

The 6th Presidedntial Innovation

Award Report

The 6^{th} Presidential Innovation

Award Report -



About the Award

E stablished in 2013 under the President's directive, the biennial Presidential Innovation Award is organized by the Ministry of Economic Affairs. This prestigious national honor celebrates outstanding innovators in multiple domains such as products, technology, management, services, and culture, recognizing their remarkable contributions to Taiwan's economic growth.

The core mission of the Award extends beyond highlighting exceptional achievements in technology, education, industry, and public service but also in fostering innovation across various sectors in Taiwan. The evaluation criteria are divided into four categories: technology R&D, cultural and creative value added, service innovation, and talent cultivation. Candidates in these categories undergo a rigorous two-stage review process. The final selection is made by the Presidential Innovation Award Committee convened by the Minister of Economic Affairs and comprising heads of relevant ministries and esteemed figures from diverse fields, ensuring that winners with exceptional innovation value are duly recognized.

The Presidential Innovation Award stands as a symbol of the nation's commitment to fostering innovation. Now in its sixth edition, the Award has honored a total of 26 outstanding groups and individuals. Through a distinguished award ceremony, the government reaffirms its dedication to promoting innovation and boosting national competitiveness, while extending heartfelt recognition and tribute to the awardees. It is also a call to action for all sectors to work together to advance the nation and showcase Taiwan's accomplishments with pride on the global stage.

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Aim and Orientation of the Award

The Presidential Innovation Award is handed out in recognition of those who have achieved outstanding innovative accomplishments and have made concrete contributions to the country's economic development in terms of their products, technical skills, management, services or cultural performance. With their ideas and enthusiasm about how to move from innovation to starting a business, they can be of help to Taiwan's on-going industrial transformation by serving as models for all sectors, leading them toward the development of an innovative economy for Taiwan and helping establish a comprehensive innovation system for the country and create a competitive edge in economic development.

Individuals or groups in public, private, and academic sectors are encouraged to actively pursue innovation and value creation in products, technical skills, management, organization, marketing, services or cultural performance so that they can help boost the country's overall economic development and strengthen its competitiveness in the world.

Introduction to the Award

The Presidential Innovation Award is held every two years. It is given out to five winners, with two in the group category, two in the individual category and one in the youth category. Registration for competition for the 6th Presidential Innovation Award started in August 2022, ending on Sept. 28 of the same year. A total of 251 individuals and companies registered.

They were evaluated by a selection team divided into four groups : technology R&D, cultural & creative value added, service innovation and talent cultivation. They were responsible for preliminary and secondary reviews. In the final review, they decided on the winners together with members of the Presidential Innovation Award committee. E Ink Holdings Inc., Bora Pharmaceuticals Co., Ltd. and Zeczec Co., Ltd. were the winners in the group category. National Tsinghua University Burn J. Lin and Bito Keng-Ming Liu were the winner in the individual category.

Presidential Innovation Award Group Category

Eink

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E Ink Holdings Inc. Bora Pharmaceuticals Co., Ltd. Zeczec Co., Ltd.







Group Category

E Ink is synonymous with ePaper

Becoming Synonymous with ePaper: Building Dominance and Benefiting the Entire Ecosystem with Patents

Twenty-seven years ago, Mr. Ho Shou-chuan, the founder of E Ink, foresaw that electronic paper displays from the Massachusetts Institute of Technology (MIT) would replace traditional paper. Since then, E Ink, initially producing TFT-LCD, has embarked on a journey to dominate the global market. Following three strategic global mergers and acquisitions, supported by thousands of patents, E Ink has implemented a research and development strategy that taps into high co-opetition to maintain technological leadership. The company has successfully established a dual-focused business model for the Internet of Things (IoT) and consumer electronics, fully committed to creating an industrywide beneficial ecosystem. E Ink has proudly achieved 100% green revenue, marking a remarkable journey from MIT in the US to "MIT" (Made in Taiwan.)



Elnk confidently asserts its dominance, commanding over 90% of the global market share for electronic ink film, effectively positioning itself at the head of an oligopoly. This success is bolstered by a strategic sharing of benefits, steering the ePaper industry toward a thriving ecosystem.

This journey began with YFY Inc.'s establishment of Prime View International (the former name of E Ink) in 1992. At that time, investment was driven by the recognition of the emerging digital trend, foreseeing that LCD technology would become the mainstream for displays and replace traditional paper. This led to the establishment of Taiwan's first small and medium-sized TFT-LCD facility to produce gen 2.5 panels.

However, when founder Ho Shou-chuan visited the Massachusetts Institute of Technology in 1997, he was captivated by the potential of ePaper display technology and convinced that it was the true future substitute for paper. The company decided to transform and focus on developing ePaper, halting its expansion into larger panel sizes. Ultimately, it officially phased out its LCD business at the end of 2016. The key to E Ink's leadership in ePaper technology has been its strategic mergers and acquisitions of major ePaper makers, including Philips' ePaper division in 2005; E Ink, an MIT-spun off ePaper maker, in 2009; and SiPix, with its bistable technology, in 2012. These moves have helped the company amass a vast portfolio of patents, gradually integrating the entire ePaper supply chain, and marketing globally under the E Ink brand.

iPad Impacts E-Readers: Transition to ePaper Labels

In its early days, E Ink primarily focused on e-book readers. In 2004, Sony launched the first e-reader using E Ink technology in the United States, sparking widespread discussions about the potential of ePaper to replace textbooks and printed books. With the rise of music and movie streaming, the rise of e-books seemed imminent.

But then in 2009, Apple released the iPad, a multi-functional tablet that significantly impacted the ePaper industry. Traditionally, e-readers were limited to reading functions, but the emergence of the iPad offered consumers more options, denting the





demand for E Ink's ePaper products. This prompted the company to diversify, prioritizing the identification of new applications to stabilize the business.

ePaper labels emerged as the innovative successor. From 2012 to 2016, the R&D team shouldered a significant responsibility as they supported exploring this new application and business opportunity, successfully integrating it into the company's development roadmap.

"By 2016, we had determined that e-paper labels would be our new development direction, ushering the company into a new phase," said CEO Johnson Lee. "Although sales of e-readers are declining, it remains a relatively mature market. The business potential of ePaper labels continues to grow, giving us confidence that we've made the right decision."

The use of electronic shelf labels (ESLs) significantly helps retailers improve operational efficiency and manage inventory more effectively. Especially with labor shortages during the COVID-19 pandemic, the value of ESLs was fully demonstrated, addressing the need for real-time updates on prices and inventory information.

"Over the past year, we've collaborated with partners to help more than 350 retail stores conduct up to 4 billion price updates, which is equivalent to saving 1.6 billion sheets of A4 paper," highlighted Dr. FY Gan, President of E Ink, pointing out that this significant reduction in paper usage underscores the contribution of ePaper to environmental sustainability.



Prioritizing Long-Term Gains and Building a Mutually Beneficial Ecosystem

In navigating the burgeoning ePaper market, the cornerstone of E Ink's growth hinges on cultivating the application market and sustaining investment in research and development, given the relatively nascent technology.

"It is indeed challenging to allocate about 16-18% of our annual revenue to research and development, especially within the prevailing OEM mindset in Taiwan. The evolution of ePaper from black and white to color represents hundreds of millions of US dollars invested in R&D. Despite numerous setbacks, these challenges have not deterred us, " Johnson Lee stated.

"Investing close to US\$100 million in R&D each year puts enormous pressure on the management team," Lee said bluntly. "However, we have the firm support of our founder Ho Shou-chuan, the board of directors, and our shareholders. Prioritizing longterm development over short-term gains is what sets us apart and our enduring strategy. Our goal is to become a truly great company."

Through relentless innovation, raising the technological threshold, and a meticulous patent strategy, E lnk has secured a global market share of over 90% in ePaper materials. Despite this dominance, it chooses an unconventional path—focusing on long-term commitments to industry partners and dedicating itself to the mutual benefit of the ecosystem, rather than prioritizing short-term profit maximization.



Lee noted that during the COVID-19 pandemic, the global electronics industry faced supply chain pressures and rising raw material costs, leading many suppliers to raise their prices. E Ink also faced similar pressures, but after thorough deliberations, the management team decided against raising prices. "As the sole supplier in the market, we certainly have the ability to adjust prices," Lee expressed. "But we prioritize a long-term vision and are committed to maintaining the trust of our partners."

This ethos of mutual benefit is evident in its pricing strategies as well as in its exploration of the new market for e-labels. E Ink aims not just to operate as a company but also to actively foster the ecosystem for the ePaper industry. A key component of their strategy is the company's dual-focused business model.

This model is two-pronged: one for the IoT (such as e-labels) and one for consumer electronics. In the IoT segment, E Ink supplies ePaper materials to ten module manufacturers, with pricing determined by market mechanisms. In consumer electronics, the company has full control over pricing, from materials to modules. This dual-focused approach solidifies E Ink's market position at the source and envisions a promising future in the IoT market. It benefits and promotes the healthy development of the overall ePaper industry chain.

Yet, how does one find like-minded partners to explore new markets in an uncertain future? "This requires first establishing successful and profitable cooperation cases with E Ink, " Lee reflected.

Once it had a successful first mover, more companies quickly joined the partnership, and

now the number of partners has grown to ten. This proves that E Ink has led the way in building a win-win ecosystem and shows that, amid intense market competition, sharing profits and deepening cooperation indeed propel the ePaper industry towards positive growth.

Ecosystem Allies: Driver IC for Four-Color Innovation

Electronic paper display differs from traditional LCD or OLED as it uses tiny ink particles that move under an electric field to display images, a technology known as electrophoretic display. This unique display method necessitates a specific driver IC to control the display effect, making it essential to collaborate closely with IC design houses. The partnership focuses on developing cost-effective products that also cater to diverse product lines.

To ensure supply chain stability and costeffectiveness, E Ink pursues a strategy of engaging at least two IC suppliers for each type of product. On one hand, this mitigates the risk of supply chain disruptions, and on the other, it controls costs through competitive mechanisms, ultimately offering more choices and flexibility for module partners.

Fitipower is one of the driver IC suppliers for E Ink's ecosystem. Young Lin, Chairman and CEO of Fitipower, shared two stories illustrating how close cooperation between them has left significant marks on the evolution of ePaper display.

"We've developed four generations of products with E Ink, each bringing its own set of technological challenges. For example, the earlier eReaders could use a faster page-turning speed, a feature eagerly anticipated by consumers. Achieving this involved more than just IC design. We had to conduct joint

Prioritizing long-term development over short-term gains iswhat sets us apart and our enduring strategy.

CEO of E Ink

 research on panel structure and material properties, which eventually led to more efficient page-turning and enhanced reader experience."

Another story involves ePaper labels. Originally, e-labels used in supermarkets were only available in black and white. Over time, they evolved to include black, white, and red. Most recently, a fourth color has been added—yellow. These four colors not only create a richer visual effect but can also produce new colors, such as orange, helping to capture the attention of on-site customers.

But adding a color requires a dedicated IC driver. Fitipower not only participated in the joint IC development initiative led by E Ink but also committed significant resources. Within just ten months, they produced IC drivers for ten resolutions, enriching the product line in collaboration with E Ink and tapping into new customer segments.

From Supplier to Client: Fostering Ecosystem Comradeship

Innolux President James Yang recalled a memorable story about being a supplier of TFT backplanes for E Ink. Before the COVID-19 pandemic, E Ink faced a significant challenge: a large order for ePaper from the United States needed to be fulfilled days before the Lunar New Year, also coinciding with the company's annual banquet.

"A large order for E Ink was fantastic, but the delivery deadline was extremely tight. Johnson was struggling to meet the capacity needed for the delivery in Taiwan. Upon learning that then Innolux President Wang Jyh-chao and I were in Shenzhen, he made the effort to meet with us and asked for our assistance in boosting production capacity," said Yang. "Ultimately, we allocated our 4.5th generation production capacity of our Zhunan headquarters to help E Ink deliver on schedule."

Yang quipped that this was a classic case of neighborly support, alluding to their Tainan roots. He

acknowledged that the E Ink team has developed and expanded the ePaper technology from MIT in the United States to achieve the world's number one market share under the MIT (Made in Taiwan) name. "Being part of this incredible journey with E Ink has been a privilege and a source of pride for Innolux and myself," added Yang.

Additionally, with E Ink's success in the iteration and development of ePaper technology, particularly the introduction of large-size thin film, Innolux has transitioned from being a supplier to becoming a client.

When E Ink ventured into large-sized ePapers for markets such as smart retail and public electronic displays, Innolux saw energy saving as the right direction and joined the initiative, further investing in the cultivation of professional talents. Yang expressed, "We've invested in a team of engineers with expertise in designing large-sized ePaper structures, optics, reliability, and product management. We then buy materials from E Ink, assemble the modules ourselves, and sell them."

Cross-Border R&D Centers: Balancing Competition and Collaboration

Taking into account the needs of its partners, E Ink's success in recent years stems from its ongoing market expansion and aggressive technological innovation. Particularly through three major mergers and acquisitions, it has harnessed powerful R&D momentum from international professional teams.

Currently, E Ink operates three R&D centers globally, including sites on both the east and west coasts of the United States. These R&D centers are strategically located near top universities and research institutions, providing the company with access to cutting-edge scientific research and opportunities to recruit top-tier talent. Meanwhile, being in tech innovation hubs like Silicon Valley further allows E Ink to engage in exchanges and collaborations with mainstream technology heavyweights.



Notably, each R&D team has its own unique color technology platform. The company's strategic approach encourages these teams to compete with one another while also collaborating when necessary. FY Gan emphasized, "In a market with limited competitors, this mode of internal competition and collaboration helps avoid technological stagnation. It is equally important for driving technological innovation and maintaining our market lead."

How does it foster collaboration and competition among scientists from diverse backgrounds to achieve effective cooperation? In addition to sharing common goals and vision and offering incentives such as stock options and bonus dividends, E Ink's leading position in ePaper materials has greatly contributed to fostering collaboration.

Gan stated plainly, "These scientists all share a common passion for ePaper technology, and E Ink is the best place for them to realize their scientific research and innovation ambitions." By successfully integrating R&D talent, innovating technologies, and dedicating efforts to managing organizational culture and international talent, E Ink continues to reinforce its leading position in the market.

Financial Sustainability: The True Value of Collaboration

With the global shift from corporate social responsibility to a broader emphasis on environment, social, and governance (ESG), E Ink has also embarked on this transformation journey. In response to the vast challenges presented by ESG, it has initiated internal changes by establishing a dedicated task force to ensure the effective execution of its strategic transformation.

Although initially considering building a large team and seeking guidance from external experts, E lnk ultimately chose to form a lean, efficient team of five to drive this initiative. It has innovatively assigned the CFO the additional responsibility for sustainable development goals. This decision highlights E lnk's commitment to closely integrating financial management with social and environmental responsibility, while also underscoring its determination to promote sustainable development within the supply chain.

Johnson Lee explained the rationale, "Having one Chief Sustainability Officer (CSO) specifically for managing ESG responsibilities could potentially limit



our perspective. The scope of ESG is extensive, and the real value lies in collaboration across departments."

"From a financial standpoint, we can more comprehensively assess the effectiveness of investments, ensuring that resource allocation aligns with the overall financial health of the company. After all, implementing projects requires financial support and precise investment management. Identifying core investment areas is crucial. Particularly concerning environmental protection, it not only pertains to our own operations but also encompasses the entire supply chain, involving communication and collaboration with suppliers. It is a lengthy journey, certainly not a task that can be accomplished in the short term."

Lloyd Chen, CFO and Secretary of the ESG

Committee at E Ink, pointed out, "Some people may view sustainability development as merely a form of 'greenwashing'. However, we believe the crux lies in truly embracing this concept and integrating these principles into our daily operations."

For example, before the widespread adoption of ESG concepts, company decisions were often based on cost. Now, as times have changed, environmental standards are considered when designing new products. This demonstrates that the concept of sustainability has been internalized and represents a significant transformation in corporate culture.

Furthermore, E Ink's commitment to sustainable practices has not only deepened its understanding in this field but has also garnered significant recognition both internationally and locally over the past few years. Chen stated, "We have been recognized by international institutions like DJSI, FTSE, MSCI, and have also been affirmed among the top sustainable companies in Taiwan for our corporate governance. Our ranking has improved from the initial top 20% to the top 5%."

E Ink has been conducting bi-weekly crossdepartmental discussions on ESG issues. These meetings are alternately held in the morning and evening to accommodate the participation of overseas colleagues, especially those in the United States. This practice not only promotes the ESG adherence but also bridges cultural differences within the company and fosters the exchange of diverse ideas.

Since 2020, E Ink has begun strengthening the sustainable management of its supply chain. Johnson Lee emphasized, "We are not just passively influenced by the ecosystem chain; we actively seek to influence it. We drive this process through care and stakeholder interest, helping our ecosystem partners understand the benefits of cooperation, thus creating positive momentum."

These efforts have borne fruit, as evidenced by E Ink's scores in the Corporate Sustainability Assessment (CSA), which climbed from 60-65 points in 2021, to 77 points in 2022, and to 89 points in 2023, making it the highest-scoring company in the global ICT field and surpassing other benchmark enterprises in Taiwan.

E Ink's achievements are further highlighted by its recognition in numerous national-level awards in Taiwan, including the Distinguished Enterprise Innovation Award from Ministry of Economic Affairs' National Industrial Innovation Award and the most recent Presidential Innovation Award. The company originally planned to win the Presidential Innovation Award by 2026. However, the team achieved this goal ahead of schedule, demonstrating their commitment to sustainable development and their ability to deliver results in practice.

"There are two reasons for participating in various awards and competitions. First, external recognition helps more people become aware of us and attracts top talents." Lee concluded, "Secondly, each award and evaluation provides feedback, helping us understand our strengths and weaknesses. Participating in award selections allows us to fully identify our blind spots and continuously improve."

Mantra for Success

It has acquired three key ePaper display companies and secured thousands of patents as staunch technology support. It has maintained R&D bases, continued to develop unique technological platforms, and promoted technological innovation both competitively and collaboratively to maintain market leadership.

Implementing a dual-focused business model: For the IoT market primarily focusing on e-labels, multiple module manufacturers are authorized to compete through market mechanisms through its licenses. For the mature e-reader market, pricing control is maintained throughout the entire process from materials to modules. These dual efforts have promoted the overall healthy development of the ePaper industry ecosystem.

It cultivates at least two IC suppliers for each product type to secure the exclusive source of the required IC drivers for the unique display method of ePaper. On one hand, this mitigates the risk of supply chain disruptions, and on the other, it controls costs through competitive mechanisms, ultimately offering more choices and flexibility for module partners.

E Ink Holdings Inc.

1996 🤇	Joseph Jacobson developed microcapsule electrophoresis technology at the MIT Media Lab, Massachusetts Institute of Technology.
2004 🤇	Sony launched its first electronic book reader, the Sony Librie.
2007 🤇	Amazon debuted the first-generation Kindle e-book reader, which sold out within hours of its launch.
2009 🔿	Prime View International acquired E Ink, a company specializing in electronic ink technology and the research and production of ePaper in the US.
2012 🤇	Sipix was acquired to deepen Microcup® technology research and development.
2019 🤇	The first color electronic paper, ACeP, was launched, signifying the beginning of the color era for ePaper.
2022 🤇	uring the pandemic, electronic shelf labels(ESL) saw a surge in adoption across the retail industry, with a global cumulative usage reaching 600 million units.
2023 (The revolutionary new E Ink Spectra ™ 6 was launched, featuring high color saturation and brightness designed to replace paper posters. E Ink Prism ™ 3, a color-changing ePaper film, was launched; collaborated with BMW to develop applications for its use on car surfaces.



- Eink 元太科技工業股份有限公司
- President's Name | Johnson Lee
- Awardee's Address | No. 3, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan
- Time of Establishment | June 16, 1992
- Telephone No | 03-564-3200
- Website | <u>https://tw.eink.com/</u>
- No. of Employees | 1429
- Scope of Operation
- E Ink is a global leader in the ePaper industry, leveraging technology developed by the MIT Media Lab at the Massachusetts Institute of Technology. Known for its ultralow power consumption display characteristics, it is ideal for various applications. It is used in products such as eReaders, ePaper notebooks, and in sectors like retail, logistics, hospitals, and transportation, helping customers integrate the display interface into various surfaces. The ultra low-power ePaper helps customers meet their sustainability goals. E Ink has committed to using 100% renewable energy by 2030 (RE100) and achieving net zero carbon emissions by 2040. This demonstrates its commitment to promoting low-carbon, environmentally sustainable development through its ePaper technology and applications.
- ePaper is a reflective display technology that operates without a backlight, relying instead on ambient light for visibility. It is free from eye-straining blue light, making it suitable for various applications such as eReaders, notebooks, shelf labels, logistics labels, and ePaper billboards. Its visibility under sunlight, low power consumption, and compatibility with solar energy systems position ePaper as a prime solution for ecofriendly, zero carbon emission outdoor ePaper signage. It is the optimal display choice in the IoT era.

Group Category

Bora Pharmaceuticals Co., Ltd.

Bora Pharmaceuticals, Taiwan's Leading CDMO: Model of Globalization for Taiwanese Biotech Industry Expanding from Local to Global Markets

Over the last decade, Bora Pharmaceuticals has swiftly grown through strategic mergers and acquisitions. Combined with solid integration and execution capabilities, Bora is able to become Taiwan's largest CDMO and compete with global players. This expansion has accelerated the development and distribution of new drugs at more accessible prices, invigorating the biopharmaceutical industry both in Taiwan and the world to bring forth more possibilities. Bora exemplifies through concrete actions that innovation is not only just crucial for boosting their competiveness as a company, but also a vital role in advancing enhancing human health and well-being.







The biopharmaceutical sector in Taiwan has evolved over decades. According to the 2023 Biotechnology Industry in Taiwan report by the Ministry of Economic Affairs, there are now 193 certified biopharmaceutical companies in Taiwan, collectively offering 492 products. Despite being a key component of the nation's industrial strategy, Taiwan's biotech industry, particularly in pharmaceuticals, has consistently faced several challenges.

Taiwanese biopharma companies are predominantly dedicated to new drug development. While the exact investment by various firms is hard to quantify, the drug development process - from research and development, pre-clinical trials, clinical trials, and to market approval - is notoriously lengthy, often spanning a decade or more. This process requires substantial financial outlay and has a high burn rate, which can stifle projects before they reach fruition. Companies also face decisions about whether to construct their in-house manufacturing facilities. "The pharmaceutical sector in Taiwan grapples with the challenge of a small domestic market. The limited local demand for pharmaceuticals and health products creates a bottleneck, leading to market saturation for the traditional pharmaceutical sector. Expanding into international markets becomes imperative to overcoming these challenges," said Bobby Sheng, Bora Group CEO & Chairman. To address these challenges, Bobby Sheng initiated his "targeted therapy" strategy ten years ago.

Under Bobby Sheng's management, Bora has been methodically enhancing its capabilities as a CDMO (Contract Development and Manufacturing Organization), achieving both vertical and horizontal integration from distribution to developing and manufacturing.

In essence, a CDMO provides outsourced research, development, and manufacturing services for pharmaceutical companies. "By utilizing CDMO services, new drug developers can concentrate on innovation and brand management. This not only





reduces costs but also speeds up product launches, allowing Taiwanese developers to gain an edge and showcase their capabilities globally," explained Bobby Sheng.

Forging New Paths to Establish a World-Class CDMO

A decade ago, recognizing the talent experiences and service ethos of Taiwan's OEM manufacturing sector, Bobby Sheng saw the potential for establishing a global CDMO service in Taiwan and chose to take the road no one took. The subsequent success of Bora has validated his foresight.

Since 2013, under Bobby Sheng's leadership, Bora has executed eight domestic and international mergers and acquisitions (M&As), becoming Taiwan's largest and most recognized CDMO in the biopharma industry. Bora now operates nine production facilities: For small molecule facilities, there are five in Taiwan, two in the United States, one plant in Canada, and a large molecule biopharma facility. In 2023, Bora's small molecule manufacturing facilities produced around 1.4 billion doses, encompassing six commercial products. Meanwhile, the large molecule facility successfully completed 14 commissioned development projects. Regarding new business expansion, Bora secured a total of 40 commissions on large/small molecule products and new business ventures in 2023. In 2022, its revenue surpassed the NT\$10 billion (~US\$310 million) mark, and in 2023, it climbed further to NT\$14.2 billion (~US\$441 million).

Driving Innovation: Embracing the Crucial Role of Manufacturing in Accelerating Drug Development

Bora is revolutionizing Taiwan's biopharmaceutical industry by transforming manufacturing responsibilities through its CDMO services. Offering one-stop support from clinical batches to commercial production, Bora challenges the conventional Taiwanese biotech model of a single company managing research, manufacturing, and sales. This approach enables drug developers to rapidly bring their products to market and capitalize on the



critical patent period. A prime example is the collaboration between Shine-On BioMedical and Bora.

In early 2023, Bora began its collaboration with Shine-On BioMedical on their groundbreaking Nanobody-based Double Immune Checkpoints Trispecific T Cell Engager, Nano-TriTE (SOA101). Within just one year, Bora and Shine-On successfully completed and optimized the process development, analytical method development, with verification and cGMP production for clinical trials. Shine-On has received favorable feedback from the US FDA, highlighting the success of this partnership with Bora.

Founded in April 2021, Shine-On is dedicated to the innovative development of targeted exosome cancer therapies and trispecific T cellengaging antibodies, aiming to provide patients with highly effective cancer treatment options. "Antibody technology is rapidly advancing, and multispecific antibodies are increasingly prominent in new drug development. Yet, globally, no trispecific antibody drugs have been successfully developed and marketed. We recognized a critical opportunity to be pioneers in this field, and Bora has been instrumental in our efforts to consistently deliver results on schedule," said Jennifer Ho, Deputy General Manager of Shine-On.

To remain competitive, especially in the manufacturing sector, enterprises must achieve certain economies of scale and capital market cap.

. Tololy Shung CEO of Bora



Shine-On selected Bora from numerous CDMOs primarily for its expertise in manufacturing bispecific antibody drugs and its rigorous quality control system, which adheres to both US FDA and EU standards. "Simply having a GMP (Good Manufacturing Practice) facility isn't enough, as this is standard across all CDMOs. The true foundation of successful collaboration lies in the team's experience, professional knowledge, and strong international communication skills," emphasized Jennifer Ho.

Additionally, the development and production of trispecific antibodies present unique challenges due to the absence of prior benchmarks. The complex structure of these antibodies poses unprecedented challenges in maintaining protein stability during scaling and purification processes. It is essential for CDMO providers to be equipped to address these novel challenges. For Shine-On, a positive attitude and strong problem solving capabilities are particularly crucial. "Whenever we present issues, the teams at both Bora and Shine-On collaborate to address them, with additional prompt support from Shine-On's consultants in the US," noted Jennifer Ho. "Bora consistently resolves issues



quickly, devising and implementing solutions within the scheduled timeframe." After more than a year of collaboration, Shine-On regards Bora as a partner rather than just a contractor.

It's noteworthy that partnering with Bora has enabled Shine-On to effectively manage the costs associated with early clinical trials. Looking forward, there is optimism that the cost structure will be further optimized during the mass production phase. "Using the analytical method validation and GMP drug production for SOA101's drug process development as an example, Bora has helped us ensure drug quality, suitable costs, and fast development timelines. This serves as a compelling case for addressing the ongoing challenges in Taiwan's biopharmaceutical industry," concluded Jennifer Ho.

Precise Evaluations and Valuing Talent: Keys to Successful Integration

In a mere decade, Bora has significantly expanded its production capacity and technological scale, establishing itself as a leading manufacturing partner for new drug development at home and abroad. How did Bora manage to achieve such remarkable growth? The answer is: eight successful M&As over the past decade. "The key to Bora's success lies in its focus on professional contract manufacturing and its knack for strategic M&As. This strategy has propelled rapid growth, with every M&A bringing substantial benefits," said Alex Shih, Chairman of Taishin Securities Venture Capital Investment Co., Ltd. The partnership between Taishin Securities Venture Capital Investment and Bora encompasses Bora's IPO, fundraising, transition from OTC to the Taiwan Stock Exchange, and the establishment of a health fund, highlighting their strong relationship.

Bobby Sheng, who evaluates around 80 cases annually, explained his approach to ensuring precision in M&As: "Before pursuing an M&A, it's crucial to first understand your company, clearly define its development direction, and use that understanding to choose suitable targets. Choosing the wrong target from the start can complicate the process, hinder the execution, and potentially lead to future challenges if pursued forcefully." To ensure precision in his assessments, he has established standard operating procedures (SOPs) to evaluate the target company's condition, the capabilities of its management team, and other critical factors.

Moreover, Bobby Sheng emphasized that the most crucial aspect of successful M&As is a focus on talent. "With each M&A, the most valuable assets we obtain are not the facilities or equipment, but the international-level biotech professionals," he stated. From an observer's perspective, Shih greatly admires Bora for its strong focus on personnel and corporate cultural integration during M&As. "This approach not only turns the employees involved into valuable assets for the company, but it also builds a strong reputation for Bora. It instills confidence in international pharmaceutical companies like GSK to entrust their facilities to Bora," Shih noted.

Unlocking Global Opportunities: Gaining Unique Insights into International Markets

Bora's transformative journey into M&As started with the 2013 purchase of the Tainan facility



from Eisai, a Japanese pharmaceutical company. This move marked Bora's transition from a sales agency to a CDMO, making it the first traditional drug agency in Taiwan to venture into the CDMO sector. In 2014, UNION CHEMICAL & PHARMACEUTICAL, a prominent Taiwanese pharmaceutical company, approached Bobby Sheng with an offer to sell its manufacturing plant and 185 drug licenses to Bora.

In 2017, facing declining revenues from generic drugs, the U.S. Nasdaq-listed company Impax Laboratories decided to sell its Taiwan branch in Zhunan Science Park to raise funds. However, high operating expenses and insufficient production capacity at Impax Laboratories Taiwan made many established pharmaceutical companies hesitant to take it over.

Bobby Sheng had an innovative idea. Impax Laboratories Taiwan's Zhunan facility had an annual capacity of 2 billion tablets and capsules. At that time, it was the only pharmaceutical company in Taiwan that exports all of its drugs to the United States, also approved by the US FDA, UK MHRA, and TFDA. "Acquiring this facility offers us a golden opportunity as a stepping stone to the US pharmaceutical market," remarked Bobby Sheng. Reflecting on his bold decision, Bobby Sheng recognized that he was right, as evidenced by the outcomes. Bora became the first pharmaceutical company in Taiwan to successfully step out of the Asian market with a business model centered on CDMO services.

Acquisition of Renowned Pharmaceutical Company Shocks Global Biotech Industry

The acquisition of Impax Laboratories Taiwan

was significant news in the biotechnology industry, but the subsequent merger and acquisition were truly groundbreaking. In December 2020, Bora, with annual revenues of less than NT\$2 billion (~US\$62 million), officially acquired the Canadian facility of GlaxoSmithKline (GSK), taking over a satellite facility from a company with revenues exceeding US\$40 billion at the time. This bold move also marked the establishment of Bora's North American headquarters in Canada.

The task of acquiring a much larger company presented numerous challenges, as one might expect. Bobby Sheng recalled: "Initially met with skepticism, I personally flew to their UK headquarters to meet with them, communicated persistently, and leveraged our track record of past M&As to convince them." Bobby Sheng showcased Bora's strong execution capabilities, demonstrated through the success of several past M&As. These efforts effectively improved the output efficiency and cost advantages of assets, consistently creating a win-win for both the buyer and seller. Furthermore, Bora's commitment to high-quality contract manufacturing, including focus on customer service, and solid reputation in the global pharmaceutical industry were key factors that ultimately sealed the deal.

Despite further challenges in the facility takeover later due to the pandemic, the effort proved worthwhile. Bobby Sheng guided Bora to make history once again, as it became the first Taiwanese company to successfully acquire a worldclass pharmaceutical facility. Consequently, Bora uniquely positioned itself among the global top ten pharmaceutical supply chains. As 2022 unfolded amidst the ongoing COVID-19 pandemic, Bora completed two M&As. One was TWi Pharmaceuticals, including its BPO facility. "For Taiwanese ophthalmic drugs to reach the international market, it was necessary to have a pharmaceutical manufacturing facility approved by the US FDA. Therefore, our team collaborated with American consultants to enhance the quality system, and refine the SOPs, and in 2023, we passed the FDA inspection, becoming the only ophthalmic pharmaceutical company in Taiwan that could export to the US," Bobby Sheng explained the significance of acquiring TWi Pharmaceuticals.

Expanding into Large Molecule Drugs: Broadening Its CDMO Footprint

Bora also transitioned from small molecule to large molecule through M&A, marking a pivotal expansion in Bora's CDMO operations. Large molecule drugs, often referred to as biologics, are created using biotechnology in microorganisms, as well as animal and plant cells. These include substances like insulin, monoclonal antibodies, protein drugs, and nucleic acid drugs, primarily used to treat chronic diseases, cancer, and other serious illnesses. The CDMO market for biologics is experiencing a growth rate of over 11.5%, outpacing the global CDMO market's compound annual growth rate of 7%, indicating biologics as a significant driver of future growth in the biotech industry. Once the opportunity arose to enter the biologics market, Bobby Sheng did not miss it.

Leveraging Bobby Sheng's convincing communication and negotiation skills, Bora acquired the assets of Eden Biologics, including its teams, projects, and equipment to establish a molecular biopharmaceutical facility in Zhubei. This move officially marked Bora's entry into the fields of large molecule antibody drugs, successfully entering into the supply chain of biologics CDMO.

This acquisition established Bora as the first and only CDMO in Taiwan capable of providing a comprehensive range of both large and small molecule drugs. Bora is also actively evaluating opportunities to integrate various advanced technologies and future applications such as the field of cell and gene therapy. Bobby Sheng noted, "Although these next-generation technologies and related applications are still in their initial stages, they are definitely among the main drivers of future industry growth. If we can establish an early presence and prepare in advance, we are confident in overcoming the challenges from customization to mass production."

The global CDMO market is growing and competition is intensifying. "This is a field where production volume and technical scale are crucial, so our aim is to break into the top ten CDMOs worldwide and strive to prevail in the competition among the major players," Bobby Sheng explained. In the global CDMO ecosystem, developed countries in Europe, America, along with Asian nations like China, South Korea, and Japan have traditionally led



Mantra for Success

By moving beyond traditional pharmaceutical business model and targeting the global CDMO market, Bora Pharmaceuticals has completed eight domestic and international mergers and acquisitions in ten years. This expansion across different dosage forms and markets has made Bora the largest CDMO in Taiwan, leading the globalization of the domestic pharmaceutical industry.

With eight small molecule drug facilities and a biologics plant, Bora stands as the only CDMO in Taiwan capable of providing both large and small molecule drugs. It supplies to over 100 countries worldwide, showcasing strong international competitiveness.

A small player taking over a giant, Bora Pharmaceuticals successfully acquired GlaxoSmithKline's Canadian facility, becoming the first Taiwanese biotech company to acquire a world-class pharmaceutical plant. This achievement uniquely positioned Bora within the supply chain of the world's top ten pharmaceutical companies.

Bora has formed a CDMO community in Taiwan that supports domestic pharmaceutical R&D companies in shortening submission schedules, entering the international market, and showcasing Taiwan-made drugs to the world.

the way. Bora is demonstrating with its capabilities that Taiwan will emerge as a formidable contender.

Advancing towards its goal of joining the top ten CDMOs globally, Bora is continuing its M&A strategy. Earlier this year (2024), the company successfully acquired Upsher-Smith, an American pharmaceutical company jointly owned by Japanese pharmaceutical company Sawai Group Holdings Co., Ltd., and Sumitomo Corporation Group. Following this acquisition, the facility will not only serve as Bora's initial stronghold in the US domestic market, but will also position Bora as one of the largest manufacturers of oral solid dosage forms in the United States. Bora plans to utilize this larger-scale production facility base to further expand into the global CDMO market, accelerating the company's expansion and growth in the global market.

Robust Fundraising Capabilities: Building a Solid Cushion for Bora

Andrew Fuh, Bora's CPA and Managing Partner at Ernst & Young Taiwan, has witnessed Bora's growth firsthand. Ernst & Young has fully committed to supporting Bora's M&As. "Honestly, raising funds in Taiwan's biopharmaceutical industry is quite challenging. However, Bora has navigated these hurdles through a well-rounded strategy that includes private/institutional investments, bank financing, and various funding avenues like IPOs," he explained.

Fuh credits Bobby Sheng's charismatic leadership and communication skills as key elements to Bora's fundraising successes. "His sharp insight into industry trends is remarkable," Fuh noted. "He accurately foresaw the trend towards shortening supply chains and strategically expanded production bases from Taiwan to America, achieving the goal of localized manufacturing."

Looking ahead, Bobby Sheng outlines two primary objectives for Bora. The first is numbers, focusing on continuous revenue growth. The second is mission-oriented: "We aim to boost Taiwan's presence in the global pharmaceutical market, showcasing Taiwan's capacity to produce high-quality drugs that can benefit the global community," he explained. As a leading figure in Taiwan's pharmaceutical CDMO industry, Bora Pharmaceuticals remains committed to innovation and aspires to become among the top ten CDMOs globally.

Bora Pharmaceuticals Co., Ltd.

2007	Bora Pharmaceuticals, headquartered in Taipei, was established with a focus on CDMO services.
2013 (Bora acquired Eisai Tainan, a Japanese owned facility in Southern Taiwan, marking its entry into the field of drug manufacturing.
2017 Ċ	Bora was listed on the Taipei Exchange (TPEx: 6472).
2018 💧	Bora acquired Impax Laboratories Taiwan, entering the US CDMO market and obtaining Taiwan's largest facility for oral dosage forms. This facility was the only one capable of exporting all its products to the US at that time.
2020 🌔	Bora acquired GSK's pharmaceutical facility in Canada, establishing its North American headquarters.
2022 (Bora Biologics was established and Eden Biologics was acquired, marking its official entry into biologics production. It also acquired TWi Pharmaceuticals, gaining two production bases and further expanding its market presence in the United States.
2023 (Bora was listed on the Taiwan Stock Exchange and formed a strategic alliance with SunWay Biotech Co. to enter the global health and wellness product market.
2024 🤆	Bora acquired the long-established and renowned American pharmaceutical company Upsher-Smith, propelling itself to the forefront of the global CDMO and sales market.

Bora bora Pharmaceuticals



President's Name | Bobby Sheng

Awardee's Address | 6F., No.2, Aly.36, Ln.26, Ruiguang Rd., Nei Hu Dist. Taipei 114, Taiwan

Time of Establishment | June 12, 2007

Telephone No | 02-2790-1555

- Website | <u>https://bora-corp.com/?lang=zh-hant</u>
- No. of Employees | 1046 (1895 globally)
- Scope of Operation

• Global CDMO (Contract Development and Manufacturing Organization) services:

Bora offers comprehensive services for the development, testing, certification, and delivery of both large and small molecule drugs, tailored to the diverse needs of global customers. The Taiwan facilities produce a variety of dosage forms, including solid (tablets and capsules), liquid, suspension, semi-solid formulations, and ophthalmic products like eye drops and ointments. Additionally, the Taiwan facility boasts biologics CDMO capabilities that adhere to international standards and cater to the Asia-Pacific region. The manufacturing facilities in the United States primarily focus on the production of solid dosage forms and are among the largest oral solid dosage manufacturers in the country. Meanwhile, the Canada manufacturing facility primarily focuses on liquid and semi-solid formulations, while also producing solid dosage forms.

• Sale of pharmaceuticals and health products:

Bora's global sales business encompass a range of dosage forms, which include the distribution of self-branded and imported healthcare products through agency agreements. The majority of its sales and distribution revenue is generated through self-owned generic ANDA or generic sales rights in the United States, including authorized generic drugs. Domestically In Taiwan, Bora's sales focus on oral tablets and capsules for conditions such as low blood pressure, epilepsy, and gastroesophageal reflux disease (GERD).





Group Category ZECZEC CO., LTD.

Crowdfunding Ignites the Potential for Innovation with 1,800 Proposals Each Year

As a trailblazer in Taiwan's crowdfunding scene, Zeczec Co., Ltd. not only offers a platform for showcasing creativity and products but also a nexus for creators and entrepreneurs to engage directly with backers and supporters. With its transparent fundraising guidelines, robust business infrastructure, and analytical approach to marketing data, Zeczec attracts more than 1,800 proposals yearly from small and medium enterprises, startups, and designers in sectors like retail, environmental protection, publishing, and social innovation. Amassing over 3.8 million backers, Zeczec unlocks opportunities far beyond conventional investor channels.


n May 2024, updated records on the Zeczec platform reveal three impressive figures: over NT\$12.9 billion (~US\$400 million) from one-time pledges, more than NT\$140 million (~US\$43.5 million) from subscription-based pledges, and a cumulative total of 4 million backers.

In August 2023, the platform's co-founder, Quake Hsu, held a press conference to announce that Zeczec had received NT\$10 billion in pledges. The data demonstrates a consistent upward trend in the crowdfunding market, maintaining its growth even after a sharp spike during the COVID-19 pandemic followed by a period of normalization.

Since its inception in 2012, Zeczec has been at the forefront of crowdfunding in Taiwan, growing to become the country's largest crowdfunding platform. For over a decade, Zeczec has shaped fundraising trends and facilitated the creation of unique products and exceptional experiences by consistently enhancing commercial trust. Successful fundraising enables backers to receive pre-order rewards and contribute to creating positive outcomes; if a campaign fails, the pledged funds are fully refunded, minimizing the risk for project creators.

Crowdfunding first gained traction as an alternative funding source for those struggling to secure capital, particularly after the global financial crisis, when traditional financing avenues became increasingly conservative. Over time, the commercial value of crowdfunding has become apparent not just in fundraising, but also in market risk assessment. "Crowdfunding serves as a rational market survey that uncovers true market demand by identifying who is willing to pay for a product," Quake Hsu explained. "This enables creators and entrepreneurs to gauge market response beforehand, helping them steer clear of uninformed production."

Remote Work: Task Assignment in a Flat Organizational Structure

In the early 2010s, when crowdfunding was a relatively novel concept, Quake Hsu and his colleagues had to scour various startup incubators across Taiwan to seek project proposals. A decade



later, the situation has completely reversed. Today, the platform receives over 1,800 proposals annually, spanning various themes and diverse areas. To this day, Hsu still dedicates 10% of his time to actively exploring interesting projects and identifying intriguing proposals, ensuring the crowdfunding platform remains diverse and dynamic, rather than homogeneous.

Zeczec embraces a fully remote work model, a practice that originated from Hsu's needs when he started the business. "In 2012, I was still working in the UK as an architect while running this part-time business in Taiwan. Due to geographical and time differences, colleagues from both locations had to collaborate online. This marked the beginning of our remote work model."

This model has naturally attracted talent who value flexibility and possess a high degree of selfdiscipline. Despite growing to nearly 50 employees, the company still operates without a fixed office, using shared spaces in startup clusters and renting meeting rooms and private booths as needed. Among them, more than half of the employees are proposal managers (PMs) who work remotely based on the location of the proposals.

On the other hand, it operates with a flat, functional structure consisting of groups such as project management, quality control, and website development/maintenance. Instead of traditional hierarchical management positions, it encourages



active participation from all members. "We primarily use task grouping, selecting individuals from various core functional groups to form teams that advance business plans. Once the task is completed, the team disbands, and members return to their respective functional groups," Hsu explained. "Most new colleagues are brought in through internal referrals rather than open recruitment, with the hope that they will come with a sense of alignment with the company's culture and values."

Zeczec also highly values individual attributes. Each PM brings their unique persuasive skills some excel in public speaking, others are adept at organizing data, and some have a strong ability to empathize and listen. Hsu takes these personality traits into account when assigning projects.

"If the proposer is an efficient boss, it's better for us to present key data succinctly rather than rely on someone eloquent but long-winded. Conversely, if the proposer shares a pitch with profound stories, colleagues who are empathetic and patient listeners are the ideal candidates. As a matter of fact, matching the right skills to the task significantly impacts the success of a proposal."

Four-Stage Proposal: Dedicated PM on Standby

"Humans cannot create entirely new things out

of thin air. Innovation requires ample information and life experiences. The primary reason crowdfunding can drive innovation is due to the abundance of proposal resources." Quake Hsu stated plainly, "We communicate with over 1,800 proposers each year, effectively studying the same number of cases. Behind every proposer, there are unique elements, whether related to the industry or the product. The Zeczec platform is able to innovate thanks to the many proposers who provide us with rich materials and experiences to learn from and reference."

At Zeczec, proposals must meet specific criteria: the proposer must be a citizen of Taiwan; pre-order products must be launched in Taiwan first; and if the proposal involves global fundraising, the product must also be launched globally.

A fundraising campaign is divided into four stages: preparation, pre-heating, launch, and feedback. The first stage, preparation, involves assessing feasibility. Zeczec assigns a proposal manager to act as a 1-on-1 coach for the project and, if necessary, invites professionals from relevant fields to provide consultation. Hsu remarked, "This is what sets us apart, providing the early support that Taiwanese proposers truly need."

Reviewing is like a persuasive confrontation process; it is also a collaborative effort by both parties to refine the proposal. Anyone seeking



crowdfunding must first ask themselves: Do I have the technical ability, experience, and team manpower necessary to realize this idea? During the preparation period, it is also crucial to evaluate the actual funding needs of the proposal to avoid inaccurate estimates due to lack of experience.

The second stage is the pre-heating. Before going live, a fake door test is conducted to allow the proposer to adjust the page materials and design, generating buzz for the actual launch. The pre-heating strategy leverages the psychological principle of herd mentality to create a "crowd effect" online. Zeczec uses social media to attract potential backers to upcoming project launches in advance. Through survey advertisements, they engage these backers in selecting project promotional materials and providing price suggestions, thereby increasing their anticipation and involvement in the project.

During the pre-heating stage, proposers can gather specific consumer opinions and tweak their product or marketing strategy accordingly. Hsu stated, "The pre-heating stage not only generates essential buzz but also establishes a direct and close connection between the proposer and the backers, which is a crucial step for a project's success."

The third stage is the official launch, where attention is drawn through visual materials, and the goal is to achieve the fundraising target within the specified time frame. The final stage involves producing the product or reporting on the progress of activities after successfully raising the funds. This stage is often overlooked, but it is crucial for maintaining the trust and support of backers.

Effective Crisis Management: A Pillar of Trust

In business, nurturing repeat customers is essential. Crowdfunding platforms also value repeat

project proposers. However, after one proposal cycle ends, when the same proposer pitches a new project, the fundraising results can vary significantly.

Quake Hsu observed, "Successful proposers are often perfectionists." They are uncompromising about production defects and will honestly inform the backers, proposing a solution without delay or avoidance. Once backers accept their crisis management approach, most will continue to support them—not just for this project, but also for future campaigns from the same proposer.

A prime example is uanuan, initially known for its stainless steel cutlery. "No matter how well we plan and prepare for crowdfunding proposals, there are always uncertainties and what we call shipment risks," said James Wang, uanuan's creative director. "But by maintaining a sincere attitude and approach to communication, we have gained the understanding and support of substantial backers."

Wang shared his experience, highlighting that production challenges include scheduling and technical issues, as well as unforeseen external factors like equipment delays caused by the pandemic. To mitigate risks, they do their best to open more molds and engage multiple suppliers to ensure the stability of the production process as much as possible. "Even so, when production hiccups occur at the factory, we always clearly communicate our resolution plan to the backers. If we sense that they are unwilling to wait or are concerned about the delay, we'll advise them to cancel their order. This is our commitment to responsibility."

Millions NTD Raised: Launching an Original Epic Board Game

After ten years of refinement, Zeczec has

Funke Hen Zeczec Co., Ltd.

Crowdfunding in Taiwan is continuously innovating, fueled by an abundance of proposals that bring forth interesting, meaningful, and valuable projects on a consistent basis.

evolved into more than just a channel for capital aggregation. It now plays a crucial role in market testing and risk assessment, which is especially important for early-stage creative or entrepreneurial projects. KJ Chang, the founder of Mizo Games, lauds the multifaceted support provided by the crowdfunding platform.

Starting in 2017, Mizo Games successfully raised NT\$14.55 million (~US\$ 450,000) over three consecutive years for their original historical board game series, Raid on Taihoku: Epic Collection, on Zeczec. This game is themed around the air raids of three cities in Taiwan (Taipei, Kaohsiung, and Keelung) during World War II. Despite tabletop games and crowdfunding being niche markets at the time, it achieved extraordinary success.

Chang, a self-proclaimed history buff, founded a local board game development team in 2016. Back then, the market for original games was small and prices were low, but he chose to develop a largescale, elaborate game from the outset. This decision led to higher costs and larger print runs, prompting him to seek funding and marketing channels on crowdfunding platforms.

Since players could not physically see the game, Chang placed special emphasis on effectively conveying the design concept to attract backers' attention. He took several unconventional steps, including securing the rights to use the song Defenders of Bú-Tik Palace by the band CHTHONIC. He used this song in the teaser trailer of the board game and in a crowdfunding preview trailer that resembled a music video, simply because the song's vibe matched the game's theme. Not to mention, all the buildings from the Japanese colonial era featured in the board game were meticulously hand-drawn by artists. These expenses were virtually unheard of in Taiwan's board game industry.

In the past seven years, every Mizo Games project has chosen to raise funds and market on Zeczec. "This platform has built a community of people who believe in startups, are willing to give opportunities, and are curious about new things," Chang concluded. "For many board game buyers or distributors, seeing our board game on Zeczec instills confidence in them; for us, it's become a natural process for launching a new product."

Welcoming the Tiger God at a New Temple & Transforming Century-Old Flower Tiles into Calendars

Moreover, Zeczec's cumulative three million plus backers are themselves a significant driving force. This support has been crucial in advancing crowdfunding cases for cultural assets or social issues that require substantial funding.

Quake Hsu, who is professionally an architect, highlighted a particularly intriguing case. Due to urban planning, the Wufu Temple in Luzhou was demolished. After many years, the temple managed to raise enough funds to purchase a narrow plot of land near the community park. However, there were still insufficient funds to build a new temple to welcome back the Earth God and Huye (Tiger God). After receiving divine approval through the casting of lots, Zeczec launched a three-stage fundraising





campaign to build the temple and successfully raised over NT\$17 million (~US\$530,000) to begin construction. Following media coverage of the project, the number of supporters surged from nearly two hundred to over two thousand. The proposal and reward items all received approval from the Earth God before production commenced.

One noteworthy aspect is that the construction team for this local temple incorporated modern architectural elements into the renovation, such as varying column heights and an exterior that distinctly differs from traditional temples, offering worshippers and visitors a fresh impression. The proposer maintained the traditional practice of commemorating donor names, but shifted this from the walls to the floor tiles, effectively blending new and old cultural elements.

Meanwhile, at Zeczec, we also observe cultural creatives breaking traditional molds and utilizing crowdfunding to drive ongoing innovation in cultural assets. The Museum of Old Taiwan Tiles is one such example.

The Museum, founded by a group of dedicated individuals who invested over 20 years of their youth and savings, professionally restores and repairs over 10,000 pieces of century-old flower tiles found in people's ancestral homes. The Museum offers free admission and requires stable, continuous funding for its operations. Consequently, they turn to Zeczec to seek financial support. In 2020, the Museum began by selecting two flower tiles, which they remade into threedimensional hand-painted pieces. This campaign resonated with over 3,000 people, helping to raise more than NT\$5 million (~US\$155,000) in funding. These reborn flower tiles were imprinted with a serial number and engraved with a name specified by the backer, potentially serving as a family heirloom. That campaign was a success, but it also prompted the Museum to consider more sustainable practices: "If culture is merely preserved, it will eventually fade; only by integrating culture into daily life can it endure." The creation they realized is the exquisite Taiwan Tiles Calendar.

In 2022, the Museum applied an intellectual property mindset to select 365 pieces from a database of tens of thousands of flower tiles and transformed them into a beautiful calendar. The campaign raised over NT\$10 million (~US\$310,000) with more than 6,000 backers. The calendar features information, such as the name of the tile, the year of production and origin, and the meaning of the pattern, effectively making it a tile visual book. It serves both as a research tool and a source of creative inspiration.

In addition to receiving excellent reviews, the Museum continued to inject new vitality into old tiles by releasing the 2024 edition of the calendar. The campaign still attracted over NT\$10 million in crowdfunding and was supported by over 6,000 backers. This edition features a variety of patterns and color schemes, sometimes aligned with solar terms, sometimes with festivals or moods. The colors of the flower tiles are used as the background for the calendar, highlighting the beauty of glaze colors from a century ago.

International Brands Pilot and Test Potential Products

In 2022, Zeczec was approached by a Korean home appliance brand about potential collaboration opportunities. Some agents had no intention of introducing certain products, prompting the brand to explore using the crowdfunding platform as a way to give well-designed products a chance to shine. Quake Hsu saw this as an opportunity to develop new clients: "When a brand's customer base comes to Zeczec, they might explore other proposals on the platform, inadvertently increasing the likelihood of further engagements."

His expectations were indeed proven correct. The Korean company LG has pitched seven projects so far, all with outstanding results. Particularly notable is LG's design capability to combine innovative features with high-quality aesthetics. Their first proposal, a wireless portable touch screen, features a 27-inch FULL HD IPS screen that can be moved freely, creating a personal entertainment experience. This campaign alone raised NT\$ 30 million (~US\$934,000), with over a thousand backers. Furthermore, the two parties collaborated again at the end of 2023 on a new product that combined a vacuum cleaner with a floor-sweeping robot. Interestingly, this product was the winning entry in an internal design competition at LG, but it never actually went into mass production. Although it was launched on a crowdfunding platform in South Korea, the results underperformed.

Unexpectedly, it garnered much better results on Zeczec, raising nearly NT\$6 million (~US\$187,000) and receiving excellent reviews, demonstrating a stark contrast in market response between the two locations. Taiwan was the first market to globally launch this product, which later became available on the official LG online store, bringing this well-designed product into the spotlight.

Future Outlook: Creating a Fundraising Industry Ecosystem

Zeczec's next goal is to raise a cumulative total of NT\$20 billion pledges (~US\$623 million) by 2026. How can this momentum be extended to a broader vision on the existing foundation? Quake Hsu envisions a crowdfunding ecosystem.

The crowdfunding market has evolved from its early stages, with platforms, proposers, and backers now attracting more participants, including



Mantra for Success

By continuously strengthening its business models, it has driven the fundraising trend in Taiwan. Successful fundraising enables backers to receive pre-order rewards and contribute to creating positive outcomes; if a campaign fails, the pledged funds are fully refunded, minimizing the risk for project creators.

A fundraising campaign consists of four stages: preparation, pre-heating, launch, and feedback. It has dedicated proposal managers (PMs) in place to assist the proposer in reviewing their technical expertise, experience, and feasibility of manpower, and in setting an appropriate funding amount.

Before going live, a fake door test is conducted to allow the proposer to adjust the page materials and design, generating buzz for the actual launch. This process also gathers specific consumer opinions, enabling the proposer to tweak their product or marketing strategy accordingly.

After the official launch, attention is drawn through visual materials, and the goal is to achieve the fundraising target within the specified time frame.

After successfully raising funds, the platform's quality management system is used to track the progress of the proposer's product shipment or activities. If unexpected problems arise, the PM collaborates with the proposer to openly communicate and propose solutions, aiming to gain the understanding and support of backers.

marketers, consulting firms, advertising service providers, and key opinion leaders promoting crowdfunding. These participants are collectively building the crowdfunding ecosystem, with the platform's role being to provide volume and economic scale to support it.

Additionally, Zeczec is considering promoting the products and services proposed in Taiwan to the international market. They noticed that certain foreign products, once localized in Taiwan, received crowdfunding support several times higher than in their home countries. Consequently, they have begun researching how to bring Taiwanese products to the international market through platforms like Kickstarter, Indiegogo, and crowdfunding platforms in Japan and South Korea.

In August last year, when Zeczec announced its cumulative pledges had surpassed NT\$10 billion, it also revealed plans to establish an early-stage venture capital fund. This fund will focus on three major directions: originality, Taiwanese culture, and local industries, showcasing its commitment to innovation and development. "From a venture capital and fundraising perspective, crowdfunding is not a process from 0 to 1, but rather from 0.1 to 1," said Hsu. The reason for this is that our review standards require functional prototypes, not just graphic design drawings. Before a project goes online, it must pass through the planning and early development stages with verifiable models. These stages require funds and resources."

It is unfortunate to see many proposals exhaust their resources or be deemed too high-risk in the early stages, forcing them to terminate. Therefore, Zeczec combines its own project service experience with the support of partners who share the same values to establish an early-stage fund. "The goal is to provide more opportunities for proposers from different industries, helping them overcome the challenges of creating functional prototypes and generating valuable and innovative ideas." A fundraising platform must continually introduce new elements. This is crucial for maintaining Zeczec's vitality and fulfilling its mission.

Zeczec Co., Ltd.

2011 C 2012 C 2014 C In the summer of 2011, the name Zeczec, derived from the Chinese phrase zezechengqi (to be amazed), was chosen for Taiwan's first crowdfunding platform.

At midnight of February 24, 2012, the platform and its first campaign, "No More Future, No More Past Hand-printed Shopping Bag," were officially launched. The campaign concluded successfully on April 15, with a total backing of NT\$16,400.

On August 25, 2014, the Stair-Rover Longboard became the first crowdfunding project in Taiwan to exceed US\$1 million in backing, ultimately raising a total of NT\$39,062,040 (~US\$1.2 million).

- On April 10, 2020, the "TaiwanCanHelp" fundraising campaign for an advertisement in The New York Times became the fastest project on the Zeczec platform to attract over 10,000 backers.
- On November 27, 2020, then President of Taiwan, Tsai Ing-wen, in collaboration with the Huikuang Guide Dog Foundation Taiwan, launched the 2021 Charity Desk Calendar: Healing Every Day with Love! on Zeczec.

202I

2023

On July 30, 2021, the Roborock S7 robot vacuum raised NT\$211,526,716 (~US\$ 6.5 million) on Zeczec, becoming the highest-funded project not only on Zeczec but across all of Taiwan.

- On May 16, 2023, the Hiding Tou beverage cup campaign attracted pledges from 31,089 backers, making it the project with the highest number of crowdfunding participants on Zeczec.
- On August 4, 2023, the total pledges on the Zeczec platform surpassed NT\$10 billion (~US\$ 311 million).





President's Name | Quake Hsu
Awardee's Address | 4F., No. 30-2, Beiping E. Rd., Zhongzheng Dist., Taipei City 100, Taiwan

Time of Establishment | March 16, 2012

Telephone No | 02-2321-8690

Website | <u>https://www.zeczec.com/</u>

No. of Employees | 50

Scope of Operation

- Crowdfunding platform services
- Project manager consultant: providing related identity, financial flow, and project management services
- Other special demands, including additional digital services, public relations crisis management, and more
- Website functionality development
- Special business collaborations



National Tsinghua University Burn J. Lin, Distinguished Research Chair Professor Bito Keng-Ming Liu, Creative Director

Presidential Innovation

NTHU

CoSR



Individual Category

National Tsinghua University Burn J. Lin, Distinguished Research Chair Professor

Leaping Six Generations: The Odyssey of an Immersion Lithography Expert in Mass Production

Tracing the history of semiconductor technology, Academician Burn J. Lin, a foremost scientist in optical lithography, made a pivotal contribution by introducing the concept of immersion lithography using water as the medium at the 193 nm vacuum wavelength. He successfully convinced the industry to adopt this as a mainstream technology. This groundbreaking process, evolving from theoretical invention to mass production on the production line, positioned Taiwan to set industry standards for the first time. It enabled the country to leapfrog six technological generations and emerge as a global leader. Holding numerous prestigious titles, Burn remains committed to advancing semiconductor education in his later years, spearheading a newly established college dedicated to nurturing domestic semiconductor talents.







College of Semiconductor Research



hen I began working with projection lithography, the minimum linewidth was 2000 nm. Now, it has been reduced to 5 nm. With each generation shrinking by about 70%, we have progressed through sixteen generations. God orchestrated my journey to IBM, providing me with the prime opportunity to contribute to the advancement of semiconductor technology. Later, the fortuitous chance to join TSMC and apply my research on a leading mass production platform was a remarkable turn of events." — Burn J. Lin, "Put Your Mind on Your Life, Work, and Family", 2018

In 1942, Burn J. Lin, a second-generation overseas Chinese, was born in Cholon, near Saigon, (now Ho Chi Minh City) Vietnam. His father, William Lin, an educator, founded Vietnam's first English school, William Lin Middle School. At 16, he came to Taiwan by himself, with a camera and blessings from his elders, and enrolled at Hsinchu Senior High School. After earning his degree in Electrical Engineering from National Taiwan University, he went on to obtain a doctoral degree from Ohio State University in the United States.

In his book "Put Your Mind on Your Life, Work, and Family", Burn recounts how his doctoral dissertation advisor, Stuart A. Collins, introduced holography to Ohio State University. "After learning about holography, I wanted to focus on nothing else. Because of my passion for photography, the ability to accurately preserve three-dimensional images held significant meaning for me. So I became his student, focusing my research and dissertation on holography."

Before completing his Ph.D., he heeded his advisor's recommendation to send job applications to industry members listed in The Journal of the Optical Society of America, as these large optical research institutions were seeking researchers with doctorates. Despite not hearing back from companies like Kodak and Itek that he was keen on, he landed an interview invitation from IBM's Thomas J. Watson Research Center.

"Why would a computer company engage in optical research? How am I of use to them?" He still attended the interview and was scheduled to give a presentation that included advanced equations and



experimental data. Two weeks later, he received an offer from IBM.

IBM Ventures into Photolithography: Pioneering Alone in Deep Ultraviolet Light

Burn J. Lin's tenure at IBM marked the start of his journey into the world of optical lithography. At the time, IBM was employing near-field imaging technology for semiconductor chip production and bubble memory disks, which offered ten times higher density than semiconductors. He was involved in developing both technologies, which taught him the processes of using photoresists.

During this period, Burn worked with photoresist experts to initiate deep ultraviolet (DUV) lithography. This involved shortening the wavelength of light to 248 nm, achieving a linewidth that was ten times smaller than what was produced on the production line. Back then, the term DUV did not exist; it was coined by him and his colleagues specifically for a paper submission. More than 40 years later, the term is still widely used by semiconductor manufacturers.

Notably, IBM had a large team working on



X-ray lithography, similar in scale to today's EUV lithography efforts, while Burn led a much smaller group focused on developing DUV lithography. Despite repeatedly highlighting the reasons why X-rays could not be used for features smaller than 250 nm as well as many other reasons and that the budget for DUV would only be one-tenth of that for X-rays to achieve results surpassing those of competitors, he struggled to secure the necessary funding.

At the time, IBM's photolithography efforts encompassed X-rays, electron beams, and ultraviolet light, all overseen by a supervisor who favored X-rays. In a humorous episode during a monthly meeting, the boss sat at the head of the long table, while most attendees were sitting on his left side, and only Burn was on his right. The boss jokingly said, "Look! Ultraviolet light is so lonely." Burn looked around with a smile and said, "I chose the side with the most growth potential."

As near-field imaging approached its theoretical limits, Burn shifted to using lens imaging for projection lithography, which became a cornerstone for advancing Moore's law. In this highly challenging and opportunity-rich field filled with skilled professionals, he continued to make significant research and invention contributions. These included uncovering the previously unknown impact of simulated machine vibrations on imaging tolerance in photolithography; developing techniques for optical proximity correction (OPC) generated by increasing resolution, which became essential in semiconductor production; and advancing Moore's Law by six generations through immersion lithography.

Entrepreneur at 50: TSMC Invites His Return to Taiwan

After 16 years at IBM's Watson Research Center, Burn was relocated to Burlington, Vermont, to lead forward-looking research and development at its semiconductor plant. The goal was to develop technology two generations ahead of massproduced products, with a focus on 0.5 and 0.35 micron DRAM. Following the breakthrough in phase shift mask within the photolithography field, Burn was sent to Austin, Texas, by the SEMATECH consortium (Semiconductor Manufacturing Technology) to help advance this technology. This role provided him with increased opportunities to collaborate with photolithography experts from other companies.

Approaching his fiftieth birthday, IBM announced an early retirement package for employees. Initially, he hadn't considered retiring, but colleagues in New York persuaded him to take advantage of the generous retirement plan, warning that terms might worsen in the future. The idea of early retirement started to take shape.

"My position at IBM was very secure, almost like a guaranteed lifelong job. The decision came down to whether to spend an entire lifetime at IBM or venture out and start my own business." Burn's inventions had earned numerous patents for the company. By starting his own business, he could secure patents for his own company and concentrate on what he deemed most important. The downside was the need to rebuild the entire support structure from scratch. After deciding to take the early retirement package and leave his job of 22 years, Burn founded his own company, naming it Linnovation (Lin + Innovation).

In February 2000, nine years after founding his company, Burn unexpectedly received an invitation from then TSMC Vice President Chiang Shangyi to join the company. Initially, Chiang planned to establish two departments: one dedicated to chip photolithography and the other to photomasks. Burn believed that the imaging of chips and masks had many synergies and should be developed together--a very forward-thinking idea.

Later, he was invited to fly to Taiwan in March to meet with a group of senior executives at TSMC. "The interview went smoothly. Some had heard my speeches, others had taken my classes, and a few were former colleagues from IBM. The only person I didn't know beforehand was Vice President Chiang," said Burn.

Burn's excitement stemmed from realizing that his expertise perfectly aligned with the needs of TSMC, a highly successful company. He saw a group of intelligent and capable individuals, with whom he saw the potential to collaborate and achieve great things. However, as a devoted Christian who came to faith at the age of 14, he always sought the Lord's will when making important decisions. This time, the answer to his prayer came from 1 Corinthians 2:9 in the Bible: "What no eye has seen, what no ear has heard, and what no human mind has conceived—the things God hath prepared for those who love him."

In April of that year, Burn left behind 38 years of life in the US and moved to Hsinchu with his wife. He then led TSMC's Micro Patterning Technology Division (MPTD), which later became Nano Patterning Technology Division (NPTD), for 15 years, during which the team members expanded from 50 to over 700. By the time he retired in 2015, the photolithography generation had advanced from 130 nm to the brink of mass-producing 7 nm technology, with research and development moving towards 5 nm.

The Perfect Match - Water as a Medium at a 193nm vacuum Wavelength

In his preface to Burn's book, Chiang Shangyi, former co-COO of TSMC, highlighted Burn's most significant contribution to semiconductor technology development: proposing the concept of immersion lithography and successfully convincing the industry

C The power of mutual assistance is invaluable, and we must not disregard the achievements of our predecessors. We innovate to create useful new products.

Dean of the National Tsinghua University College of Semiconductor Research (CoSR)

to adopt it as a mainstream technology.

In 2002, the industry was poised to replace 193 nm with 157 nm. However, the challenge was producing the perfect lens material that could enable high-fidelity imaging of deep ultraviolet light at 157 nm. At this critical juncture, Burn diverged by proposing a new concept of immersion lithography using water as the medium at the 193-nm dry wavelength.

In Putting Your Mind on Your Life, Work, and Family, Burn elaborates on the innovative journey from invention to mass production. He actually proposed the concept of immersion as early as 1987, but it wasn't until all dry lithography innovations were exhausted, the 45-nm node was at stake, and a research report from MIT Lincoln Laboratory was published on the refractive index of various liquids Burn discovered that using water as a medium for the 193 nm dry wavelength was the optimal solution for semiconductor production.

PODD

That study primarily focused on 157nm immersion fluids, but these fluids had low permeability and were oil-based, with some of them even posing a risk of contaminating the chips. Fortunately, the Lincoln Lab people also measured the refractive index of water and found it to be 1.46 at the 193 nm dry wavelength. Due to the lack of transparency, the refractive index of water at 157 nm wavelength could not be measured nor could be used for imaging.

"When I saw the number 1.46, something clicked." Burn's knew that the refractive index of water is around 1.3 at normal wavelengths, so using water as an immersion medium could only improve it by about 30%. Switching to the available shortest wavelength of 193 nm, with a refractive index of 1.46, water could increase the resolution by 46%, avoiding all the challenges associated with 157 nm. This offered higher resolution than the 157 nm, and since water was already widely used in semiconductor production lines, its acceptance was not an issue. It truly was a perfect match.

In September 2002, Burn was invited to speak on immersion lithography at a workshop on 157 nm technology. He pointed out using water at 193 nm could advance technology by one generation beyond the dry process of 157 nm and was easier to develop. It garnered an enthusiastic reception and sparked widespread discussions among everyone during the break.

The ripple effect continued to grow. By February 2004, at the SPIE International Conference on Photolithography, thousands crowded the venue for the 193 nm immersion lithography presentations, overshadowing the 157 nm session which was attended mostly by speakers.

Optical Experts Unite: ASML and TSMC Achieve Successful Mass Production

However, such a landslide proposal hit both supporters and opponents alike, causing quite a stir in the technology communities and even more so among business interests. To persuade experts in the field, Burn spent months traveling to the United States, Europe, and Japan, exchanging ideas with major equipment manufacturers and potential users. Meanwhile, Chiang defended him against backlash from interest groups in Taiwan.

Burn led his team in publishing papers at international conferences, demonstrating the feasibility and advantages of immersion lithography from a theoretical perspective. They also refuted various negative misconceptions and applied for patents early on. Most importantly, it was necessary to persuade manufacturers to supply the machines.

Convincing scanner manufacturers to research, develop, and mass-produce immersion machines was challenging. At that time, the global R&D direction was focused on 157 nm, with investments exceeding US\$ 1 billion; one aligner manufacturer claimed to have invested over US\$ 700 million.

For this reason, Burn's team traveled to the Netherlands, Germany, the United States, and Japan for technical and business discussions. After over a year of diligent efforts, in October 2003, during a technical discussion in the Netherlands, ASML showed first imaging on photoresist using the newly developed immersion scanner, a moment of joyous triumph for everyone involved. Both companies then dedicated many years to tirelessly refining their machines and processes, ultimately mastering the use of immersion lithography for mass production.



When Chih-ming Ke, TSMC's deputy director of the Nano Patterning Technology Division (NPTD), accompanied Burn to ASML for technical discussions that year, the key negotiator was Chief Technology Officer Martin van den Brink, a main driving force behind this technological innovation and retired from his position as co-CEO in 2023.

"I was deeply impressed by the atmosphere created as Burn and Martin sat together and conversed. Both were very calm and patient while discussing technical details, resembling masters exchanging moves," said Ke. Essentially, this represented a significant shift that completely reversed the company's investment direction.

Chih-ming Ke noted that the immersion scanner proved successful within about a year, partly because the competition in the 157 nm field had yet to overcome its bottlenecks. Furthermore, the key negotiators from both companies were optical experts—Burn came fully prepared and brought strategic insights to the table, while Martin assessed the technical feasibility and market opportunities before making a decisive investment.

Reflecting on the past, Burn said, "45 nm was the first generation manufactured with immersion lithography; subsequently and globally, the 40 nm, 32 nm, 28 nm, 20 nm, 16 nm, 14 nm, 10 nm, and 7 nm generations were all manufactured using immersion technology." By 2012, products produced using immersion technology accounted for 47% of TSMC's total revenue. In the first quarter of 2017, immersion lithography machines accounted for 74% of ASML's revenue. As a result, I have gained recognition both within the company and externally."

"This technology not only enabled TSMC to lead industry specifications for the first time but also influenced several customers, including IBM, who had originally ordered 157 nm dry scanners, to follow TSMC's lead." Burn candidly stated, "This initiative propelled TSMC through six generations of technology, establishing it as a world leader. It also significantly contributed to the global semiconductor industry in advanced processes from beyond 65 nm up to 7 nm."

Scientific Validation Resolves Vibration Concerns at Southern Taiwan Science Park

In January 1996, construction began on the Southern Taiwan Science Park (STSP). Three years later, construction of the nearby high-speed rail also commenced, extending five kilometers vertically along the STSP's east side and capable of speeds up to 300 kilometers per hour. This led to controversy over potential vibration issues. The high-speed rail authorities and the National Science and Technology Council (NSTC) engaged in prolonged negotiations, attempting various proposed solutions to mitigate the impact of potential vibration without success.

It wasn't until May 2001 that the NSTC, following directives from the Executive Yuan, established a special task force for vibration reduction. This endeavor involved meticulous processes, including bidding, selecting contractors, determining construction methods, and conducting design reviews. The project was ultimately completed at the end of August 2006. By the year's end, coinciding with the operation of the high-speed rail, hundreds of data point were collected. Analysis revealed that the vibration had been reduced to nearly background levels, meeting the required standards. With this, the entire case was closed.

TSMC formally requested the NSTC to address the vibration concerns at the STSP in 2001, initiating a VP level working group to tackle the problem. Burn was entrusted with a critical responsibility: to use scientific validation to determine whether TSMC's STSP plant was affected by high-speed rail vibrations. This assessment would then inform the decision on whether to proceed with investing billions into the advanced process plant.

"Burn was responsible for proposing the technical theory, while I conducted experiments to validate it." Dr. Tsai-sheng Kao from the College of Semiconductor Research at National Tsing Hua University was one of Burn's subordinates. Together with their team, they simulated the vibration caused by high-speed trains passing through to observe its impact on the wafer production line. The experimental process was extremely challenging, and there was immense pressure regarding the success or failure of the task. For added assurance, the team adhered to the working group's request and presented their experimental data to ASML experts for review. Upon examining the results, the experts were surprised and impressed by TSMC's endeavors.

The answer was: No impact. Thus, TSMC decided to invest in the advanced process plant at the STSP, enabling them to maintain leadership in the global semiconductor competition. This strong industrial cluster has also brought substantial economic benefits to Taiwan.

An Innovation Must Have Applications: Teach Work Is from Mutual Respect, and Trust

Burn's scientific journey profoundly embodies the significance of curiosity, keen observation, and the pursuit of innovative solutions. He emphasizes that innovation should lead to practical applications—not innovating for its own sake, but creating useful new products. For businesses, this means developing superior products or processes that outshine competitors.

He also offers a reminder, "The power of mutual assistance is invaluable, and we must not disregard the achievements of our predecessors. Before investing too much effort into making a breakthrough, it's crucial to understand the baseline for that breakthrough. We need to examine how far our predecessors have advanced and the methods they used to avoid wasting time duplicating their efforts."

Burn's managerial acumen is heavily influenced by his experience at IBM, and he particularly emphasizes the values of mutual respect, trust, and assistance. Mutual respect forms the foundation for building trust among team members. With trust, spontaneous mutual assistance is encouraged, ultimately unleashing the team's greatest potential.

"A leader's responsibility is to enable team members to complement one another, push beyond their individual intellectual limits, and create opportunities and environments for their success." Burn is also recognized as an excellent leader skilled in active listening and communicating. He patiently listens to his subordinates' opinions, willingly accepts good suggestions, and never ridicules superficial ideas. In his management practice, he avoids damaging his subordinates' self-esteem and employs diverse methods to motivate the team, rather than relying on strict measures. He believes that inspiring the interest and creativity of team members is more effective than driving them with authority.

At the Helm of the College of Semiconductor Research: Cultivating Next-Generation Leaders

In November 2015, Burn retired from TSMC, bidding farewell to the semiconductor industry



Mantra for Success

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Faced with the semiconductor industry's challenge of refining the perfect lens material for high-fidelity imaging with 157 nm ultraviolet light, Burn disclosed a breakthrough in a workshop presentation. He proposed the innovative approach of immersion lithography—using water as the medium at a 193 nm dry wavelength—which was one generation more advanced than the dry 157 nm technology and easier to develop.

This innovation allowed TSMC to lead industry specifications for the first time, leaping through six generations of technology and becoming a world leader. It prompted many other companies, including IBM, to follow suit and made significant contributions to the global semiconductor industry in advanced processes from 65 nm to 7 nm.

Faced with the concerns over vibrations caused by the high-speed rail near the Southern Taiwan Science Park and tasked with validating it through scientific experiments, he and his team proved that the TSMC STSP plant would not be affected by the vibrations. This supported TSMC's decision to invest billions in advanced manufacturing facilities, ensuring its leading position in the market.

Committed to higher education in the semiconductor industry, Burn aims to foster experts armed with expertise, versatility, and adaptability to produce future leaders in the field.

after 46 years of service. However, his retirement marked not an end, but a transition from industry to academia, focusing on education and school administration. He was invited to help establish the National Tsinghua University College of Semiconductor Research (CoSR), supported by substantial investments from leading industry companies, and was appointed its first dean.

"Specialist, generalist, and innovist" are the cultivation goals set by Burn for the CoSR. Each year, only 80 master's and 20 doctoral students are admitted, with the aim of nurturing future leaders in the semiconductor industry. "Producing 80 Masters and 20 Ph.Ds helps little for an industry that needs 5-figure number of workers. I believe the CoSR should cultivate students to be leaders and equip them with leadership skills. In addition to conducting research, students should be able to communicate effectively with people of different disciplines , know how to collaborate with others, as well as possess creativity and abilities to solve new problems."

Burn led the CoSR organizing office and communicated the goals and concepts of nurturing future leaders in the industry early on. The positive response from both the industry and other CoSR faculty indicated that his direction was well-received.

Generalist refers to specialization and expertise in one of the college's four major departments-Device, Design, Process, and Material. Generalist means understanding the key points of other departments, speaking their languages, and coordinating effectively to accomplish given multidisciplinary tasks. Semiconductor technology is advancing rapidly, with frequent breakthroughs and sudden changes. An innovist must be creative, capable to solve new problems, and explore new directions, Through course design, a fractional credit system, and a personalized approach to student development, Burn has worked with the faculty and students, coupled with the support of the industry and government, to patiently and gradually realize the vision.

Burn's illustrious array of accolades in semiconductor research—IEEE Fellow, SPIE Fellow, NAE member, sole Distinguished Fellow at TSMC, Academician at Academia Sinica, and the Industrial Technology Research Institute Laureate, among others—underscores his significance contribution to the field. Yet, his relentless spirit drives him to continue his dedication to semiconductor education in the latter half of his life.



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Experiences

- He received Chinese education in Vietnam until his second year of high school, graduated from Hsinchu High School, and earned a bachelor's degree in electrical engineering from National Taiwan University.
- He married Huang Xiu-hui and obtained a doctoral degree in electrical engineering from Ohio State University.
- He has engaged in photolithography research at IBM, founded Linnovation Inc., developed semiconductor photolithography at TSMC, and nurtured students at National Tsing Hua University.

Special Honors

- Academician of the Academia Sinica, member of the National Academy of Engineering, and academician of the Industrial Technology Research Institute, IEEE Fellow, SPIE Fellow, outstanding alumnus of Ohio State University and National Taiwan University
- Outstanding Research Award from PWY Foundation (2004)
- IEEE Jun-Ichi Nishizawa Medal, Cledo Brunetti Award
- SPIE 1st Frits Zernike Award, Moze Award
- Future Science Prize Ohio State U. Benjamin G. Lamme Medal
- TSMC Distinguished Fellow, 2 Innovation and Customer Partnership Awards; IBM Outstanding Technical Contribution Award, 10 Invention Plateau Awards





Individual Category

Keng-Ming Liu, Founder and Creative Director of Bito

Shining on the Global Design Scene and Championing Taiwan's **Voice Worldwide**

as a prominent figure in international motion design. In 2012, he decided to leave his thriving career behind numerous motion design talents while carving out a new trajectory for Taiwan's design industry.



N estled in Dadaocheng, Bito is fronted by a charming facade. Behind the door houses a committed team that collaborates on projects with creative professionals from across the globe. Its success is not coincidental, but the result of years of effort. For over a decade, one visionary has worked tirelessly to create a platform for Taiwan—a stage that showcases Taiwan's creative talents to the world. This person is Keng-Ming Liu, the founder and director of Bito.

In the past, Taiwan's design industry was heavily reliant on subcontract projects, prioritizing the execution skills of creative professionals over their creative abilities. This business model stifled innovation and restricted Taiwan's creative potential. Many people recognized these challenges, and Liu was among them. However, unlike others, he didn't just talk the talk, but walked the walk.

Aligning with International Standards: Redefining Taiwan's Design Industry

"My approach is to create a global platform that gives Taiwanese designers the opportunity to directly engage in international projects, rather than merely taking on subcontract works. This allows Taiwanese design talents to showcase their skills and helps elevate the overall standard and visibility of Taiwan's design industry." In expressing his ideals, Liu stated candidly: "I want to change the stereotype of Taiwanese designers as mere "graphic artists". I hope designers are recognized as creative professionals with independent artistic vision and technical prowess, rather than just tools for executing others' ideas."

By reshaping the industry and honoring the value of creative works, Liu has inspired a new generation of Taiwanese designers to develop new perspectives to break away from the old mindset.

However, creating a more open, diverse, and internationally-oriented design industry in Taiwan is no walk in the park. But Liu has done it. He has leveraged his overseas experience to establish a new work culture and industry framework that aligns with international standards, attracting global collaborations through his impressive motion design works.

For instance, he led the Bito team to secure the visual design for the 58th and 59th Golden Horse Awards in 2021 and 2022. This achievement earned them the prestigious D&AD Yellow Pencil presented by the British Design & Art Direction for two consecutive years. The iconic D&AD Yellow Pencil is renowned as the hardest award to earn in the design industry. Each year, over 10,000 top teams from around the globe submit more than 30,000





entries. At a final overall winning rate of only 5%, the judging panel's "veto" further reduces the chance of winning the coveted Yellow Pencil to a mere 0.25%. Winning this award twice is truly an extraordinary achievement!

Motion Design Played to Perfection

What kind of design can prevail against strong competition? For the visual design of the 58th Golden Horse Awards, the Bito team drew inspiration from camera lenses to create the theme "Refocus: adjusting our distance to the world." They designed a series of dynamic key visual posters, extending the imagery to make them come alive. For the 59th Golden Horse Awards, with the theme "Gazing at Traces: How to Coexist with Change and the Unknown," Bito created a visual tribute to filmmakers. They illustrated the film creation and shooting process by transforming the 2D key visual into a 3D design. The number 59 was used to form the Golden Horse logo, which, when flipped 90 degrees, turned into the Chinese characters jinma (Golden Horse) in 3D.

In addition to the Golden Horse Awards, Liu also served as the executive art director for the Golden Melody Awards and the Golden Pin Design Awards. Tony Chang, a chair member of the Taiwan Design Research Institute (TDRI), recalled his collaboration with Liu, which began with an exhibition at the Taiwan Design Center (TDC) (TDRI's predecessor). At that time, Liu had just returned to Taiwan from the United States and was invited to participate in planning the exhibition. "His innovative, interactive image design and digital technology application abilities left a profound impression on me. Later, when the TDC organized the Golden Pin Design Award, he was the ideal candidate for art director."



From 2015 to 2020, Liu served as the executive art director for the Golden Pin Design Award. With his innovative visual design and branding, he transformed the ceremony's image and packaging, introducing interactive technology to enhance the sensory experience for the audience. His exceptional designs earned acclaim from design communities both domestically and internationally. Within just a few years, he elevated the Golden Pin Design Award from a design accolade in the global Huaren market to one of the world's most authoritative and influential design awards, standing alongside prestigious honors such as the Red Dot, iF Design, and Good Design Award.

These accomplishments are just a few of Liu's many achievements. Since returning to Taiwan, he has led Bito in completing over 200 projects. Each success has validated his prediction from ten years ago: "The future of design is motion design; bringing visual design to life is a trend." Building on this belief, he pioneered the Traditional Chinese Motion Branding System. Through continuous promotion, he has integrated dynamic thinking into traditional branding systems and graphic visual designs, establishing a motion design context for Chinese characters.

Another significant innovation by Liu is Design

Feeling, an immersive experience that integrates technology and art to infuse creative visuals into various industries, including film, television, music, design, animation, art, fashion, toys, advertising, architecture, and exhibitions. He remarked, "I aim not just to cross over but to expand the boundaries of all industries."

Pioneering the Aesthetic Renaissance in Taiwan's Public Sector

Keng-Ming Liu's efforts have left an indelible mark on Taiwan's aesthetic landscape. In recent years, discernible shifts in visual aesthetics have unfolded in both public and private sectors. The memorable video Taipei in Motion for the 2017 Taipei Universiade ignited the spark of aesthetics in the public sector for the first time. The video uses an abstract geometric approach to convey the beauty of Taipei's cityscapes and the power of sports through a sense of speed, captivating viewers from start to finish. It has garnered over 3 million views and won several international awards, including the ADC Awards and the Red Dot Award. "We have demonstrated that design can ignite public passion and even transform the image of a city," said Liu.

Subsequently, Liu's team has since reshaped the corporate images of Taipei Metro and Taiwan High Speed Rail, redefined the look of the National



Theater and Concert Hall, showcased Taipower's green energy vision, created the 40th-anniversary visual for the Taipei Fine Arts Museum, and designed manhole covers for Dadaocheng that blend local and contemporary styles. They have also collaborated with the TDRI and local governments to weave design into everyday life.

Taiwan is steadily becoming more beautiful and elegant, and Liu is one of the individuals to thank for this transformation. How did such a significant aesthetic force come to be?

Thriving in New York: Decisive Return to Taiwan to Launch a Business

Many people are surprised to learn that Keng-Ming Liu studied entomology in college, seeing a significant disparity in his cross-disciplinary interests. However, he sees it differently. "During my four years in college, I'd often spend time collecting insects in the wilderness. After graduation, I went to New York to study design and began collecting things in the urban jungle. For me, both pursuits involve using my eyes to search for beautiful things. The essence is the same."

From a young age, Liu has had a deep passion for painting and creating. As he experienced the

dawn of the Internet age and the early days of Web 1.0 (circa 1990-2004), the surge in online content only intensified his love for the visual arts. While immersing himself in his major, Liu also self-studied visual arts as part of his daily college routine.

A trip to New York around 20 years ago led him to fully embrace a career in the arts. New York is a city brimming with artistic energy, from worldrenowned museums and commercial galleries to outdoor public installations, countless exhibitions, and vibrant street graffiti. As you walk through the city, you're continuously exposed to incredible visual arts, music, publishing, literature, film, animation, and fashion.

"I felt that vibrant artistic vitality and was deeply drawn to and inspired by it." After graduating from university and completing his military service, Liu enrolled in the School of Visual Arts in New York in 2004. He earned a Master's degree in computer arts in 2006 and continued to work in the United States until 2012. Upon his return to Taiwan, he founded Bito.

While in New York, Liu was one of the early pioneers in the emerging field of motion graphics. "Since it was just beginning to rise, it was full of unknowns." Listening to Liu, one can sense

the excitement of exploring uncharted territory, reminiscent of the excitement experienced by pioneers of the Old West.

Immersed in an environment filled with creativity and experimentation, and collaborating with artists from around the world, he became part of the movement revolutionizing the traditional advertising industry. He witnessed firsthand how motion graphics were ushering in a new era of visual design. In the United States, Liu worked on the visual design for advertisements in Times Square and Yankee Stadium. He also collaborated with renowned international brands such as Facebook, Nike, MTV, BBC, and Pepsi. By then, he was already highly praised by the industry and media as a leading figure in international motion design.

Thriving in New York with a brilliant career ahead of him, Liu chose to leave it all behind and return to Taiwan. Why? "Being overseas had allowed me to appreciate the beauty and richness of Taiwanese culture even more", Liu has explained when asked numerous times about his decision to return to Taiwan. With each repetition, his resolve only grows stronger. "With my international experience and connections, I believe I can carve a new path for Taiwan's design industry. I can help Taiwan create and define the motion design industry, elevating it to a world-class level."

Connecting Taiwan with the International Community: Committing to Design Diplomacy

In 2012, Keng-Ming Liu returned to Taiwan and founded Bito. By engaging closely with worldrenowned designers, he has actively brought cuttingedge global design know-how back to Taiwan. Bito has grown from a modest team of 2 to an international team of nearly 30 full-time employees and over 100 collaborators, including designers from Malaysia, Canada, South Africa, Japan, the United States, China, Belgium, and Germany. This creator platform established by Liu enables creators with years of international experience to continue producing digital work for global clients after returning to their hometowns.

I am establishing a new work culture and industry framework in Taiwan, encouraging everyone to reconsider the value of design.

Keng Mug/i - Founder and Creative Director of Bito

Starting from Taiwan and bringing together creators from around the world, the Bito team led by Liu is one of the few international innovative teams that seamlessly integrate Eastern and Western culture, imagery and graphic design, business and art, as well as technology and design. Bito's unique positioning has garnered global recognition. By leading the way in creative output, it has successfully shaped the advanced image of Taiwan's design industry, enhancing its visibility on the international stage.

"To me, design is not only a creative activity but also a form of 'diplomacy.' At international conferences, judging panels, or seminars, I am often the sole representative from Taiwan, giving me the opportunity to share Taiwan's story." He believes that the more people know and appreciate Taiwanese culture, the safer Taiwan will be. "Showcasing the power of design can, to some extent, protect Taiwan," remarked Liu.

Exploring Technology to Unlock New Possibilities

Keng-Ming Liu relishes the thrill of discovering new things, which fuels his passion for design. "When tackling a new project, I always strive to shatter conventional definitions and fundamentally rethink the approach." For instance, when approaching the Lantern Festival, the Bito team didn't limit themselves to traditional concepts. Instead, they reinvented it as a digital campfire, creating a new type of experience that conveys warmth despite the use of "cold" medium of technology. "This method of redefining things frees us from past frameworks and creates new possibilities."

"The design field is rife with infinite possibilities, especially with the recent integration of various technologies expanding the creative potential even further." In 2023, he established the Bitween lab, dedicated to transforming the imagination of immersive experiences and visual spaces in Taiwan; for example, the production Threshold for the opening ceremony of the first 5G+4K fully immersive digital exhibition space, AMBI SPACE ONE. Additionally, they created the first narrativedriven exhibition BUNNY RUNNING which combines 3D billboards, real-time interaction, and crossmedia performances. This exhibition set a record at Songshan Cultural and Creative Park, drawing over a million visitors in a single month.

Liu emphasizes the importance of continually updating our knowledge and skills in the face of rapid change. "Sharing insights and learning from each other within the team is crucial, much like my experiences in the United States. Every colleague, no matter their age or experience level, has something to teach me."

Tony Chang attributes Liu's ability to achieve innovative feats in just ten years to his innovative

thinking, outstanding talent, and fearless approach to new challenges, but also to his humility and empathy. "These personal qualities have earned him the respect and trust of industry professionals. Public institutions, private enterprises, and collaborators are all eager to work with him, leading to projects that have won international acclaim."

Cultivating Young Talent to Harness Design's Problem-Solving Power

Despite his numerous accomplishments, Keng-Ming Liu has always prioritized mentoring young designers as a crucial part of his work. He has recruited cross-disciplinary creative talents from across Taiwan for training and, in 2016, taught the Motion Design: Future of Graphic Design course at Xuexue, cultivating many seed professionals in Motion Design. Since 2021, he has been invited to serve as a chair professor at the College of Creative Media at Tainan's Kun Shan University, dedicating his efforts to developing the next generation of talent. Liu advises young aspiring designers to keep an open mind: "When confronting various challenges, both present and future, such as climate change and social inequality, designers should look beyond creating aesthetically pleasing work but also consider how to impact society through design and produce truly meaningful work." He emphasizes that an open and innovative mindset is critical for navigating future uncertainties.

Liu encourages others with his own journey, advising, "Don't fear setbacks; you can create your own opportunities." During his studies in New York, Liu sent out over a hundred resumes to find internship opportunities. He even visited his favorite studios and slid his portfolio under the doors, living by the motto, "If it doesn't work the first time, try again." Returning from New York to Taiwan, Liu has achieved numerous firsts and elevated Taiwan's design industry to the global stage. His story demonstrates that as long as one steadfastly holds onto their core values and never gives up, anything is possible.

Mantra for Success

He has led his team to win the prestigious D&AD Yellow Pencil presented by the British Design & Art Direction for two consecutive years. Their visual design for the 58th and 59th Golden Horse Awards made them the only winners from Taiwan to receive the Yellow Pencil for design.

He has developed a unique Motion Branding System that enhances traditional brand identification systems and graphic visual designs with dynamic thinking, establishing a motion design context specifically for Chinese characters.

He has used the innovative thinking of Design Feeling to inject creativity into various industries such as film, television, music, design, animation, art, fashion, toys, advertising, architecture, and performance. With comprehensive integration capabilities, he has moved beyond simple crossovers to push the boundaries of existing industries.

His collaborators hail from all over the world, where he marries New York-style design education with Eastern philosophies and fosters deep connections with outstanding individuals in the global design community. They are among the very few innovative teams internationally that integrate Eastern and Western cultures, visual and graphic design, business and art, as well as technology and design.

Keng Ming Liu

MFA in Computer Arts, School of Visual Arts, New York

2001-2006

2004-2012

2013-present

2017

2016-2023

He graduated from the Department of Entomology at National Taiwan University and earned an MFA in Computer Arts from the School of Visual Arts in New York. In 2006, he released his first animated short film, Travel Diary, which was nominated for the Student Academy Awards, also known as the student version of the Oscars. He also became the first Taiwanese recipient of the Adobe Design Achievement Awards (ADAA).

During his nine-year stint in New York, he became one of the pioneers in the global motion graphics industry, collaborating with renowned international brands such as Facebook, Nike, MTV, BBC, and Pepsi. He received praise from the industry and media as a prominent figure in international motion design.

He founded Bito after returning to Taiwan from New York. He has trailblazed the motion design industry in Taiwan, cultivating over 500 emerging motion design creators.

The image film Taipei in Motion for the 2017 Taipei Universiade ignited the seed of aesthetics in the public sector for the first time. The film won the ADC Awards, the German Red Dot Award, and several other international accolades, and earned him widespread acclaim in Taiwan.

He served as the executive art director for the Golden Bell Awards, Golden Melody Awards, and Golden Pin Design Awards. Through innovative visual design and branding, he transformed the image and packaging of these ceremonies, elevating Taiwan's awards ceremonies to an international level.

Experiences

- BITO founder and creative director
- MFA in Computer Arts, School of Visual Arts in New York; thesis advisor/independent study instructor
- Chair professor, College of Creative Media, Kun Shan University
- Juror, D&AD Awards of British Design & Art Direction
- Juror, ADC Global Awards & Club
- Juror, iF DESIGN AWARD
- Juror, Singapore Good Design Awards
- Art director, 58th-60th Golden Horse Awards (2021-2023)
- Creative director, Golden Pin Design Award (2016-2020)
- Image film director, 2017 Taipei Universiade
- Chief curator, Taiwan Pavilion at 2021 London Design Biennale
- Artistic director, Island of Spark at the Hsinchu Lantern Festival (2021)
- Artistic director, Bunny Running at Taipei Lantern Festival (2023)
- Chief juror, X-site at Taipei Fine Arts Museum (2023)
- Art director, 28th Golden Melody Awards (2017)
- Speaker, TEDxTaipei (2013)
- Director, art director, animator, designer: Freestyle Collective / Huntergatherer / MTV Network / Transistor Studio / Hornet / Suspect / Brand New School (2007-2012)

Special Honors

- He led the Bito team to win the D&AD Yellow Pencil for two consecutive years, a first for Taiwan.
- He led the Bito team to win the prestigious ADC Awards, the longest-standing honor in the international design industry with over a century of history, seven times—they won the Gold prize for their work on the 58th Golden Horse Awards.
- He has trailblazed the motion design industry in Taiwan, cultivating over 500 seed motion design creators.
- The 2017 Taipei Universiade image film Taipei in Motion ushered in a new aesthetic Renaissance for Taiwan's public sector, using the power of design to build the city's brand and transform its image.
- He has launched the innovative Motion Branding System, a new type of brand identification system that positions Taiwan at the forefront of global Chinese character motion design.
- He has opened the doors to Taiwan's immersive experience to revolutionize the conventional awards ceremony format. As the executive art director for the Golden Horse Awards, Golden Melody Awards, and Golden Pin Design Award, he led the industry and transformed perceptions of image design within the Taiwanese design community.
- He won the Adobe Design Achievement Award as a Taiwanese designer.
- He was nominated for the 34th Student Academy Awards as a Taiwanese designer.
- His work Travel Diary was screened at an annual TED conference at New York headquarters, the first for a Taiwanese designer, and was included in a book on character design collected by Pictoplasma in Berlin, Germany.
The 6th Presidential Innovation Award Report

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