthineers.com/en-sg/artificial-intelligence

Singapore Management University Centre for AI and Data Governance - https://caidg.smu.edu.sg/

Singapore University of Technology and Design AI Faculty - https://dai.sutd.edu.sg/

Smart Industry Readiness Index (SIRI) – www.siri.gov.sg

SMART Nation - www.smartnation.gov.sg