

# Expanding innovation through digitalization

THE GLOBAL INNOVATION HUBS INDEX has refined its approach to become more useful to policymakers seeking to transform their cities.

## “Digitalization has changed the boundaries of innovation,”

says Ling Chen, who led the research team from Tsinghua University’s Center for Industrial Development and Environmental Governance that, with support from Springer Nature, created the Global Innovation Hubs Index (GIHI) in 2020. Now in its second year, GIHI measures the innovation capacities and development potential of global science and technology innovation hubs, called GIHs, that lead global innovation and influence resource allocation. “GIHs reveal the impact of the digital revolution on innovation patterns,” says Chen.

The impact of this digital revolution is particularly apparent in the context of the COVID-19 pandemic, which experts believe may have fundamentally changed the way we work and innovate. While the pandemic led to a sharp decline in global greenfield investment (foreign direct investment), international flights, and talent mobility, sectors like the pharmaceutical, chemical, digital healthcare, and remote working industries experienced significant growth.

“People need more personalized services, so they order everything online,” explains Chen. She notes that, due to this, the new digital economy, which includes industries such as data and software services, was stimulated by the pandemic.

With this in mind, Chen and her team made the digital economy and enabling technologies such as artificial intelligence (AI) and integrated circuits (IC), areas of increased focus in GIHI 2021. As Chen notes, innovation is no longer tied to superstar cities, so the team expanded the number of cities and metropolitan areas (MA) studied from 30 to 50, to take a closer look at ‘second-tier’ cities that are rapidly developing their innovation capabilities.

## GIHI 2021 IN A NUTSHELL

The GIHI ranking was calculated based on three main indicators: research innovation, the innovation economy, and the innovation ecosystem.

As in 2020, this year San Francisco-San Jose was the top ranked GIH, with the United States dominating the top 20, taking up another 9 spots. Asia had a strong showing in the top 20, taking up 5 spots, with Beijing



The GIHI ranking is calculated based on three indicators: innovation economy, innovation ecosystem, and research innovation.

ranking the highest at 4th overall. The report authors note that while San Francisco-San Jose had fairly balanced behaviour in all three indicators, the other cities had differing strengths.

Research innovation was the strongest category for both the US and UK/Europe taking out 12 and 6 spots, respectively, in the top 20. It was calculated by taking a city’s science and technology human resources, research institutions, knowledge creation, and scientific infrastructure into account. This category is Asia’s weakest and one it needs to improve, with only Beijing and Guangdong-Hong Kong-Macao Greater Bay Area (the Greater Bay Area) in the top 20, due to their research institutions such as Tsinghua

University, Peking University, and the Chinese Academy of Sciences, and scientific infrastructure such as Beijing’s EarthLab, the High Energy Photon Source (HEPS), and the Tianhe and Sunway series of supercomputers.

The innovation economy indicator was calculated by considering technological innovation capacity, innovative enterprises, emerging industries, and economic growth. Asia’s strongest showing was in this category, tying with the US for 8 places. The UK/Europe, on the other hand, had its weakest showing with only 4 cities in the top 20. Significant investments in China have led to the rise of Beijing and the Greater Bay Area in this indicator, with China

topping the list for the number of unicorn companies — start-ups valued at more than US \$1 billion.

Openness and collaboration, support for start-ups, public service, and innovation culture were accounted for using the innovation ecosystem indicator. Here, the US again led with 9 cities, whereas Asia and Europe both had 5 cities represented in the top 20. Innovation culture is a particular strength of cities from the UK/Europe which represented the top five in the category. The report authors note that this is another area that needs improvement in Asia.

## LOOKING FORWARD

While there were few surprises in the makeup of the top 20 lists, Chen is intrigued by the

inclusion of ‘second-tier’ cities, such as Changsha, Suzhou, Hangzhou, and Chengdu, typically associated more with tourism than technology, in the candidate pool. A particularly surprising finding was that the number of unicorn companies in Hangzhou exceeds the sum of those in Tokyo MA, Paris MA, and Munich.

“These new, rising cities attract young people with fresh ideas,” says Chen. The allure is possibly due to the comparatively lower costs of living, combined with lack of incumbent institutes, and fewer boundaries for entrepreneurs, giving them more freedom to innovate. This is another area where digitalization has been a leveler. Previously, innovation had been tied to large

cities, but now thanks to better internet connectivity, this is no longer the case. That being said, to move up the ranks as a GIH, Chen notes these cities need to improve their scientific and digital infrastructure, and secure top scientific talent.

According to Chen, ultimately, there are three key elements to successful GIHs: strong basic scientific research, an inclusive innovation culture, and an open digital infrastructure that provides services not only to universities and companies, but to the public as well. “Now consumers and communities can be the innovators,” says Chen.

The results of the report provide policymakers a way to benchmark their cities, analyse their position and

gain perspective on how to improve. For cities aiming to make their way up the ranking, Chen suggests working to improve digital connectivity, provide affordable public cloud computing services, and affordable broadband.

Chen and the GIHI team are planning to incorporate more cities next year and eagerly welcome suggestions for the GIHI 2022. ■

To read the full 2021 Global Innovation Hubs Index report, visit: [www.nature.com/collections/cideg2021](http://www.nature.com/collections/cideg2021)



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