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DCB exists to connect academia, industry, and government in a way that allows biotechnology to develop coherently rather than in isolation

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Biotechnology in Taiwan is no longer a future aspiration, but an industrial system deliberately built for global relevance. In this conversation, the Chairman and CEO of the Development Centre for Biotechnology explain how policy, data, manufacturing discipline, and clinical capability are being aligned to create a coherent national ecosystem. The discussion moves from long-term strategy to practical execution, offering a clear view of how Taiwan positions itself in an increasingly competitive global biotech landscape.

How does biotechnology fit into Taiwanâ??s national development strategy today, and what role does the Development Center for Biotechnology play in shaping that direction?

Dr Shiing-Jer Twu: Biotechnology has long been one of Taiwanâ??s two strategic pillars for economic development, alongside information and communications technology, including semiconductors. The Development Centre for Biotechnology sits under the Ministry of Economic Affairs by design, reflecting a deliberate policy choice to treat biotechnology as an industrial priority rather than a purely academic endeavour. DCB was established in 1984, roughly a decade after Taiwan began laying the foundations of its semiconductor ecosystem. While semiconductors were able to scale rapidly on a global level, biotechnology has followed a very different trajectory.

Development timelines are longer, regulatory requirements are more complex, and the sector is largely business to business rather than consumer facing. For that reason, comparisons with semiconductors should be understood as a long-term vision rather than a direct parallel in speed or economics.

From the outset, our role was not to replicate the semiconductor industry, but to apply similar industrial principles where they make sense. We focus on quality, process discipline, and global relevance. Taiwanâ??s domestic market of around 23 million people is too small to sustain a biotechnology sector on local demand alone, so internationalisation has always been central to our mission. DCB therefore works to help Taiwanese biotech companies build development platforms, manufacturing capabilities, and expertise that can serve global partners. Historical context also shaped this role. In the early 1980s, Taiwan faced a significant hepatitis B burden, with studies showing that around 15 to 20 percent of the population were chronic carriers before universal vaccination began. DCBâ??s early work included supporting hepatitis B vaccine capability in Taiwan, including licensing vaccine technology from Sanofi-Pasteur in France. That experience reinforced our broader mission of translating scientific capability into products that address real and pressing health needs.

Although Taiwan has not yet produced a global biotech champion on the scale of TSMC, the strategic direction has remained consistent for more than four decades. Our ambition is to combine engineering discipline, manufacturing reliability, a strong healthcare system, and effective public-sector coordination to build an internationally competitive biotechnology ecosystem. That positioning, as an industry-facing development organisation rather than a traditional research institute, continues to define DCB today.

Dr Tsai-Kun Li: Over the past decade, this strategy has become increasingly tangible through ecosystem building. Since 2017, DCB has been operating from the National Biotechnology Research Park, with full operations established around 2018. The park was designed to co-locate key stakeholders, including the TFDA, research institutes, and industry players, in order to accelerate collaboration and translation across the biotech value chain. Our role extends beyond technology development alone. We support biotechnology development from both a technical and a business perspective, always guided by national priorities. We build platforms, but we also advance products. As a result, we rely on two main commercialisation pathways. Where appropriate, we license technologies and products to external partners. In other cases, we establish spin-off companies when a platform or capability is better developed as an independent entity.

More recently, we have expanded our geographic footprint. In 2025, DCB formally opened a South Taiwan office in Shalun Smart Green Energy Science City in Tainan. This move reflects a broader effort to strengthen regional balance and extend our services beyond Taipei. The southern office is intended to connect local industry, academia, hospitals, and investors, while also supporting collaboration with international partners. Taken together, these efforts reflect our aim to build a coordinated national ecosystem rather than a fragmented one. The objective is to support innovation, development, and global engagement across Taiwan, while preparing the ground for emerging areas such as the integration of artificial intelligence with biotechnology to play a growing role in the next phase of development.

How would you describe DCBâ??s institutional role within Taiwanâ??s biotech ecosystem, and how do you want global partners to understand its positioning?

Dr Shiing-Jer Twu: In biotechnology, competition is inherently global, and Taiwan cannot rely on domestic demand alone to sustain a competitive sector. This is why our orientation has always been international rather than inward looking. When we consider positioning, the most relevant reference is not product branding, but the industrial mindset that underpinned Taiwanâ??s semiconductor success. TSMC built its role by focusing on manufacturing excellence, process discipline, and trust, rather than by selling its own branded products. While biotechnology follows very different timelines and economics, that industrial logic remains highly relevant.

Innovation in biotech has two equally important dimensions. One is scientific innovation, identifying and addressing unmet medical needs. The other is industrial innovation, the ability to manufacture complex products reliably, at scale, and to consistently high standards. Taiwanâ??s strength lies in bringing these two together. We have a strong base of scientists, high-quality hospitals, and a healthcare system that generates robust clinical data, combined with an engineering culture that prioritises precision and continuous improvement.

This combination allows Taiwan to contribute across the entire value chain, from unmet need identification and development, through clinical trials, to high-quality manufacturing. Our regulatory approach is not about lowering standards, but about pairing rigorous oversight with efficient processes so development can move forward without compromising quality. In a field where products directly affect patientsâ?? lives, quality is paramount, and this is where Taiwanâ??s industrial culture becomes a genuine competitive advantage.

Dr Tsai-Kun Li: From an operational perspective, DCB functions much like a small to mid-sized biotech organisation, but with a national mandate. We help shape strategy at the government level, while working closely with industry to translate clinical needs into viable products. Taiwanâ??s compact scale and close interaction between hospitals, researchers, and developers make it easier to move efficiently from unmet clinical need to development and commercialisation.

Our role is to convert scientific capability into clinical and economic value, both within Taiwan and internationally. We actively present Taiwanâ??s biotech ecosystem at major global partnering platforms, including the BIO International Convention in the United States, BIO-Europe, Bio Japan, and Swiss Biotech Day. Through these activities, DCB acts as a bridge, supporting collaboration between Taiwanese innovators and international partners.

Manufacturing is a central part of this positioning. Taiwan Bio-Manufacturing Corporation (TBMC), established in 2023 with DCB involvement, provides advanced biomanufacturing and CDMO services. Its role draws conceptually on the same principles that supported Taiwanâ??s semiconductor industry, with a strong emphasis on quality, reliability, and service for global partners.

Looking ahead, the ambition is to move beyond a simple â??Made in Taiwanâ?• model toward â??Created in Taiwan.â?• This means strengthening original innovation, platform development, and value creation, while continuing to offer world-class manufacturing capabilities. Artificial intelligence supports this transition as an enabler, helping to accelerate development, improve processes, and reinforce Taiwanâ??s competitiveness across the biotech value chain.

When moving technologies toward the market, how does DCB decide whether to license an asset, develop it internally, or create a spin-off company?

Dr Tsai-Kun Li: From an early stage, we usually assess two pathways in parallel. We look at witch a programme is better suited to becoming a spin-off or to being licensed out to an external partner. That judgement depends on where the technology sits in development, how differentiated it is, and

whether the global market opportunity is large enough to justify building a standalone company around it.

In practice, a single asset is rarely a strong enough foundation for a spin-off. Investors and partners generally expect a pipeline, or at least a platform capable of generating multiple products for different indications. When value is concentrated in one product, licensing is often the more efficient route, particularly if scale and market access can be achieved faster through a larger partner. Spin-offs tend to make sense when the underlying technology supports broader, repeatable value creation. For this reason, we usually focus first on developing platform technologies and validating them through early products or indications. Based on those results, we decide which commercialisation path creates the greatest impact. That decision is also influenced by Taiwanâ??s industrial priorities, as there are policy mechanisms designed to support spin-offs when they fit national development goals.

When we do create a spin-off, DCB remains closely involved. Core team members often move with the company, covering both scientific and business functions. Leadership may be identified internally or recruited externally, depending on the situation. We retain equity and continue to support these companies as they mature, with value returning to DCB through a combination of equity, dividends, service income, or licensing revenues, also depending on the structure.

Dr Shiing-Jer Twu: There is sometimes a misunderstanding that DCB should be judged primarily by the number of spin-offs it creates. That framing misses our purpose. We are not an academic research institute. We are a development organisation, and our mission is to support biotechnology development across Taiwan as a whole.

Most of our work focuses on platform technologies rather than individual products. We build capabilities that others can use, whether they are companies, hospitals, or research institutes. When a platform reaches sufficient maturity, licensing it out can often create greater impact than spinning it off ourselves. Success is not measured by how many companies we launch, but by how many organisations we help move faster and deliver better solutions for unmet medical needs. This is the message I consistently share, including with our own teams. DCB exists to support the ecosystem. If we can provide a capability efficiently, others do not need to duplicate that effort. Cooperation improves both quality and speed, which is critical in biotechnology.

That is also why strong business development capability is essential. If a technology is meant to become a product, it must pass through a commercial and development process, not only a scientific one. At DCB, business development is integrated from the earliest stages, supporting proof of concept, development planning, clinical strategy, partnering, and commercialisation. This is why we sit under the Ministry of Economic Affairs rather than a research ministry, and why we describe ourselves as a development organisation with a clear industrial mandate.

In a highly competitive regional environment, what makes Taiwan an attractive location for global pharmaceutical and biotechnology companies, and where does DCB see the strongest opportunities?

Dr Shiing-Jer Twu: This is a challenging question because competition is intense across the region, with countries such as China, Japan, and Korea investing heavily and moving quickly. Taiwanâ??s advantage does not lie in scale, but in the depth and coherence of its systems. One of our most distinctive strengths is public health data. Taiwanâ??s National Health Insurance programme covers more than 99 percent of the population, creating a comprehensive longitudinal dataset that supports biomedical research, clinical development, and real-world evidence generation. This is

complemented by the Taiwan Biobank, which links biological samples with health records and enables high-quality clinical and genomic research.

Taiwan also benefits from a dense and capable hospital network that supports clinical research and trials. When combined with a healthcare system that delivers high-quality care at relatively efficient cost levels, this creates an environment that supports the entire development chain, from identifying unmet medical needs to executing clinical studies. Our regulatory approach is not about lowering standards, but about combining rigorous oversight with efficient processes so development can move forward without compromising quality.

Because Taiwan is not a large country, we cannot compete by trying to do everything. We need to operate as an integrated system. This thinking underpins the â??13579â?• framework, which encourages closer coordination across research, development, manufacturing, and regulation, almost as if the country were operating as a single organisation. Taiwanâ??s geographic compactness makes this possible, with major research centres, hospitals, regulators, and industry clusters connected within short travel times.

At the core of this approach are two priorities that must work together. One is targeted innovation focused on unmet medical needs. The other is industrialisation and production, including development and manufacturing at scale. As global supply chains diversify and companies seek alternatives to over-concentration, Taiwan has an opportunity to play a larger role in pharmaceutical production while continuing to invest in innovation. Taiwan cannot rely on only one pillar. Both are essential.

Dr Tsai-Kun Li: Taiwanâ??s resources are limited, so our starting point is always national need and careful prioritisation. In earlier years, this meant addressing urgent public health challenges such as hepatitis B, where DCB supported vaccine capability through technology licensing. Over time, the centre of gravity has shifted. Today, our focus is firmly on biopharmaceutical development and enabling platforms, particularly in precision medicine.

One area where Taiwan has developed clear strength is advanced antibody-based therapies. We have invested in complex modalities such as antibody-drug conjugates and bispecific antibodies, which require tight integration between biology, chemistry, manufacturing platforms, and regulatory engagement. These programmes also depend on early and sustained clinical input, which Taiwanâ??s hospital ecosystem is well positioned to provide.

Artificial intelligence further reinforces this positioning. Over four decades, DCB has accumulated extensive biological and sequence data, including antibody constructs with strong stability and performance characteristics. AI allows us to apply this accumulated knowledge more efficiently, supporting molecular design, immunogenicity assessment, and optimisation of complex protein structures. This is where Taiwanâ??s ICT strengths intersect naturally with biomedicine.

More broadly, Taiwanâ??s national health data infrastructure is also a strategic asset. Long-term, population-wide health data provides a strong foundation for applying AI and data science to healthcare and biomedical research. When combined with platform-based development approaches, similar in principle to those used in mRNA technologies, this can meaningfully shorten development timelines. That combination of data, platforms, and execution capability thus underpins Taiwanâ??s attractiveness as a partner in a highly competitive global landscape.

As you look ahead, what legacy would you like to leave through your work at the Development Center for Biotechnology?

Dr Shiing-Jer Twu: At its core, DCB exists to connect academia, industry, and government in a way that allows biotechnology to develop coherently rather than in isolation. Operating under the Ministry of Economic Affairs gives us both a public mandate and a policy role. We do not only develop technologies. We also help shape how the system functions, how priorities are set, and how different actors work together across research, regulation, and industry.

What I would like people to remember is that DCB serves as a first point of entry into Taiwanâ??s biotech ecosystem. For partners who want to understand how Taiwan works or explore collaboration in research, manufacturing, or investment, they can start with us. We help explain the landscape, identify the right partners, and support discussions around regulation and investment, including through the governmentâ??s one-stop service mechanism. If there is a legacy, it is the idea that cooperation should replace fragmentation, and that Taiwanâ??s biotech ecosystem works best when it is open, connected, and collaborative.

Dr Tsai-Kun Li: From a futue perspective, my focus is on making sure Taiwan chooses its priorities wisely. As a small market, we cannot pursue everything, so areas such as specialty and precision-driven development matter. One theme I care deeply about is green chemistry. Life sciences are fundamentally linked to life and sustainability, and the pharmaceutical industry should reflect that responsibility. Encouraging cleaner processes, more sustainable manufacturing, and environmentally responsible innovation is not only good for the planet, but also strengthens long-term competitiveness. If Taiwan can be recognised for combining scientific capability with responsible practice, that would be a legacy worth leaving.

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