Science, Technology, Education and Health News from China

Number 159 – September 2017

Please note that the previous newsletters can be downloaded from the website of the Embassy of Switzerland in China: www.eda.admin.ch/beijing. To subscribe/unsubscribe or send us your comments, please write an email with the corresponding subject to yijun.wu@eda.admin.ch.

Introduction

The story of the month covers China’s concentration on sci-tech innovation. In science and technology, China formulates national smart car industry strategy. BeiDou navigation will cover Belt and Road countries by 2018. China plans to widely promote ethanol gasoline. Chinese spending on innovation, technology is growing twice as fast as in the US, fuelled by cloud services. China's supersonic 'flying train' would race at 4,000kmph. Beijing is to improve urban planning using big data. In health, Beijing issues blueprint to boost life expectancy. In education, China lists 42 colleges it wants to make ‘world class’ universities.

Contents

Story of the Month ........................................................................................................................................2
1. China formulates national smart car industry strategy ..............................................................................4
2. BeiDou navigation to cover Belt and Road countries by 2018 .................................................................4
3. China plans to widely promote ethanol gasoline ......................................................................................5
4. Chinese spending on innovation, technology growing twice as fast as in the US .................................6
5. Faster than hyperloop: China's supersonic ‘flying train’ would race at 4,000kmph .......................................7
6. Beijing issues blueprint to boost life expectancy .......................................................................................8
7. China lists 42 colleges it wants to make ‘world class’ universities .............................................................9
8. Beijing to improve urban planning using big data ......................................................................................10

Contact

Nektarios PALASKAS
Science and Technology Counsellor
Head of Science, Technology and Education Section
Embassy of Switzerland in the People’s Republic of China
Tel: +86 10 8532 8849
Email: nektarios.palaskas@eda.admin.ch
www.eda.admin.ch/beijing

We invite you to follow the Swiss Embassy on Weibo! http://e.weibo.com/swissembassy
We also invite you to follow Swissnex on Weibo! http://e.weibo.com/swissnexchina
Story of the Month

China concentrates on sci-tech innovation

(Xinhua, 18-9-2017)

Wang Junfeng and seven fellow Chinese researchers at Harvard Medical School gave up life in the United States to move to a small island on the outskirts of Hefei, capital of east China's Anhui Province.

"Science Island" is home to more than 10 research institutes and 1,000 top researchers - and an ideal place to focus on their research, they said.

In the 1990s and early 21st Century, many Chinese college students flocked to developed countries to pursue studies and professions with the help of more advanced research equipment.

In the past two decades, as its economy blossomed, China has attached greater importance to science and technology, making it an increasingly attractive base for researchers.

Wang said he came to the island because advanced experimental equipment on steady high magnetic fields was to be built there. It would make China the fifth country in the world to have such equipment.

Kuang Guangli, leader of the project, said the team has already made an impact in international academic circles and that the members have made greater academic achievements here than they did in Harvard.

Experience in China over almost a century has shown that it is necessary to mobilize efforts and resources to concentrate on major tasks. Now the experience is being applied to scientific and technological innovation.

Innovation is at the heart of China's 13th Five-Year Plan (2016-2020), which sets the aims to become an "innovation nation" by 2020, an international leader in innovation by 2030, and a world powerhouse in scientific and technological innovation by 2050.

At the forefront of fundamental research and strategic key technologies in fields such as space, deep sea, super computers and quantum communication, China has shown determination and speed, capturing world attention.

Over the past year, Chinese have been inspired by landmark achievements in science and technology.

Chinese scientists completed all the experiments designed for the world's first quantum satellite a year ahead of schedule, laying the foundation for a hack-proof global quantum communication network.

China's supercomputer, Sunway TaihuLight, was crowned the world's fastest computer at both the 2016 and 2017 International Supercomputing Conferences held in Frankfurt, Germany.

In early July, China made breakthroughs in the search for alternative clean energy sources by completing a 60-day trial of mining gas hydrates, commonly known as combustible ice, in the South China Sea.

"Combustible ice is considered a strategic alternative to oil and natural gas," China Geological Survey Bureau's deputy director Li Jinfa said. "The whole world is looking towards it."

In mid-June, China launched its first X-ray space telescope to observe black holes, pulsars and gamma-ray bursts.

"I am really impressed with how China is developing its scientific space program," said Arvind Parmar, head of the Scientific Support Office in the Science Directorate of European Space Agency (ESA). "The recent launches of the Dark Matter Particle Explorer and the Quantum Experiments at Space Scale missions highlight China's capabilities and commitment to science as does the range of missions under study for future launch opportunities."

China took a major step toward becoming a global aviation powerhouse as its homegrown large passenger plane, the C919, took to the sky on May 5. The flight makes China the fourth jumbo jet producer after the United States, Western Europe and Russia.
Last year, China launched its first space lab, Tiangong-2, and sent the Shenzhou-11 manned spaceship to dock with it. Two Chinese astronauts stayed in Tiangong-2 for a month, setting a new Chinese record for space residency.

In April this year, China launched its first cargo spacecraft, Tianzhou-1, to dock with Tiangong-2, to test space refueling technology, laying the foundation for building the country's space station.

This string of achievements shows the innovation-driven development strategy is paying dividends.

A report jointly issued by the National Center for Science and Technology Evaluation and Clarivate Analytics said China's expenditure on research and development accounted for 1.42 percent of GDP in 2006 and the ratio increased to 2.1 percent in 2016.

In 2016, China had over 1.1 million patents for inventions, ranking the third after the United States and Japan.

The latest Global Innovation Index showed China rose three places to 22nd on the list of the world's most innovative nations in 2017, the only middle-income country to join the top 25 innovative economies.

In the 13th Five-Year Plan, the evolution of the universe was given pride of place on the scientific research list. It was followed by material structure, the origins of life, and neurology.

"Fundamental questions, like this, have the power to influence solutions to some of the most prominent problems faced by society and the world at large," said Han Song, a Chinese sci-fi writer.

With economic pressures forecast to continue, China is committed to fostering new development momentum through innovation.

China has been striving to upgrade its industrial structure and shift its economy to a growth model that draws strength from innovation as its competitive advantages in low labor and raw material costs are eroded.

Zhang Xinmin, a researcher with the Institute of High Energy Physics of the Chinese Academy of Sciences (CAS), said China is starting to value basic science.

Zhang, who studies primordial gravitational waves in Ngari, southwest China's Tibet Autonomous Region, said research is the origin of innovation. Without it, innovation on a large scale is unachievable.

Studying the evolution of the universe seems unrelated to more pressing issues, such as lifting tens of millions of people out of poverty by 2020.

However, Hugo Award-winning author Liu Cixin said many advances rely on science and technology.

Wu Ji, director of the CAS National Space Science Center, said that since China's first satellite was launched into space nearly 50 years ago, a number of communications, remote sensing and navigation satellites have followed.

"If China wants to be a strong global nation, it should not only care about immediate interests, but also contribute to humankind. Only that can win China the real international respect," Wu said.

China will produce another five or six scientific satellites by 2020, which will aid research into black holes, dark matter, quantum physics and the space environment.

"If you want to innovate, you must have knowledge of the sciences. Space science is inseparable from China's innovation-driven development," said Wu.

A Chinese probe is expected to land on Mars in 2021.

"Exploring the red planet and deep space will mean that China can establish itself as a scientific and technological leader. The knock-on effect is that inventions and independent intellectual property rights will surge, and, as a result, China's core competence will increase, pushing development in other industries," said Jia Yang, deputy chief designer of China's Mars rover.
"Although China still lags behind scientifically-advanced countries in some areas, we have made great strides in basic science and space science. As long as we are diligent, in the near future we will achieve great success," said Chang Jin, vice director of the CAS Purple Mountain Observatory.

(http://news.xinhuanet.com/english/2017-09/18/c_136618501.htm)

News

1. China formulates national smart car industry strategy
   (Xinhua, 10-9-2017)

China is working on a national strategy on smart cars, and mulls banning production and sales of fossil fuel cars, according to policy makers attending a forum on automotive industry development.

With the global auto industry leaning toward intelligent and electric vehicles, work has begun on a timetable to ban manufacture and sales of traditional energy cars, according to Xin Guobin, vice minister of industry and information technology.

He told a forum in Tianjin that auto-makers should have a thorough understanding of the situation and readjust their strategies.

The Ministry of Industry and Information Technology (MIIT) will work out the timetable, Xin said.

Producing and selling more than 28 million vehicles in 2016, the eighth year as the world's biggest producer and manufacturer, China's auto industry contributed at least one tenth of total retail sales of consumer goods.

Also the largest producer and market for new energy vehicles, more than 500,000 of them were built and sold last year. There are more than 1 million new energy vehicles on the road, or half of the world total.

To encourage development of new energy vehicles, subsidies of as much as half of the original price are available, but in the long term, such subsidies may lead to blind expansion by auto makers, said Song Qiuling, a deputy section chief from the Ministry of Finance, at the forum.

Subsidies will gradually be reduced and a new energy credit policy introduced, according to Song.

On June 13, the MIIT released a policy document for public opinion on fuel consumption control and new energy vehicle credits, requiring auto-makers to meet a new energy credit ratio of 8 percent in 2018, 10 percent in 2019, and 12 percent in 2020, to ease pressure on energy and environment. Xin confirmed that the policy would be put into effect in the near future.

He said the time period up to 2025 will be critical for the auto industry. Energy-saving and emission reduction requirements are increasing, the development of new energy vehicles is becoming more technically demanding and intelligent vehicles are expected to have a profound effect on the industry.

(http://news.xinhuanet.com/english/2017-09/10/c_136598784.htm)

2. BeiDou navigation to cover Belt and Road countries by 2018
   (Xinhua, 13-9-2017)

China's home-grown BeiDou Navigation Satellite System will cover countries and regions along the Belt and Road by 2018, said an official at the China National Space Administration (CNSA) on 11 September.
Wu Yanhua, deputy head of the CNSA, said the plan was based on the satellite system's improving regional services, which had been cooperating with various countries and regional organizations.

China now has 17 communication satellites in orbit, with nearly 300 transponders, and the country's satellite communication services cover over 30 countries and regions, said Wu, who is also deputy head of the State Administration for Science, Technology and Industry for National Defence.

Since the launch of APSTAR-9, one of China's advanced communication satellites in October 2015, China's satellite communication services have also covered most areas along the 21st Century Maritime Silk Road, he said.

As China's leading satellite navigation system, BeiDou will see six to eight of its satellites sent into orbit in the second half of 2017 and is set to form a complete global satellite navigation system by 2020.

(http://news.xinhuanet.com/english/2017-09/13/c_136606478.htm)

3. China plans to widely promote ethanol gasoline

The Chinese government plans to expand use of ethanol in gasoline as energy by 2020, a move to improve the environment and stimulate the development of the country's agriculture.

The plan was issued and published by 15 government departments, including the National Energy Administration and the National Development and Reform Commission on 13 September.

China is to realize mass production of cellulosic ethanol, and improve the technology, equipment and production of biological liquid fuel to reach the world's top level by 2025, according to the plan.

The ethanol fuel will effectively reduce the vehicles' carbon and particulate matter emissions, which will help reduce air pollution.

One ton of ethanol can help reduce 34 percent of emissions in its life cycle, said Le Youhua from China International Engineering Consulting Corporation, the China National Radio reported.

Zhou Dadi, vice director of the China Energy Research Society with the National Development and Reform Commission, told the Global Times on 13 September that developing bio-fuel ethanol will also help change China's energy structure and reduce reliance on petroleum import.

According to a long-term development plan on renewable energy released by the National Development and Reform Commission, China will consume about 10 million tons of bio-fuel ethanol by 2020.

The cost of making ethanol fuel is comparatively low, which is simply made by redundant corn and straw.

Moreover, developing bio-fuel ethanol can help improve the country's regulation of the grain market, as it builds a long-term, stable and controllable processing channel for primary agricultural products.

Le said that producing ethanol fuel is an effective way of dealing with redundant agricultural products, and "We can also use cassava as a raw material if the other agricultural products are in shortage," Le said.

However, the development and promotion of bio-fuel ethanol in the country also faces challenges, according to Zhou, because the technologies to transform corn or straw into ethanol need to be further developed as the current conversion rate is only 20 percent to 30 percent.

Another challenge is to supervise grain cultivation as more people might seize land to grow grains for ethanol, which may lead to huge grain waste in the country, according to Zhou.

(http://www.globaltimes.cn/content/1066321.shtml)
Corporate spending on innovation and technology has been growing twice as fast in China than in the US over the past two years, fuelled by accelerating migration to cloud services, according to industry watchers.

In a latest research report released by US investment bank Morgan Stanley, information technology (IT) spending by Chinese companies is projected to grow 11.2 per cent this year, more than double their American counterparts’ 5.3 per cent rise.

The study, led by equity analyst Grace Chen, surveyed 126 chief information officers (CIO) in China and an undisclosed number of CIOs in the States.

While the scales of IT spending in both countries were not revealed, the faster growth by Chinese is clear, and is in line with figures showing data collection levels the year before.

Chinese companies spent 10.2 per cent more on technology last year, against 4.4 per cent in the US.

The findings also show Chinese cloud and CRM (customer relationship management) software spending growing at its fastest click in three years, adding the winners of such acceleration are the “leading public cloud vendors, and select semi [conductor] suppliers”.

The group of analysts name AliCloud and Tencent as the industry leaders in public cloud, and among the foreign players, IBM outshine other competitors.

“Our survey shows more than 30 per cent of CIOs have adopted Alicloud, and that China will maintain a similar leading share over the next three years, echoing our positive view,” the Morgan Stanley analysts said.

AliCloud's parent company Alibaba owns the South China Morning Post.

“What surprised us most, was CIO’s optimism about Tencent and Huawei in public cloud: Tencent ranks second with a 15 per cent share predicted to rise to 23 per cent within three year,” they added.

Katy Huberts, an equity analyst at the firm, said: “Our survey shows that IBM, which is in partnership with Wanda, stands out in public cloud ahead of Amazon Web Services (AWS) and Azure.”

Morgan Stanley also noted Huawei, which trails AliCloud and Tencent in public cloud, tops its competitors in private cloud, a result of Huawei's competitive advantage in having a hardware business.

Public clouds are typically applications and storage made available on the internet as services for all companies. In contrast, private clouds are proprietary data centres tailored specifically for one company.

In China, those companies interviewed said about 34 per cent of their workload is handled using the cloud.

The analysts said that figure will be bumped up to 53 per cent by the end of 2020, and more specifically, the percentage of workload on the public cloud is expected to rise from 20 per cent to 29 per cent, during the same timespan.

However, this still trails behind cloud adoption by US companies, however, which currently use it for 34 per cent of their workload and by the end of 2020, that'll reach 59 per cent.

Gordon Orr, senior adviser to McKinsey China, echoed Morgan Stanley’s finding, that companies are increasingly spending more on technology, particularly cloud.

“Private-sector corporate investment will accelerate this year, recovering from the low levels of 2016. Lower real interest rates will stimulate investment in productivity-enhancing technologies, such as robots and cloud-based services,” Orr wrote in a commentary.
A separate analysis by McKinsey partner Yougang Chen, chimes against, that Chinese firms have been increasing digital engagement in recent years.

His report says domestic mainland companies are "investing heavily in the building blocks of the internet economy: cloud computing, wireless communications, new digital platforms, big data analytics".

According to statistics platform Statista, the size of the public cloud as a service market in China is expected to be valued at US$2.4 billion this year, up from US$1.8 billion in 2015, and then to grow to US$3.8 billion by 2020.

However, as cloud services continue to expand, companies providing more traditional IT and content delivery networks (CDNs) will face serious disruption to their business models.

"Alicloud's success is already weighing on corporate IT vendors in China, similar to how AWS has challenged US IT suppliers," Morgan Stanley analysts said.

"In China, margins for traditional server makers, (such as Lenovo, Inspur) began to soften in 2016."

That shift in the industry, meanwhile, will present opportunities for a select group of semi-conductor suppliers.

“The migration to solid state drives and the increasing focus on cloud computing are going to benefit several semiconductors companies, including Silicon Motion, TSMC and Samsung Electronics," Morgan Stanley predicts.

Its equity analyst Robert Lin wrote in June that AliCloud had 500,000 paying clients, including half of the top 35 Chinese "unicorn" internet companies – start-up firms with a US$1 billion valuation, funded either publicly or by private investment.

Philbert Shih, managing director at Canadian firm Structure Research, in June was also projecting substantial growth for AliCloud “that would already be at historical record highs for the cloud industry”.

Launched a decade ago, Amazon Web Services' calendar year 2020 revenue is projected to hit US$75.41 billion.


But Morgan Stanley is even more aggressive, suggesting a US$8.72 billion revenue by 2020, which compares significantly with the US$7.88 billion posted by Amazon Web Services last year.

(http://www.scmp.com/business/companies/article/2111376/chinese-spending-innovation-technology-growing-twice-fast-us)

5. Faster than hyperloop: China’s supersonic ‘flying train’ would race at 4,000kmph

(International Business Times, 01-9-2017)

China’s top aerospace contractor has disclosed plans to develop ‘flying trains’ – a new supersonic transport system which in theory would be faster than the proposed hyperloop system.

The concept of ‘ultra-speed flying trains’ might seem a bit far-fetched, or even hypothetical, but China Aerospace Science and Industry Corporation (CASIC) has started the groundwork for the project. According to a 30 August announcement from Liu Shiquan, deputy general manager of the state-run contractor, the next-generation of trains would achieve supersonic ‘near-ground flights’, going up to a whopping 4,000kmph.

That’s thrice the speed of sound (1,225 kmph), or five times faster than most commercial planes and 10 times faster than most high-speed bullet trains. The transport system would be way faster than the proposed hyperloop system, which is envisioned to travel at speeds of up to 1,200kmph. Among other major benefits, CNS, a state-run media outlet, says, the ‘flying train’ would not be affected by weather and run seamlessly without using fossil energy.
CASIC's system could pose some serious competition to hyperloop, but importantly, it would work on the same idea – magnetic levitation in a near-vacuum tube. Imagine something like a Maglev achieving supersonic near-ground flight in a tube. The contractor claims the ambitious transit-system would be the first to go supersonic.

The contractor has started research work for the new transport system. The train will be developed in three stages, first achieving speeds up to 1,000kmph in cities, then 2,000kmph in megacity clusters and finally 4,000kmph for countries connected via China's One Belt, One Road infrastructure.

The team dedicated to the 'flying trains' has partnered with some 20 research institutes and owns over 200 patents for the project. A number of safeguards to ensure the safety of passengers are to be taken. Mao Kai, chief designer of the system, notes the train will follow a slow acceleration approach – slower than a plane taking-off to keep passengers safe in the vehicle. He did not mention the timeline for the project.

(https://www.ibtimes.co.uk/faster-hyperloop-chinas-supersonic-flying-train-would-race-4000kmph-1637605)

6. Beijing issues blueprint to boost life expectancy

(China Daily, 22-9-2017)

Beijing released the "Healthy Beijing 2030" blueprint recently, aiming to increasing Beijing residents' average life expectancy to 83.4 years old in 14 years, up from 82 years old last year.

The blueprint on health development of next 14 years includes 10 chapters spanning guidance on health literacy, psychological health improvement, healthy living environment management and health care industry development to secure better living standard and medical care for the citizens.

The "Healthy Beijing 2030" plan has 15 additional criteria on the basis of 13 health indexes included in "Healthy China 2030", covering the annual concentration of PM 2.5, population of taking public transportation, and qualification rate of drug samples.

The health blueprint is set to control mortality of infants and children under 5 years old within 3‰ and 4‰ while the maternal death is eight out of one hundred thousand.

The plan also aims to improve citizens' health literacy to 45% percent by 2030 by promoting health knowledge, healthy lifestyle and behaviors.

Lei Haichao, director of Beijing municipal commission of health and family planning, said that, "The health literacy is an important measurement. The health literacy of citizens in Beijing has reached 28 degree in 2015, ranking first in China but it still remains low compared with other cities of the world."

"It should be emphasized that health is the personal treasure and responsibility. While environment and health care conditions take effect on personal health, genetic factors and personal behavior are principal to good health condition, it is important to raise citizens' awareness on health care," said Lei.

Health care services and environment will be enhanced according to the health plan. Health care industry is expected to increase to 1.6 trillion yuan in 2030 to create a batch of health care suppliers with strong creativity and competitiveness.

Cheng Si contributed to this story.

(http://www.chinadaily.com.cn/china/2017-09/22/content_32347913.htm)
7. China lists 42 colleges it wants to make ‘world class’ universities

China has published a list of 42 colleges it wants to turn into world class universities in the coming decades as it attempts to create a higher education sector that matches its increasing economic power.

Only two mainland Chinese colleges are currently in the top 100 for all four main global rankings for the world’s top universities, Peking University and Tsinghua University in Beijing.

The initiative also aims to ensure that 95 colleges in China will be global centres of excellence for specific disciplines.

Many mainland Chinese students opt to study overseas, with the perception that they will get a better standard of education abroad.

The list of universities was published on 21 September in a joint statement issued by the education and finance ministries, plus the government’s economic planning agency, the National Development and Reform Commission.

The government announced a blueprint last year on how to turn some of its colleges into world-class universities, with the colleges making the list getting extra financial support from the government.

Experts, however, have questioned whether the initiative will work.

Chu Zhaohui, a researcher at the National Institute of Education Sciences, said there was no major difference between the latest list and two similar initiatives launched in the 1990s.

More than 110 universities were included in the “211 project” and 39 in the “985 project” to boost China’s higher education institutions during the tenure of former Chinese president Jiang Zemin.

“Two decades have passed and we’re only sure we have improved in terms of quantity, but there’s been much controversy over quality,” Chu said.

“Many organisations have claimed that we’ve published a lot more papers in international publications, but we are not so sure when it comes to the people we’ve nurtured – how competent they are and what academic levels they’re at,” he said.

Wu Zunmin, a professor at Shanghai’s East China Normal University, told the South China Morning Post after the launch of the scheme last year that an injection of resources was welcome, but other factors needed to be addressed to produce world-class universities.

“It’s easy to give money for a hardware facelift, but it’s difficult to revive the atmosphere of academic freedom, focusing on academic studies and pursuing truth,” Wu said. “Currently our universities are utilitarian.”

Yuan Lanfeng, a scientist at the University of Science and Technology of China in Anhui province, was more positive after the announcement of the list of universities to be developed.

“Any plan is beneficial as long as it supplies more resources to universities and colleges, whether in terms of people or money. Otherwise, how [do you explain] China’s great leap in science and technology over the past 10 years?” said Yuan.

8. Beijing to improve urban planning using big data

Beijing's Changping District government held a launch ceremony on 24 September for a big data project to study and address urban planning issues in Huilongguan and Tiantongyuan, two large residential communities in Beijing.

Big data resources such as Location Based Service (LBS) and IC card used in public transportation will be utilized to evaluate and resolve problems in urban commute and the distances between residential neighborhoods and commercial zones, according to the Changping district government.

Huilongguan and Tiantongyuan, with a population of over 800,000, were built in the late 1990s and early 2000s without sufficient efforts in urban planning. According to representatives from IT companies at the launch ceremony, transportation infrastructure, work environment and living services in these two communities have lagged behind in development compared to newer communities such as Wangjing.

Government officials of Changping District said the goal of the project is to integrate various resources through big data and reveal and find solutions to problems in city planning. Evaluation of the two residential communities will be conducted by collecting data such as the usage of bicycle lanes, the queues for metro lines, pedestrian traffic and the communities' demographic. The project will first take place in Huilongguan, and then be extended to Tiantongyuan and the entire Changping District.

According to data already collected by various IT companies represented at the launch ceremony, residents of Huilongguan and Tiantongyuan tend to go to hospitals, shopping malls, and sports facilities away from their communities, while the residents of Wangjing conduct similar activities closer to their community. These data reflect the unmet needs of the residents in Huilongguan and Tiantongyuan. With big data as guidance, the Changping District government will be able to provide better public services for people living in the older communities.

(http://www.china.org.cn/china/2017-09/29/content_41665526.htm)