Industry Bytes

Artificial Intelligence in Southeast Asia

Artificial Intelligence (AI) is becoming a key driving force for next generation innovation, and developers in Southeast Asia are increasingly competing to uncover new approaches and broaden its reach.

What is AI?

AI is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

> *More than 24,000 AI-related papers have been published in Southeast Asia, with Singapore, Malaysia and Thailand accounting for 86% of output.*

AI Research and Innovation in Southeast Asia

The term AI was coined as early as 1956, but it was not until the advent of computing technology in the 1990s that its true potential started to be realized.

Southeast Asia is one region that has invested heavily in AI and as a result boasts huge growth in its AI capabilities and understanding. By recognizing AI's capacity to influence both business and social settings, the region has published a diverse range of AI-related research papers and patents in recent years. Subject matters include not just computer algorithms, but also semiconductors, robotics, medicine, and biochemistry, thus highlighting the versatility of AI and its potential applications to impact everyday lives.

Of course, there are industries that can be identified as vanguards in the AI community. Our analytics recognize that between 1997-2016 patenting activity in Singapore was dominated by the fields of semi-conductors, image recognition and speech recognition.

AI Research

By evaluating the input of academia in the sector we can create an overview of AI thought leadership within the region. *InCites*, which is built on the foundation of our *Web of Science* product, uses customized citation data, global metrics and multidimensional profiles on the leading research institutions to achieve true insight.

Our data identified that 24,548 AI-related papers have been published by Southeast Asian countries, with the earliest paper dated 1985. Once again Singapore is acknowledged as a prolific contributor within the region, producing 10,274 publications, with Malaysia (8,416) and Thailand (3,648) following behind. The output of these three countries alone accounted for 86% of the total for the region.

In measuring research excellence, it is important to look at the top performing papers. As of September 2017, 161 Highly Cited papers were published from Southeast Asian countries. Singapore contributed 97 of these, and Malaysia follows closely with 52. In terms of overall citation impact of these countries, Singapore is the only country that has performed above the global average.

Our analytics also identified notable organizations in the region that perform AI research, namely National University of Singapore (NUS), Nanyang Technological University, Singapore (NTU), University of Malaya (UM) and University of Technology, Malaysia (UTM).

Research performance of Southeast Asian countries

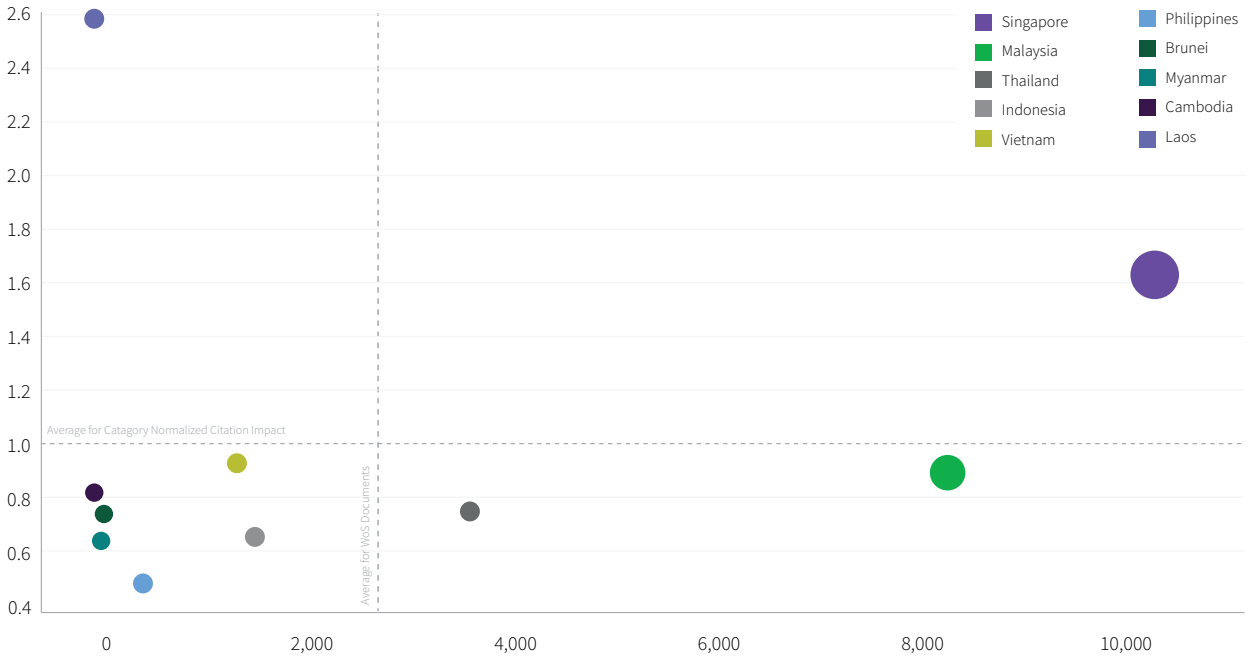

Figure 1: x-axis shows the number of papers, y-axis shows the Category Normalized Citation Impact and the size of each bubble represents the number of Highly Cited Papers published by each country.

Source: *InCites* Benchmarking & Analytics by *Clarivate Analytics*

Who is leading the AI revolution?

Derwent Innovation provides us with trusted patent data and tools to monitor trends and competitive landscapes within the sphere of AI. Our findings indicate an overall increase in the number of AI-specific patents published in Southeast Asia during the past 20 years, with consistent growth since 2013.

> *Our findings from DWPI indicate an overall increase in the number of AI-specific patents published in Southeast Asia during the past 20 years.*

AI-related Research Papers Published by Top 10 Southeast Asian Universities

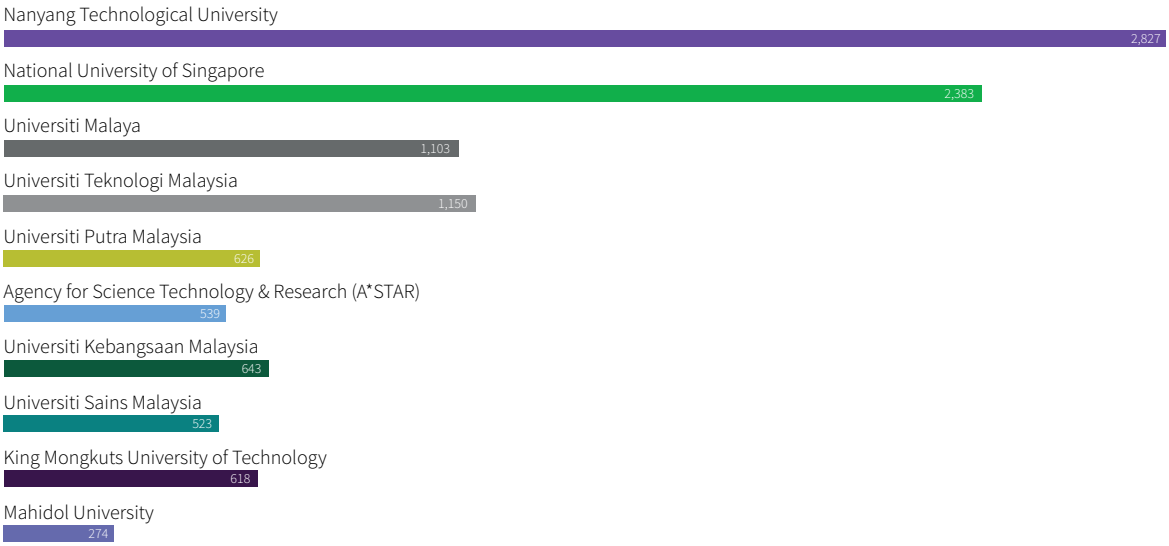

Figure 2: Number of AI-related papers published by top 10 Southeast Asian universities from 2007 to 2016. The universities are sorted according to the number of citations they received in this period.

Source: *InCites* Benchmarking & Analytics by *Clarivate Analytics*

Patents Published in Southeast Asia

By country, Singapore remains the leading light in the region, accounting for 77% of Southeast Asia's total patent publications. Using *Derwent Innovation*, we can identify the specific companies investing in the AI market. Established brands, Johnson & Johnson, Applied Materials and Softbank Robotics are at the forefront of the sector, dominating published patents in the country.

Country Snapshot of the Patent Landscape in Southeast Asia

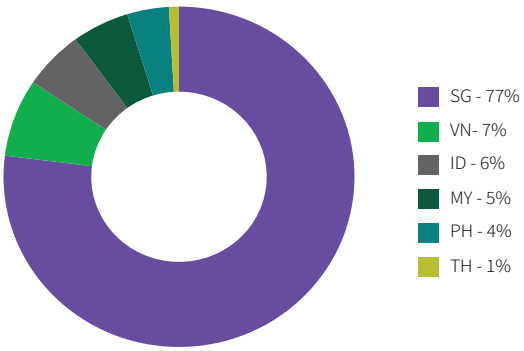

Figure 3: Artificial Intelligence patent filing country (*Derwent Innovation*, 1997~2016)

Key observations:

- Southeast Asia continues to expand its patenting output with consistent growth since 2013.
- More than 24,000 AI-related papers have been published in the Southeast Asia region, with Singapore, Malaysia and Thailand accounting for 86% of output.
- Of 161 Highly Cited AI papers in Southeast Asia, 97 derived from Singapore. Singapore is the only country that has outperformed the global average.
- Singapore is leading the region' s output, accounting for 77% of its patent publications and more than 40% of its AI-related research literature.
- Between 1997-2016 patenting activity in Singapore was dominated by the innovation surrounding semi-conductors, image recognition and speech recognition.

What's next for AI?

As the race to capitalize on the escalating capabilities of AI gains pace, many Asian countries are beginning to challenge the United States' dominance in the field. Singapore, in particular, is recognized as making great leaps in its AI learning and innovation.

In fact, in Singapore communication specialist SingTel is collaborating with Nanyang Technological University and the Agency for Science, Technology and Research (A*STAR) to develop AI, data analytics, robotics and IoT to support the country's transformation into a Smart Nation and assist its digital economy. The Smart Nation program, which aims to empower citizens and enrich their lives via technological advancement is, by its very nature, indicative of Singapore's commitment to emerging technology.

Technology Analysis of the Patent Landscape in Southeast Asia

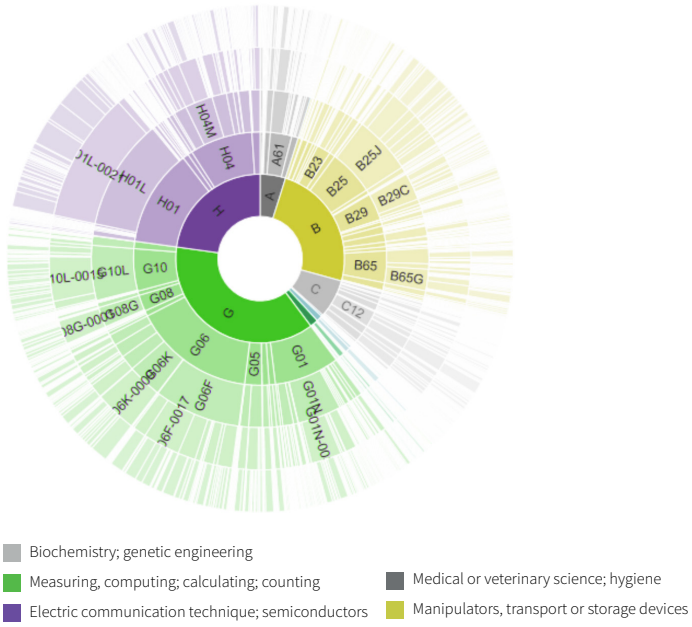

Figure 4: Technology analysis of the patents in Artificial Intelligence by IPC classification (*Derwent Innovation*, 1997~2016)

About Clarivate Analytics

Clarivate Analytics is the global leader in providing trusted insights and analytics to accelerate the pace of innovation. Building on a heritage going back more than a century and a half, we have built some of the most trusted brands across the innovation lifecycle, including *Web of Science*, *Cortellis*, *Derwent*, *CompuMark, MarkMonitor* and *Techstreet*. Today, *Clarivate Analytics* is a new and independent company on a bold entrepreneurial mission to help our clients radically reduce the time from new ideas to life-changing innovations.

For more information, visit:
clarivate.com

North America
Philadelphia: +1 800 336 4474
+1 215 386 0100

Latin America
Brazil: +55 11 8370 9845
Other countries: +1 215 823 5674

Europe, Middle East and Africa
London: +44 207 433 4000

Asia Pacific
Singapore : +65 6775 5088
Tokyo: +81 3 5218 6500

clarivate.com

01.2018
© 2018 Clarivate Analytics

Web of Science
Trust the difference

Clarivate Analytics