# INSIGHT

# The tech edge

**Stephen Wong says China's push to raise its manufacturing game gives HK the chance to play a key role**

Since Germany's manufacturing sector officially unveiled its Industry 4.0 blueprint in 2013, their competitors have begun to realise that the combination of all the current technological advances – such as the internet of things, sensors, the cloud, 3D printing, robotics, advanced analytics, big data and the like – will fundamentally change entire production lines and supply chains.

Bill Gates has a famous saying: "We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10." This insight may also be applicable to Industry 4.0: the immediate hype will eventually fade, but in 10 years' time, when people look back, they will probably be amazed at how much change has occurred.

In the past, technological advances helped mass production through economies of scale; but for Industry 4.0, each production output can have its own specifications, which will drive how it is made on the production lines. Production will become more tailor-made, supply chains more fragmented and customers more flexible.

It has been estimated that the total related investment spending in Europe will exceed €140 billion (HK$1.2 trillion) every year. Some people have even called this the fourth industrial revolution, comparing its impact favourably to the advent of the steam engine in first industrial revolution in the 18th century, electricity in the second revolution in the 19th century, and computers in the third revolution in the 20th century.

These developments present both an opportunity and a challenge to China's manufacturing sector. China has come up with its own version of Industry 4.0 – "Made in China 2025", which was launched earlier this year. While China has always aimed to upgrade its production in the value chain by relying more on technology and design and less on cheap labour and artificially low exchange rates, the "Made in China 2025" plan is certainly the most ambitious articulation of such a goal.

In a way, the showdown between Germany's Industry 4.0 and "Made in China 2025" will determine whether China can successfully transform from a low-value manufacturing hub into one of hi-tech manufacturing, for example, in large-scale industrial robotics used in auto manufacturing.

Of the four largest industrial robotics companies globally, two of them are German and one is Japanese. Obviously, the challenge for China is that the gap between German and Chinese manufacturing technology is very big, but, looking at it positively, there is an opportunity for China to catch up or even excel. China might have a chance to make use of a "last mover advantage" to leapfrog into the top echelon of manufacturing elites.

In the context of these changes in the manufacturing world, Hong Kong's prospects appear brighter than in the recent past. Over the past decade, as manufacturing in mainland China began to move up the value chain amid rising labour costs, Hong Kong's industrialists have been struggling to maintain their relevance.

Many of them have turned to real estate development. They have had more success taking advantage of the government policy of revitalising industrial buildings than in actual manufacturing.

Now, Hong Kong may yet play a bigger role in the grandiose plan of "Made in China 2025". The city has a competitive advantage in its universities with their international research reputation, and that will be crucial in providing technological know-how and innovations for China to successfully implement the 2025 game plan.

A prime example is drone maker DJI. The company, founded by Frank Wang, a mainland-born graduate of Hong Kong University of Science and Technology, is valued at up to US$10 billion, with revenues expected to exceed US$1 billion this year. Wang's interest in robotics began when he was a student at HKUST, thus DJI can be said to have started as a student project at the university. This experience shows Hong Kong can play a bigger part in China's move to upgrade its manufacturing. While the commercialisation of university research is still not yet a competitive advantage for Hong Kong, DJI has proven to be a prototype of "people transfer" – as opposed to the more traditional model of "technology transfer" – to spur innovation.

**HK need not reinvent the wheel by developing a manufacturing infrastructure**

Hong Kong's proximity to Shenzhen and Dongguan (東莞) is also an advantage, as they have been transforming themselves into leaders in providing efficient labour and logistics support for technology products. Hong Kong need not reinvent the wheel by developing a manufacturing infrastructure of its own. Instead, it should redouble its efforts to attract internationally renowned researchers to local universities, as high-quality research is something Dongguan and Shenzhen cannot yet offer.

As a percentage of gross domestic product, Hong Kong government spending in research and development is about half that of Singapore's and America's. Imagine how much more competitive Hong Kong could be if the government's raised R&D spending to a comparable level. Investing in R&D would increase the city's productivity and competitiveness in the long run, and the money invested would have a bigger impact than just lying idle as part of the government's massive fiscal reserves.

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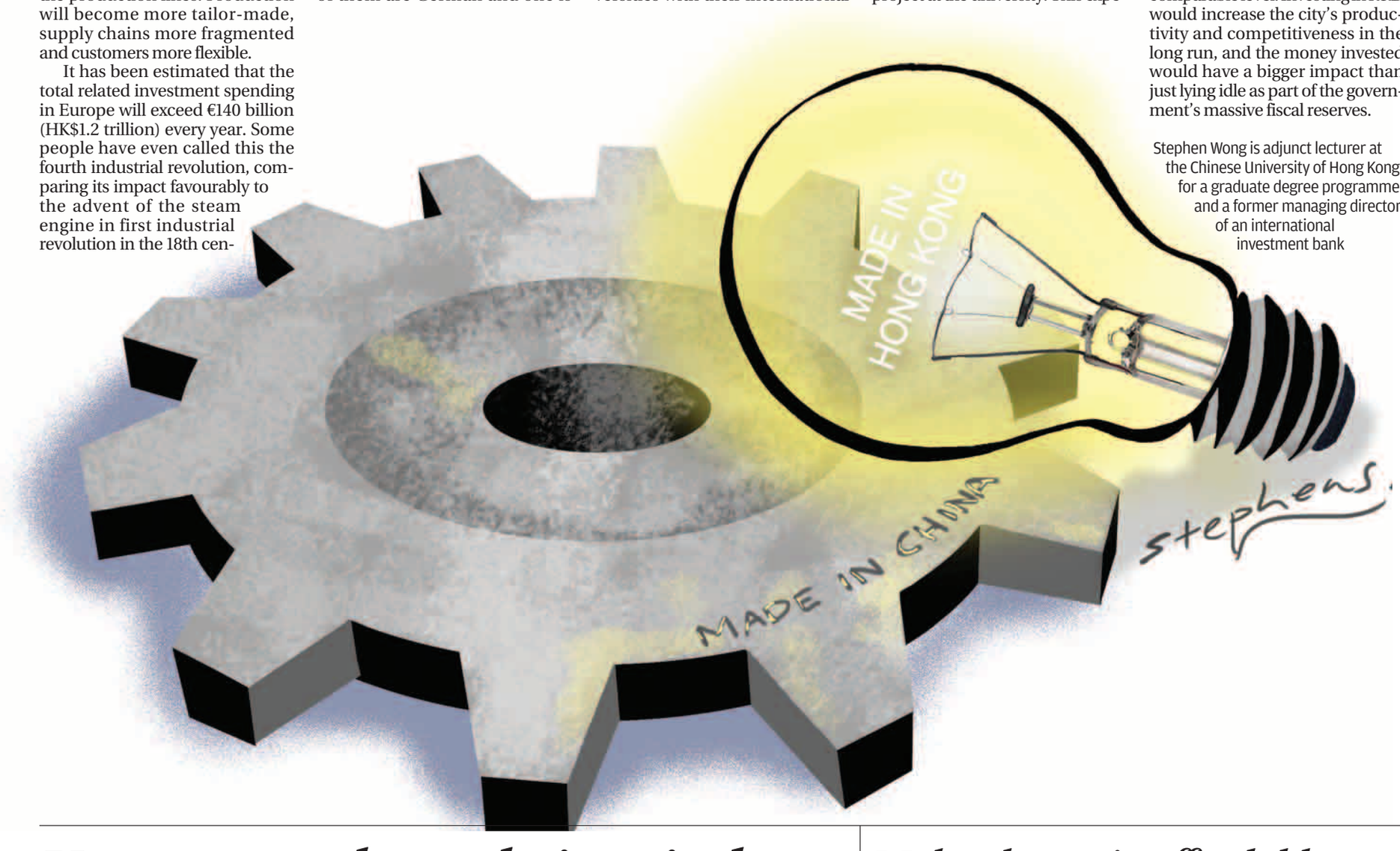


# *Young must keep their minds open to forge post-2047 future*

**Alice Wu calls on those who will inherit Hong Kong not to underestimate the force of change, both in speed and scope. Thus, they must reject absolutism and remain willing to engage**

The storms in a teacup that have erupted since the reform veto do make an interesting brew. But let's not forget that they are also impediments to moving forward. Political storms come and go, and Hong Kong must stay on course.

What is our course exactly? As we prepare to celebrate the 18th anniversary of the handover on July 1, we must know that we're also counting down the remaining 32 years of our 50 years of promised "unchange".

What lies beyond 2047? Nothing is for certain, except maybe one thing: Hong Kong Disneyland, which has a 100-year land lease. As we approach this "deadline", we should be reminded of what Scholarism's Joshua Wong Chi-fung wrote in *The New York Times* last year: that "the day will come when we decide your future". And it will do us a lot of good now to know – and accept – that the day will arrive sooner rather than later.

History has given today's generation of young people a momentous task. Those in their late teens and 20s will be in their prime, at the height of their careers, heads of the families and calling the shots. They will be playing an active role in determining what comes after "one country, two systems". Where Wong may be wrong in sounding his "threat" to the current ruling class is simply that many of them may well not be around by then.

Fortunately, when we look into the future, we have history as our guide. Informal discussions and negotiations for the Sino-British Joint Declaration, signed on December 19, 1984, began in the spring of 1979, 18 years before 1997, with then colonial governor Murray MacLehose's Beijing trip. MacLehose made the trip because of the increasing levels of anxiety about Hong Kong's future, post 1997. And these worries were practical ones too, like what happens to future land leases.

Today, our young aspiring homeowners will not only need to worry about home prices, they will also need to think about how mortgages that extend beyond 2047 will work. It's not too soon to begin thinking about it.

It would be grotesquely naive to assume that these 50 years of "no change" means this city's and our nation's development – whether economically, socially or politically – will remain unchanged.

When I was younger, the world was obsessed with China's entry into the World Trade Organisation. One of my most unforgettable experiences was assisting in an interview with Charlene Barshefsky, the United States' top trade negotiator from 1997 to 2001, and listening to her converse with my professor on easing China into the WTO.

The truth is, I would have never imagined, back in 1999, that we would today be talking about the formation of the Asian Infrastructure Investment Bank.

And this is what I would like to tell our young people of today, our true stakeholders of tomorrow: never shut yourselves up in close-mindedness. The world – your world – will be changing at a mind-spinning rate. Navigate through the terrain of the future not with fear, anger or hate. What will keep you safe from storms will be how responsive you are to the world around you, and how you keep your minds open to different perspectives and possibilities.

You're too young to fret, and there is no reason to do so, as long as you're not set in absolutism. Reject the shortsightedness of the schoolchildren we have in today's politicians, be sceptical of any one who insists on singular world views, beware of fanatics who insist on any singular ideology.

No one has a crystal ball to tell us what the world will become in 2047. History is yours to make. Engagement and communication will give us a better chance in forging a better tomorrow.

Alice Wu is a political consultant and a former associate director of the Asia Pacific Media Network at UCLA

# *Make clean air affordable*

**Ming Zhang says while waiting for anti-pollution efforts to kick in, millions of wheezing Chinese would welcome efficient and cheap air filters**

China's rapid growth has come with a severe side effect: air pollution. And although a movement to draw attention to poisonous air quality has been growing almost as fast as the country's cityscapes, solutions have been uninventive and surprisingly slow.

When I arrived at Peking University to study air quality in 2013, Beijing had launched its own monitoring system. And, in September that year, it published an action plan that not only limited the use of coal to 65 per cent of the country's energy mix, but also encouraged the installation of air treatment equipment in industrial plants.

With recognition of these problems, individuals and civil society groups have increased their advocacy. But have their initiatives made a difference? Beijing's air quality data from the first half of this year indicates that PM2.5 concentration (particle pollution) has decreased from a year ago, and the number of days considered "heavily polluted" has dropped by half since last December. There is evidence, however, that damage from the dirtiest industries is moving to western and southern China.

Given China's air pollution problems, why aren't air filters a common household item? The answer: even the cheapest air purifiers cost over a month's rent for many. Yet, there is no reason why we cannot create short-term solutions. Scientists and students should be funded to design affordable air filters and user-friendly masks.

Advances have already been made. The Smart Air filters developed by Thomas Talhelm, a former Fulbright researcher in Beijing, consist of a high-efficiency filter strapped to a fan and provide a low-cost alternative to high-end filters. However, they filter out only PM2.5, and not harmful volatile organic compounds, such as benzenes and formaldehyde. In addition, features such as a light indicator to signal when pollution has reached a safe threshold and an attractive casing are missing from these early designs.

To date, there are no affordable alternatives that can eliminate not only particulates, but also trickier gaseous compounds. While PM2.5 is generally considered the greatest air quality health risk in China, volatile organic compounds emitted from sources such as plywood, fabrics and personal care products are also significant indoor air pollutants.

A large market exists for a quiet, affordable and attractive filter that targets all the components of air pollution. The time is ripe for scientists and students to design a smart and affordable air filter to address the needs of millions of Chinese consumers.

Ming Zhang is a graduate student in civil and environmental engineering at the University of California, Berkeley, who studied air pollution at Peking University on a Fulbright grant in 2013-2014

# *Subsidies stunt growth of Chinese farms*

**Mark Godfrey says generous government assistance for farmers to buy lo-tech machinery in fact undermines Beijing's goal to create bigger and more efficient farms**

Anyone who has visited China's annual autumn farm machinery fairs in Changchun (長春) or Shenyang (瀋陽) will have seen a bewildering array of machines and brands. But the exhibition features hundreds of brands selling farm machinery of similar specifications – most of them lo-tech solutions for a country seeking to modernise its farming sector.

Tractors have proliferated in recent years because China's agricultural ministry and central government are bent on increasing the rate of mechanisation of the country's farms and have been dishing out subsidies to ensure that happens.

The amount went from 70 million yuan in 2004 to an incredible 23 billion yuan (HK$29 billion) last year, according to the China Association of Agricultural Machinery Manufacturers. In many cases, farmers get subsidies covering over a third of the price tag of a tractor or harvester.

There is certainly an argument in favour of the availability of low-cost machinery for small farmers, in particular because the Western corporations that dominate global farm machinery production (in value terms) prefer to focus on hi-tech, high-price machines.

But there is a fundamental contradiction between China's drive for greater scale and output in farming and a government-subsidised proliferation of low-end machines designed for small farms. Giving farmers up to a third of the price tag of a tractor has been a boon for the makers and dealers of tractors but it hasn't necessarily helped achieve the Chinese government's stated goal of higher crop yields through mechanisation and the creation of larger-scale, more efficient farms.

Not surprisingly, perhaps, subsidies have drawn a large number of "me-too" players into the sector, many of them building lo-tech machines for quick, low-price sales to farmers who have been encouraged and financially assisted to buy machines for a mechanised harvest. A case in point is the entry of Chinese carmaker Chery Automobile, which had no expertise in agricultural machinery prior to launching its first batch of tractors in 2010. Chery executives who talked to me at a machinery show in Shenyang credited the presence of subsidies in boosting sales as a major reason for entering the sector.

**Subsidies have drawn a large number of players into the sector, building lo-tech machines for quick sales**

Mechanisation has the biggest impact when land distribution reform is advanced and agricultural wages are high. This is not the case in China. The bigger task of land reform (leading to the goal of consolidation and larger farms) hasn't been resolved in China. Thus, there are too many machines scattered across the country tilling small fields. These lo-tech tractors will be unable to work the kind of larger-scale plots that the government wants to create.

Globally, tractor sales have shrunk in terms of number but the machines have increased in price as they become more efficient. Some large developing countries have taken a different approach – farms in Brazil have tapped credit schemes provided by the machinery makers to purchase and use larger, efficient machines, rather than seeking government assistance to buy lower-tech tractors and harvesters.

It is true Chinese low-cost makers have a potential future in sales to, say, African farms, where there is currently much focus on mechanisation. However, they will require access to innovation to meet the particular needs of these markets, and innovation has not been a strong point of Chinese tractor makers.

According to the China Association of Agricultural Machinery Manufacturers, the sector saw a "golden decade" from 2004 to last year, during which the output of Chinese farm machinery grew 20 per cent a year in value terms.

Subsidies won't end any time soon, given that the agriculture ministry wants to increase the level of mechanised farming from 60 per cent of overall farmland this year to 70 per cent by 2020. As they stand, however, the generous subsidies won't necessarily further China's goals of more mechanised agricultural production.

Mark Godfrey writes mainly about the seafood trade in China for US-based Seafoodsource.com

**Farmers are encouraged and financially assisted to buy machines for a mechanised harvest.** Photo: Xinhua