GLOBAL

Universities 'key to bridging global digital divide'

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Universities will be key in bridging new emerging 'digital divides' within countries and globally in the era of innovation driven by artificial intelligence and other new technologies, a conference organised by the Association of Pacific Rim Universities (APRU) heard last week.

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'Our Digital Future in a Divided World', the APRU conference held in Taipei, Taiwan, from 24-26 June, was attended by over 100 delegates, almost 30 of them presidents of Pacific Rim universities, which includes Australasia, Asia, North and South America.

Universities will have a key role in building more cross-disciplinary research to ensure the benefits of artificial intelligence can reach all populations and not just certain groups, the conference heard.

Cross-border collaboration in research and with industry, governments and policy-makers will also become more important to avoid the emergence of global haves and have-nots as technology breakthroughs are dominated by less than a dozen giant multinational companies with the power to harness university research, the funds to commercialise it, and the ability to acquire massive data sets that are the raw material of artificial intelligence, according to Pascale Fung, director of the Center for Artificial Intelligence Research at Hong Kong University of Science and Technology.

While a great deal is still unknown about how artificial intelligence (AI) and other technologies will shape the future, delegates agreed there will be significant disruption. At the same time different countries will adapt at a different pace to emerging research breakthroughs and their commercialisation or use in informing public policy.

"Digital technology is changing the innovation and value-added structure of every industry, even the most traditional ones," said Peter Cowhey, professor of communications and technology policy at the University of California, San Diego in the United States.

"The nature of digital technology is to create giant firms with economies of scale and scope at a global level," said Cowhey, co-author of the book *Digital DNA: Disruption and the challenges for global governance*.

The two global 'AI superpowers', the United States and China, with their huge technology giants such as Google, Facebook and Amazon in the US and Tencent, Baidu and Alibaba in China, "stand to gain 70% of the profits of AI", according to Fung, who notes it will fuel an "economic divide between these countries and the rest of the world".

"The companies in these two countries are able to harness their huge databases of users to feed their AI algorithms to therefore improve their engines and AI services in a way that no other countries can," Fung told the conference.

This is already becoming evident in the field of medicine which has benefited from AI-powered genetic technologies and the development of 'smart drugs'.

For example, lung cancer is the number one cause of mortality, including in non-smokers, in East Asia. According to Yang Pan-Chyr, professor of internal medicine at National Taiwan University and a former president of that institution, the prevalence of the genetic marker for this disease in the East Asian region is 55-60%, compared to 15% in Caucasian peoples whose genetic mutation is more smoking-related. Hence data and research have to be conducted separately and at scale.

The development of targeted therapies, while holding huge promise for the treatment of diseases like cancer, depends on huge datasets of different ethnic groups and their specific genetic and disease patterns.

Although the cost of sequencing a genome has gone from US$100 million just over a decade ago to around US$1,000 now, transforming university research in the field of genetics, targeted treatments are developed for different ethnic and risk groups, and some groups – particularly smaller distinct ethnic groups – could be left behind in the development of such treatments.

"With precision medicine all human beings are not equal because of the genetic background, the environment, even the same patient with the same diagnosis," Yang told the conference.

A great deal of money is being invested in machine learning, a branch of AI where the software adapts autonomously to changing inputs. But Fung noted that "it's impossible for machine learning to do anything with a data size smaller than 100,000 patients", as well as "data from healthy people for the machine to learn to differentiate the two".

Sequencing the cancer genome of 100,000 cancer patients would require around US$10 million at today's prices and is a logistical nightmare as researchers and hospitals would need to pool their data. This is already being hampered by separate developments in the regulatory environment related to big data.

The emerging regulatory divide

A new 'digital divide' is emerging in the area of data and AI governance and includes privacy and security regulations, said Deborah Elms, executive director of the Asian Trade Centre in Singapore, which monitors trade trends globally and in the region.

Such rules create barriers between those with digital technologies and significant databases and those without.

"The flow of data across the world has economic stakes," Cowhey said. "We see growing barriers to the movement and location of data networks on a global scale."

Cowhey notes that the European Union's General Data Protection Regulation (GDPR) on data privacy, including the use outside the EU of data generated within the EU, regulates private companies and disadvantages smaller companies which would otherwise lower costs of gathering data. "It could inhibit innovation," Cowhey said.

Asia currently has no particular rules on privacy "but that could be coming very fast", said Elms, referring to rules being prepared in Japan and other countries.

There are also differing rules related to data security that could "rapidly undermine all that opportunity and promise you all see", she

said, adding that government regulators in key Asian countries "are not going to allow health data to move, particularly across borders".

"So if students and universities have any hope of sitting together and collaborating on the movement and sharing of patient data and having health data move around, forget it," she said, adding that often governments have no idea of the potential impact of data policies on research.

For example, China this year decreed that all data gathered by companies and institutions from China, including by foreign companies, must be held on servers within China.

Chang-Chuan Chan, dean of the College of Public Health at National Taiwan University, said: "We are way behind using data across countries and that is very bad for improving health.

"In sharing digital health data, we know there is a global divide; Africa is way behind," he added.

Emerging 'research divide'

Cowhey refers to an emerging digital divide in research where only the biggest, wealthiest and most prestigious research universities can collaborate to pool data or accumulate their own big databases for AI research.

For an equitable world economy "we cannot have the capabilities of the next generation of research networks confined to a relatively small number of research universities", he pointed out.

There were many calls for collaboration to bridge the emerging gaps brought about by digital technologies, not just between universities, but also to work with governments and companies to design policies. But others went beyond that, saying the mission of universities needs to include a much starker commitment to solving problems on a global scale.

"Universities are important assets of the whole of humankind, regardless of countries," said Seiichi Matsuo, president of Nagoya University, Japan. "In the era of the digital revolution we should reconsider the role of the university."

"We need to consider whether we regard digital science as one new area, or a wider discipline that includes a whole science" that can also create new value and benefit society, he said.

APRU is currently collaborating with Google in its 'AI for Everyone' project to address such global and societal implications of new technologies, including on the future of work and aging societies.

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Photograph: APRU speaker Santa J Ono, vice-chancellor of the University of British Columbia

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