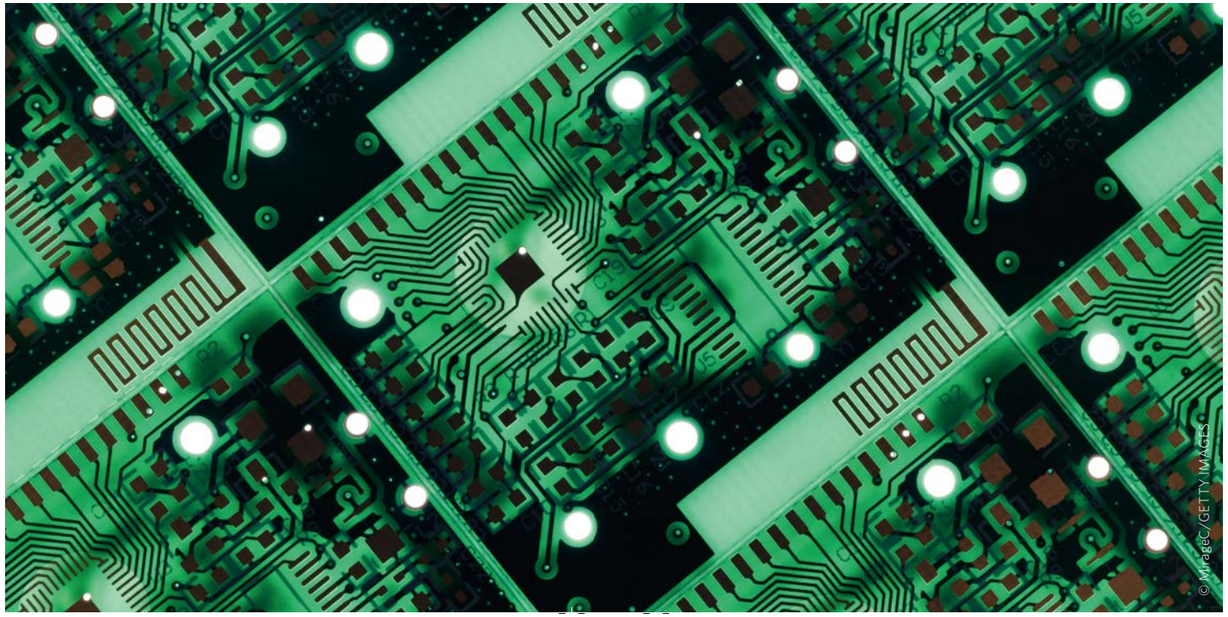
# A hardcore innovator

The city of Xi'an is **PROMOTING HARD & CORE TECHNOLOGY** to reinvent itself as a global centre for technological innovation.



© MirageC/GETTY IMAGES

© TEK IMAGE/SCIENCE PHOTO LIBRARY

© Yuichiro Chino/GETTY IMAGES

**Technological innovations** are changing our lives and transforming the world, as countries around the world look to develop their economies.

Xi'an, the ancient capital city of northwest China's Shaanxi province, is reinventing itself as a global high-tech centre and will host the Global Hard & Core Technology Innovation and the Belt and Road Innovative Cooperation Conference 2018 to attract investment in this new field. The conference is in line with the national 'Belt and Road' initiative to boost science and technology collaboration in countries along the ancient Silk Road.

**Understanding hard & core technology**

'Hard & core technology', a concept coined in 2010 by Mi Lei, founder of Casstar, an incubator and an angel investor based in Xi'an and Beijing, refers to core technologies that are more advanced and cutting-edge than high-tech. They typically require long-term investment, a long R&D cycle, and have a high threshold for entry, which make such technologies hard to duplicate and imitate. But these technologies also bring in good returns.

Since the 2008 financial crisis, it has become clear that China's demographic dividend is not enough to rely on, and the country needs to diversify. "We need to find a new engine for growth in technological innovation," said Mi. "We believe hard & core technology will lead the world in the next 30 years, and it is important for us to develop these technologies ourselves, ensuring their intellectual property."

Hard & core technology differs from deep technology, which typically refers to disruptive technologies with high impact, trying to solve big issues. When David Rothenberg, a philosophy professor at the New Jersey Institute of Technology, first proposed the deep technology concept in 1995, he referred to technologies that bring us closer to nature. Now, the term is frequently used for tech companies founded on tangible engineering innovation or scientific advances and discoveries, rather than business model or other innovations. In Mi's view, such technologies entail great uncertainty. Thus, he proposed a term that puts a greater emphasis on core technologies based on basic science. "Developing such technologies requires toughness and a down-to-earth spirit, which characterize many Shaanxi entrepreneurs," said Mi.

Hard & core technology is also more tangible and applicable, as compared to black technology, which has a futuristic connotation. The former, typically has a clear product orientation and an identified industrial basis, helps improve product performance and is able to lead and support industrial development. Hard & core technology is also different from the internet-based innovation which creates a virtual world. "It focuses on our physical world," said Mi. "It is the engine that drives industrial growth."

Mi, who holds a doctorate in photonics, offers examples of hard & core technology, encompassing artificial intelligence (AI), aerospace, photonic chips, bio-technology, information technology, new materials, alternative energy, and intelligent manufacturing. In the field of aerospace engineering, drone quadcopters are an example of high tech, but manufacturing large aircraft and launching rockets or satellites require hard & core technology. As for the technologies for rocket recovery and landing on Mars, they fall in the category of deep technology or black technology, according to Mi.

Other examples include high-speed train technology, quantum communication technology, which is between hard & core technology and deep tech, and driverless vehicle technology, which involves laser radar and autonomous driving systems. All of these have great industrial potential.

**Promoting hard & core technologies in Xi'an**

The eight major fields that represent hard & core technology are focal points of national importance. National, provincial and local government funds have been poured into these sectors in recent years. To catch this wave of science and technology innovation, the Xi'an Municipal Government is committed to boosting its hard & core technology industries and has invested heavily in these fields.

There are rewards for incubators of hard & core technology industries, supporting facilities and talent for start-ups in these sectors. In 2017, the Xi'an government hosted the inaugural Global Hard & Core Technology Innovation Conference, which gathered global experts, leading researchers, tech company chiefs and investors to discuss latest breakthroughs and trends. With support from the government and the Chinese Academy of Sciences (CAS), a white paper was released, outlining the current landscape of hard & core technology, its development and investment, and opportunities for developing its eight fields.

Xi'an is well positioned to develop hard & core technology industries, with solid research and industrial basis in the eight fields. For example, a spin-off of Xi'an Institute of Optics and Precision Mechanics of CAS, incubated by Casstar, developed a femtosecond fibre laser for ultrafast, high-precision drilling, filling a technological gap in China. This micro nano processing technology, an important aspect in intelligent manufacturing, used in aerospace engineering, will enable China to manufacture aircraft engines with its own intellectual property rights.

The Northwestern Polytechnical University in Xi'an has participated in planning the overall design of the C919, China's first domestically manufactured large passenger jet, and contributed to solving problems in the power, control and micro-electromechanical systems, as well as structural design. The R&D and manufacturing of the C919, China's industrial breakthrough in the field of short- or medium-range passenger jets, is another typical example of the application of hard & core technology. It involves the use of advanced composite materials and aluminium-lithium alloys for building aircraft body, and the latest dynamics research for designing the body.

In the AI field, Xi'an Jiao Tong University houses an AI research institute and the Northwestern Polytechnical University boasts strong research capacity in drone technology. In biotechnology, Xi'an has a national centre on molecular medicine and translational science and the technology to create bionic bones using three-dimensional (3D) printing. Xi'an houses two important airbases, several big pharmaceutical companies, a graphene industrial base, a new energy car production base, several CAS institutes and a high-tech zone. A roadmap is laid out for developing photonic integrated circuits, novel memory chips, titanium or titanium alloy products, high-efficiency single crystalline photovoltaic cells with an annual capacity of 500 MW, 3D manufacturing of metals and other hard & core technologies.

"Hard & core technology is the propeller for Xi'an's ongoing industrial upgrade and economic transformation," said Mi. "It is also the tool that enables us to change the world and our future." ■

GHCTC

www.ghctc.com.cn



Advertiser retains sole responsibility for content


Hosted by the Xi'an Municipal Government and organized by Xi'an Science and Technology Bureau, Casstar and Zero2IPO Group, the Global Hard & Core Technology Innovation and the Belt and Road Innovative Cooperation Conference 2018 is to be held in Xi'an, China November 8-11. The theme this year is "Hard & Core Technology: Develop Xi'an, Change the World, and Win the Future".

## A global conference for technology innovation

The conference will gather Nobel laureates, renowned scientists from the Chinese Academy of Sciences, opinion leaders and entrepreneurs from global and national technology industries and investors to discuss cutting-edge science trends. With talks on topics including artificial intelligence (AI), aerospace, photonic chips, bio-technology, information technology, new materials, alternative energy, and intelligent manufacturing, the conference aims to promote the commercialization of research by bridging technologies with capital and the market. It seeks to inspire greater technological innovations and foster international collaborations.

## Broad activities

Apart from 20-plus sessions, the conference will also feature an industrial expo showcasing cutting-edge technologies developed in Xi'an and around the world. A whitepaper on the development of hard & core technologies and guidelines for investment in the field will be released. Innovation contests will be held to encourage greater youth participation.