

Shanghai - A Pioneer in Innovation and Development

Between 1990 and 2019, China experienced an impressive annual average GDP growth rate of nearly 10%, contributing over a quarter of global GDP growth, according to the global consultancy giant McKinsey. This economic boom resulted in a significant increase in average household income from \$750 to \$13,000, creating a sizeable middle class with considerable global consumer influence. China's contribution to worldwide GDP stands at 18%, equivalent to that of the European Union.

Shanghai has played a vital role in driving this remarkable growth as China's most populous city and its leading financial and R&D hub. Serving as a gateway to China for the rest of the world, Shanghai was home to the regional headquarters of 891 multinational corporations and 531 foreign-funded research and development centres as of the end of 2022, surpassing all other mainland Chinese cities.

The city's commitment to innovation is evident in its substantial investment of approximately CNY170 billion in R&D in 2021, equivalent to 4.1% of its GDP. This investment reflects Shanghai's focus on leveraging its highly skilled talent pool and fostering a culture of innovation and technology. The city actively supports technology-intensive activities, attracting tech-driven companies from around the globe through dedicated funds and initiatives. Shanghai's municipal government also actively promotes foreign investment, providing tax incentives and subsidies to support international businesses. In 2021, it attracted \$22.55 billion in paid-in foreign investment and \$60.39 billion in contractual foreign investment. Notably, paid-in foreign investment in high-tech services reached \$6.32 billion. These efforts have created a multinational environment, with over 330,000 work permits issued to foreign nationals in 2021. But Shanghai will not be resting on its laurels - the city's leadership and its private sector partners are committed to further strengthening the business environment to ensure that Shanghai remains a pioneer as a "global oriented opening-up hub".

Mayor Gong Zheng expressed this vision in his New Year's address at the start of 2023, stating, "With a stronger sense of mission and responsibility, Shanghai should spearhead reform and opening up and be a pioneer in innovation and development. We should prioritise high-quality development, comprehensively promote reform, opening up, and innovation, carry out major national strategic tasks, deepen the development of the city as a centre of the international economy, finance, trade, shipping, and scientific and technological innovation. Shanghai should strengthen its functions in allocating global resources, leading



Gong Zheng
Mayor of Shanghai

scientific and technological innovation, directing the development of high-end industries, and serving as a hub for opening up. Additionally, we should vigorously boost market confidence, strive to stabilise growth, employment, and commodity prices, and promote effective qualitative and quantitative economic growth."

As Gong noted, in 2022 Shanghai's three "forerunner industries" - integrated circuits, biomedicine, and artificial intelligence - reached a total value of \$203bn. The city created over 550,000 new jobs in 2022 alone, while also providing \$41.5 billion in tax and fee reductions for enterprises, providing crucial support during a critical time. These achievements further strengthen Shanghai's position as a global business hub.

"The important difference, or advantage, is not just manufacturing, it is R&D, technology, and software," says Gerald G. Wong, Chairman and CEO of Cambridge Industries Group (CIG), a leading communications and data equipment manufacturer. CIG has made significant investments in R&D in Shanghai, developing its technology in the city and deploying it globally across satellite

locations. Shanghai's proximity to the entire supply chain and its robust talent pool make it an ideal centre for R&D and manufacturing. Wong also highlights the government's support for the private sector. CIG has expanded its business in the United States and across Asia, collaborating with numerous suppliers and serving leading global telecom operators.

Espressif Systems, a Shanghai-based semiconductor giant with a 30% share of the global market, is another example of a Shanghai company leveraging its position in global supply chains, skilled workforce, and favourable environment for high-tech investment and R&D. Teo Swee Ann, Espressif's CEO, explains, "We source 100% of our wafers from Taiwan, while the products test packaging operations are divided between China and Taiwan. The assembled chips are then shipped globally, while some are further processed into modules in China. We have recently expanded our module manufacturing partners to include Vietnam and Malaysia, making our supply chain truly global. As we set our sights on global expansion, one of our core strengths lies in the vibrant development community that augments our R&D efforts. Leveraging our advanced software components with the growing influence of AI, we have witnessed a remarkable surge in productivity. This progress has sparked heightened interest among our international clientele, leading us to anticipate a sustained growth in exports for the foreseeable future."

As Xue Feng, president of Invest Shanghai, aptly stated, "Shanghai's economy has deeply integrated into the world, and Shanghai's future development is inseparable from the extensive participation of enterprises from all over the world."

As China's economy continues to flourish, with projections of surpassing that of the US, Shanghai remains at the forefront - confident, outward-looking, and innovative. Mayor Gong declares, "Hard work builds a brilliant future. Let's beef up efforts to develop the city into a modern socialist international metropolis of global influence and create more remarkable miracles on the new journey."

Cambridge Industries Group (CIG)

Providing high-quality R&D and collaborative manufacturing services for the world's biggest telecom equipment vendors and operators

China's economy rebounded strongly from the Covid-19 pandemic after bucking the global trend throughout 2020-2022, posting a 3% economic growth rate last year, according to the International Monetary Fund (IMF). The IMF now predicts that China's GDP will grow by 5.2% this year, exceeding the government's 5% target, as the country reconnects with the world - welcome news as it accounts for almost a fifth of the global GDP. To put that into perspective, China's largest province, Guangdong, has a higher nominal GDP than Canada, while the Yangtze River Delta, which encompasses Shanghai, has a GDP approximately the size of Germany's, according to the International Trade Administration (ITA).

China has been the world's largest manufacturing hub and a leading R&D powerhouse for more than a decade. China accounted for 30% of the global manufacturing output in 2021, according to government data, and was the second largest R&D spender in 2022 at USD 551.1 billion, contributing to an 18.2% year-over-year rise in high-tech manufacturing output. China's manufacturing industry is in full swing, with its Purchasing Managers' Index (PMI) rising to 52.6 in March - the highest reading in over a decade - from 50.1 in January this year. Looking ahead, China's 14th Five Year Plan (CY2021-2025) continues to supercharge its 'indigenous innovation' system for economic growth across ten key sectors, including robotics and advanced information technology, and promote advanced manufacturing technologies.

Founded in 2005, CIG is an internationally leading ODM, JDM, and OEM vendor for wired access, wireless access, carrier Ethernet, home networking, and optical transceivers for worldwide markets. CIG provides high-quality, end-to-end customer-integrated R&D and collaborative manufacturing services to its global customers.

CIG initially focused on mainly providing R&D services before branching out into manufacturing, starting with the high-volume production of carrier-grade home networking products and solutions. In 2014, CIG relocated its manufacturing site to a 300,000 square feet state-of-the-art facility, which has become a best-in-class manufacturing facility, mixing automation robotics and lean manufacturing techniques with advanced information systems towards a 'dark factory.' In 2016, CIG expanded from the home broadband access market to the wireless market, followed in 2019 by its diversification into the data center and optical transceiver markets - CIG currently offers a wide range of optical transceivers for PON ONT, data center, and telecom applications. "We focus on telecom, data, home access units, broadband, and



Gerald G. Wong
Chairman & CEO

slowly expanding our horizon. We plan to diversify the business with more products, staying within our current scope," says Wong. Every five to seven years, CIG aims for a major acquisition, which Wong believes is integral to moving the company in the right direction and opening new business verticals.

While companies produce the main components, we lead the way in manufacturing peripheral products for global network providers. We don't compete with these companies; we work together with them," says CIG's chairman and CEO, Gerald G. Wong, who earned degrees from MIT in the 1980s.

Today, CIG's extensive R&D competencies for industrial and hardware design and software development are met with an ever-expanding large-scale manufacturing, resulting in a market cap of CNY 17 billion (USD 2.5 billion). The company's monthly production capacity stands at 3 million units, and it has recently announced plans to build a manufacturing and logistics facility in the China-Singapore Jiashan Industrial Park near Shanghai. "We're prudent with our growth. Our strategy is to grow from our core and then gradually to our peripherals,

CIG currently exports over 85% of its products - the majority of which goes to the USA and Europe and Southeast Asia - a uniquely high number set to increase further as China continues incentivizing exports. The company has multiple subsidiaries in the US, Japan, Germany, and Malaysia, having established an R&D and operation support center in Silicon Valley in 2006, Japan in 2018, and Malaysia manufacturing center in 2022. CIG is open to strategic partnerships, including joint ventures, with companies designing and manufacturing new products. Future partners can be confident in CIG's exceptional track record - particularly in JDM partnerships - which spans US data centers, international industry giants, and hundreds of suppliers and major telecom operators. "We look for growth potential across a range of sectors, and we're always open to new opportunities," says Wong.

CIG listed on the Shanghai Stock Exchange in 2017 and has registered continuous growth since its inception, illustrated most recently by the astronomical 4.5 times rise in its share price between January-May this year. Such a feat reflects the caliber of high-growth businesses currently operating in Shanghai, a city Wong credits for much of the company's success as its R&D hub and core manufacturing location. "Shanghai is an international city, and the local government is extremely proactive and supportive of entrepreneurs because the relationship is mutually beneficial. One of their main concerns is to promote and support businesses," he says, adding, "People are also key here - the talent pool is excellent, and there's a strong base of hard-working young people coming to Shanghai."

CIG

Espressif Systems

A World-Leading AIoT Champion

“The open-source collaborative model has the power to unleash the creativity of individuals and organizations alike and to accelerate technology development and use in ways that ensure a sustainable future.” - Mitchell Baker, Executive Chairwoman of the Mozilla Foundation

China is one of the world's largest semiconductor producers, with a 9% share of the global market in 2020, according to the Semiconductor Industry Association. The government strongly supports the sector, investing \$1.75bn last year in a drive to increase the country's self-sufficiency. The domestic market alone is the world's largest, worth nearly \$200bn.

A leader in this wave of growth, Shanghai-based Espressif Systems is a remarkable industry success story. Founded just fifteen years ago, in 2008, it has grown rapidly to take a 30% global market share in WiFi-enabled microcontroller units (MCUs). From its roots as a small start-up, the company has become a multinational artificial intelligence internet of things (AIoT) leader with a global presence. It sells half its products outside China, particularly in Europe and North America, and has offices in Brazil, India, Singapore, and the Czech Republic. Its success is based on an innovative business approach, as well as technical innovations and a stable and secure supply chain - a vital advantage in an era of disruption and uncertainty.

Espressif Systems' CEO, Teo Swee Ann, highlights the company's commitment to open-source innovation by offering a software development kit (SDK) that is accessible to all. “This approach, which departs from the traditional practice of keeping software proprietary, has been well-received by the community, enabling Espressif to capture a significant 30% share of the global market. Our financial performance has consistently been strong, with impressive double-digit growth in Q1, even as the overall semiconductor market faced a downturn of 20%. We attribute this success to the added value we provide, as well as our steadfast focus on maintaining a reliable supply chain and price stability. Customer satisfaction remains our top priority, and we continue to work diligently to meet their needs.”

In 2014, Espressif launched its first WiFi solution. By incorporating all RF components into the silicon, the ESP8266 provided an unprecedented opportunity for affordable internet connectivity in everyday devices. Two years later, the company launched a new series of chips, ESP32, enhancing functionality across the board; it now has nearly a dozen products in the series. These flagship chips move Espressif closer to its fundamental vision of “fast, secure, and green



Teo Swee Ann
CEO

IoT technology that can be available to all”.

In 2019, Espressif debuted on the Sci-Tech Innovation Board (STAR) of the Shanghai Stock Exchange, selling 25% of its shares in an offering that valued the company at \$716m. The offering was nearly 3000 times oversubscribed - a remarkable statement of investor confidence and enthusiasm in Espressif and its future. As well as broadening the company's access to capital, it also opens the business to Chinese and international investors, who can tap into its unique growth story.

It is growth that Teo expects to continue, with growing demand from overseas customers in particular that promises an uptick in exports. The company's investments in R&D are paying off in increasing productivity. Teo also expects the rise of artificial intelligence to benefit Espressif, as AI programs such as ChatGPT and co-pilot, can interact with the company's open-source code.

Internationally, the company has more than 5,000 clients and rising. The customer base is diverse, with strengths in IoT-enabled home appliances and industrial IoT. Espressif also offers a full cloud solution, with cloud products providing platforms for users. Along with its open-source software foundation, which allows engineers to build upon, Espressif offers significant advantages as both a partner and supplier.

“Our offerings encompass the entire

vertical stack, and we collaborate with a diverse range of companies interested in developing internet-connected devices. This includes device manufacturers, cloud service providers, and platform companies alike,” says Teo. “In considering partnerships for product design or distribution, we maintain an open-minded approach to all potential joint ventures. Our perspective on collaboration is inspired by the wisdom of Peter Drucker. He thought that in the knowledge economy, collaboration and the sharing of information would become essential for success.

Teo takes pride in the skilled workforce his company has amassed, which has played a crucial role in establishing its presence in the fiercely competitive global market. This pool of talent is a testament to China's inherent strengths as an investment hub.

“China's vast population and emphasis on talent development have been key factors,” Teo explains. “The country has made significant investments in educating microelectronics engineers. It's rare to find such a high concentration of engineers specializing in microelectronics anywhere else in the world, perhaps with the exception of the US, which operates within a distinct ecosystem. Furthermore, there's also a strong network of customers in China who actively utilize our chips in their products.”