CEO Interview

Phison's Successful Transformation from NAND Flash Grocery to one-stop Boutique

EXECUTIVE SUMMARY

- From a fast follower of technology, Phison has successfully transformed into a NAND storage boutique through increased R&D investment in recent years and the release of the world's first PCIe Gen4 SSD controller.
- In some markets and businesses that Phison did not reach before, because of the leading technology of PCIe Gen4, many old and new customers actively contact Phison to strengthen the depth and breadth of cooperation.
- In the next five years, Phison will have the opportunity to become the world's largest independent SSD controller supplier, and will continue to create a win-win situation for employees, partners, customers, shareholders, and all stakeholders.

"Before 2018, Phison was a fast follower in technology. Today, our technology leadership has created a path for Phison's future growth based on advanced technology R&D."
-Khein-Seng, Pua (KS Pua, founder and chairman of Phison Electronics).

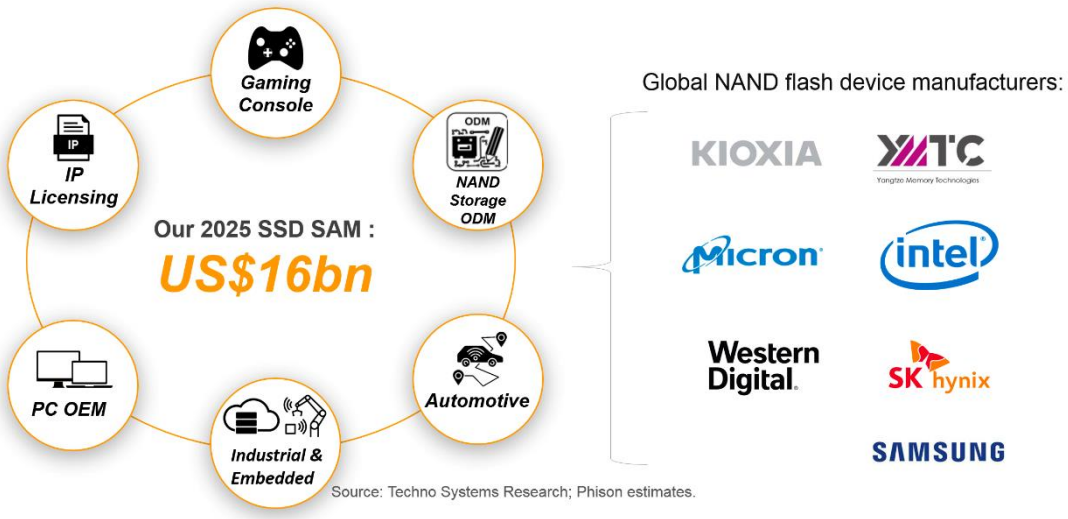
Recently, we met KS again to conduct this interview, with a focus on Phison Electronics 20th Anniversary. A faint peppering of gray hair for a man whose energy knows no bounds, served as a marker both the rapid growth that Phison has made over the years, as well as the hard work KS has put in to shepherd Phison and its unique business model through the challenges of the NAND Flash marketplace. KS looks me square in the eyes, and says, "After having begun our cooperation with AMD in 2018, we launched the PCIe Gen 4 SSD controller IC last year, one year ahead of our industry peers. This year, Intel launched its effort to quickly follow in AMD's footsteps. They expect to launch their Gen 4 platform in 2021. For Phison, this is the beginning of a new era, in which its innovation and R&D will lead us to success in new markets. Two weeks ago, we announced the establishment of our Systems Integration and Engineering (SIE) Center in Colorado, the seat of the global storage industry, at the same time that we launched a higher-performance 12nm Gen 4 SSD controller IC. These are two examples of our commitment to continuous investment in R&D and high-quality talent to extend our technology leadership. Our technology roadmap is focused on developing and refining our controller IC, IP licensing, ASIC, design services and system products to expand the scope our serviceable available market (SAM) in industry segments where we have not participated in the past, or where we have limited market share. According to our estimation, Phison's current SAM is about US$8 billion. We plan to use technology innovation as a tool to seize share in more market segments and to obtain more outsourcing orders from NAND Flash manufacturers – thereby doubling our SAM to US$16 billion by 2025 and making Phison the largest supplier of SSD controller ICs in the world."

EXPANDING PHISON'S POTENTIAL MARKET RANGE THROUGH R&D AND TECHNOLOGY LEADERSHIP

KS reflected on Phison's 20 years in the NAND Flash industry, "We have continuously cultivated our strategic relationships with upstream chip manufacturers and downstream branded channels through our controller IC and system module product lines. The upstream manufacturers include KIOXIA, Micron, WD, SK Hynix, Intel, Samsung and YMTC. Our first strategic alliance was with Toshiba (now renamed KIOXIA), and we followed that with long-term collaborations with Micron, SK Hynix, WD and Yangtze Memory Technology. In addition to purchasing NAND Flash from upstream manufacturers, Phison also supplies controller ICs with proprietary designs to these same upstream producers. Downstream brand channel customers include Kingston, Seagate, Advantech, etc. In addition to supplying controller ICs to the downstream producers, we also assemble and sell a variety of system modules using NAND Flash purchased from our upstream partners. We do not compete with downstream customers, but instead create an independent platform to help our customers enter various market segments such as industrial, embedded and consumer storage. This business model has helped us gain the trust of our upstream and downstream partners in the industry, allowing Phison's revenue and business scope to grow rapidly. Through advances in technology, teamwork and by building economies of scale in operation, we have built barriers to entry. It is too late for competitors to imitate us, let alone challenge our position in the industry. While controller ICs are our core competence, our system module business provides us with bargaining power with NAND Flash suppliers, a broad channel in which to sell product and strong operating cash flow. We seek to create a virtuous cycle in which we reinvest our profits into research and development of controller IC technology to further drive our revenue. In this way, we create an immunity to short-term fluctuations in the NAND Flash industry, allowing our quest to become the world's largest SSD controller IC supplier to continue uninterrupted. "

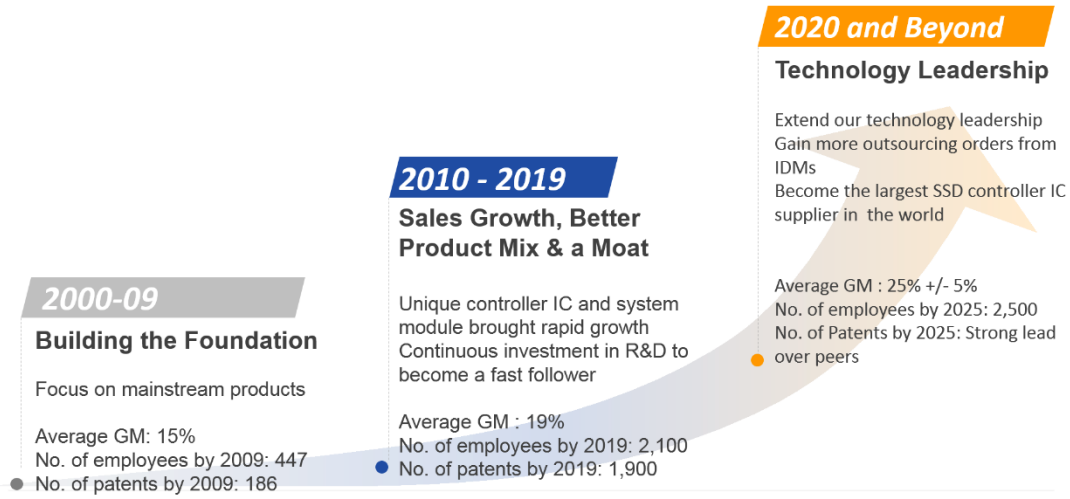
KS continues: "After 20 years of refinement, we have created a one-stop solution for controller IC and system modules that serves both integrated device manufacturers and the downstream branded channel, while at the same time providing an inventory cushion for the entire industry. In the NAND Flash industry, Phison has already become the biggest storage solution provider besides the integrated device manufacturers. We have also proven that our unique business model can create revenue and profit growth. From 2010-19 our sales grew by a CAGR of 4%, while net profit grew by 13 % and ROE averaged 21%. With the support of our strong and growing cashflows, we've used continuous investment in R&D to achieve breakthrough results, the best example of which is our PCIe Gen 4 controller IC collaboration with AMD. PCIe is the industry standard for data communication within a NAND flash-based memory device that defines the SSD read performance specifications. Beginning in October 2018, we invested US$25 million in R&D and hired 150 R&D engineers, achieving mass production of our proprietary Gen 4 SSD controller IC within nine months. Within 18 months, we reached break-even on the project. Our design optimizes performance, power consumption and production cost, and we believe it has given us a 12-month lead over our peers. We tested our 28nm controller chip against an IDM's 16nm chip, and our 12nm chip against their 8nm chip for performance, heat dissipation and price, and came out ahead on all 3 fronts. Since its launch, our Gen 4 controller IC has achieved shipments in excess of 3 million. Yet this is only the beginning. Our 1,500 engineers are busy with new development projects every day, and the visibility on some of these projected reaches out to 2023-2025. In fact, we need to recruit 300 more engineers by the end of this year to meet the advanced product design needs of our clients in multiple product segments."

"Our cutting edge Gen 4 technology is opening the door to new markets," says KS. "In the past, we focused on ODM NAND Flash controller IC and storage systems. This year, the SAM of this business is approximately US$6.7 billion. However, we are now gaining increased exposure to gaming platforms, gaming laptops and embedded OEMs, and intend to expand our market share in enterprise-level data centers, automotive, industrial and embedded applications next year. We estimate that these new markets will push Phison's SAM to US$8.2 billion in 2020. Phison will continue to invest in R&D, implement technology leadership strategies, and work to receive more IC controller outsourcing orders from IDMs. By 2025, we expect our SAM to double to US$16 bn, equivalent to 60% of the global NAND Flash market."



TWO DECADES OF GROWTH, FOLLOWED BY A THIRD DECADE OF TECHNOLOGY LEADERSHIP

During the interview, KS also walked me through Phison's entrepreneurial foundation, its rapid growth, and explained his business development strategy for the next decade.



THE FIRST TEN YEARS – 2000-2009: BUILDING THE FOUNDATION

Phison Electronics was founded in November 2000. The English name, Phison, was created using a combination of the initials of the five classmates from NCTU who co-founded the company. KS recalls, "We started out making USB card readers, MP3 and voice recording products, then developed the first USB NAND Flash control SoC in the world. Our revenue grew from NT$6.3bn upon listing in December 2005 to NT$24.5bn by 2009. During the same time frame, we grew from 150 employees to nearly 450. I attribute Phison's fast growth to the unceasing hard work of our talented staff. My original intention was to treat all colleagues who fight together with me as family, and this has not changed from the time we started the business until now. It's also why our employee salaries and bonuses are well above the industry average. Also, we worked hard to cultivate young employees and to establish a corporate culture of mutual trust and collaboration.

It wasn't all smooth sailing for Phison during its first decade of existence recalls KS, "We encountered infringement disputes from competitors and the mismatch between supply and demand caused by the global debt crisis in 2008. However, every crisis also brought opportunities. From the beginning, we treated suppliers and customers with sincerity. Long-term partnerships must be based on mutual trust, so that business partners will help each other during times of adversity. As for the timely help we received from Taiwan's Industrial Technology Research Institute as well as from Toshiba (now Kioxia), which has become a long-term strategic partner in addition to being a shareholder, we also helped them when they needed us. In fact, I am also thankful for our competitors. They've helped set the bar higher while growing the market together with us, allowing Phison to grow faster, see farther and to have more confidence in our unique business model."

THE SECOND TEN YEARS – 2010-2019: SALES GROWTH, MARGIN EXPANSION AND A MOAT

NAND controller IC research and development is Phison's core competency, and the system modules that are applied to various applications are the company's main product. This unique business model enables Phison to find success between the upstream of IDMs, and the downstream of brands and distributors in the global NAND Flash market. KS confidently says, "In the first decade of our existence, we created and refined our business model, while the second decade was a period of rapid growth. Through our long-term cooperation with our supply chain partners, we grew our exposure to various NAND Flash application markets, including eMMC, UFS, SSD, etc. With the continued evolution of our controller IC technology, the added value of NAND Flash applications increased. And, during every NAND Flash cycle, we gained opportunities to increase our market share."

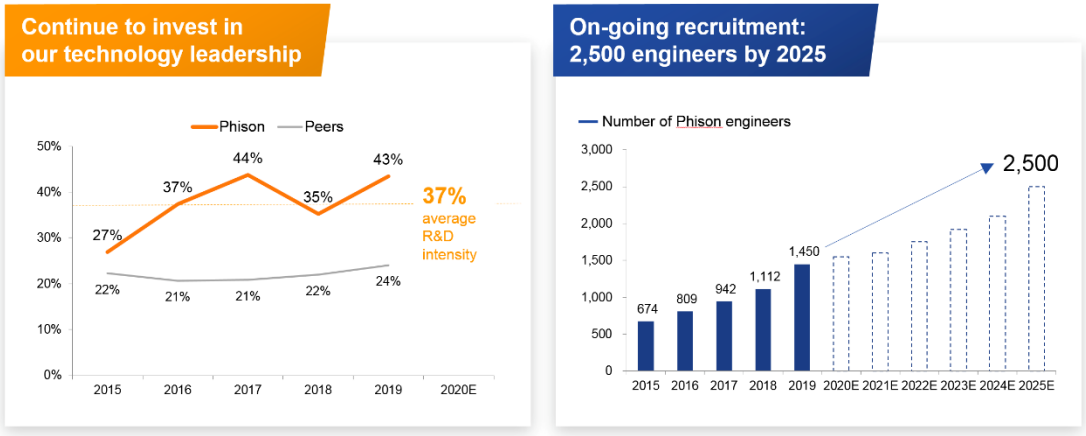
At the beginning of the decade, revenue from controller IC, industrial and embedded modules was 10% of Phison's total sales. But, by the end of the decade, they accounted for 45% of sales. This improvement in product mix resulted in an expansion in gross margins to 19% during Phison's second decade, from 15% in the first. While the revenue CAGR in the second ten years was a modest 4%, Phison's net income CAGR was 13%. The increased profit and cashflows were not only distributed to shareholders but also re-invested in R&D. Employee headcount grew to 2,100, 71% of which were engineers. And the company's corporate culture remained intact – the average employee turnover rate in the past five years was 5.6%, demonstrating a high level of staff loyalty.

The re-investment in R&D paid off. Phison now has more than 1,600 global patents, surpassing their well-known local peer, who has roughly 1,500 patents. As KS points out, "In 2018, most industry players followed Intel's intended path of jumping directly to Gen 5 from Gen 3. However, we blazed our own trail, and decided to cooperate with AMD to develop a 28nm PCIe Gen 4 SSD controller IC. The result has worked out for both AMD and Phison, as AMD has increased its market share in the past two years, while Intel will first launch its Gen 4 platform in 2H2020. Meanwhile, Phison vaulted into the industry leadership position, where we have remained for the past year, obtaining dual certification from AMD and Intel. We expect demand for PCIe Gen 4 SSD controller IC and NAND storage modules will grow substantially in 2021 and we are well-positioned to benefit. When competitors launch their Gen 4 solutions next year, Phison will be ready to launch our next generation 12nm Gen 4 and 7nm Gen 5 controller IC. I firmly believe that the R&D ability and scale of operations we accumulated in the past two decades have prepared Phison for the next decade, an era in which the technology leader will likely also lead in growth."

THE THIRD TEN YEARS – 2020-2029: TECHNOLOGY LEADERSHIP

Sharing his vision for the company's 3rd decade of existence, KS says, "Our breakthrough in Gen 4 technology in 2020 was a watershed moment. Up until now, we have been a fast follower. But moving forward, we will look to use our R&D and innovation skills to expand our SAM into ASIC services and IP licensing over a wide range of storage applications. Using our unique business model to maintain high levels of profitability, we intend to maintain our industry leading level of R&D intensity (currently 37%) by hiring more talented engineers. By 2025, we plan to have 2,500 R&D engineers on our team. We will build up the world's largest independent NAND Flash controller IC R&D

team and use our R&D core competency to attract more and more IDM outsourcing orders. In doing so, we believe we can become the world's largest NAND flash controller IC producer."



*RD intensity is RD expense/IC related sales. ** Peers include SIMO, Marvell, MediaTek, Realtek, Novatek and Silergy.

KS explains further: "We already have 12nm PCIe Gen 4 SSD controller IC mass production capability and have begun client certification in the fourth quarter of 2020. Our PCIe Gen 5 SSD controller IC has double the reading speed versus Gen 4, and we intend to launch it in 2021. Phison has started to cooperate with global social media companies through our ASIC design service business, focusing on customized SSD storage applications for enterprise-level data centers, and helping to optimize data center servers, which have higher requirements in internal and external data storage and read-write speed due to the increasing demands of artificial intelligence. Additionally, NAND Flash IDMs have also expanded collaborating with Phison in the ASIC business due to Phison's leadership in PCIe Gen4 SSD controller technology. Looking forward to the next five years, our SSD controller IC process will be scaled down from 28nm to less than 7nm, with higher performance and lower power consumption, supporting PCIe Gen 5 and next generation of PCIe spec. With the continuous improvement of our solutions, we expect to attract more outsourcing orders from NAND Flash IDMs. We also aim to utilize our strong software and hardware integration engineering design capabilities to expand our large system storage product business (i.e. NAND storage module business).

CONCLUSION – GEN 4 FIRES A SHOT AND TAKES THE LEAD IN TECHNOLOGY

November 8, 2020 was the 20th anniversary of the establishment of Phison. Phison also held its annual Family Day on October 24. Says KS: "Our family day event this year – the "Longfeng Fishing Port Road Run"- was very meaningful. Looking back on the growth trajectory of the group over the past two decades, it is almost as if we have been training for cross country running. Extending the metaphor, daily regular diet and exercise are equivalent to investment in R&D; and the ups and downs of different cross country running routes are like an industrial cycle. No matter if it is 10 kilometers, a half marathon or a full marathon, our team breathes deeply, pushes through 'the wall' and maintains our pace when facing the myriad of challenges that our industry presents. As a result, every time we finish a race, our collective will to succeed and corporate culture become even stronger."

KS pauses, then adds thoughtfully, "I'm aware that investors have often viewed Phison as a trading stock to play the NAND Flash cycle. I strongly believe that over the next ten years, those investors who join us as long-term equity partners will have the opportunity to see their investment grow along with us, not only as we execute our long-term R&D and new market penetration strategies but also Phison's successful transformation from NAND Flash storage solution grocery to one-stop boutique."

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PHISON FACTS

- Over 20 years of experience in NAND controller IC design and module integration
- Over 2,000 employees globally, with more than 75% in engineering
- Over 1900 memory-related patents globally
- 3 major priorities: enterprise, embedded, and consumer markets
- 600M average annual controller shipments
- $1.45B USD sales revenue in 2019 (no debt)
- Confidence that our unique business model can produce consistently strong cashflows and profits over the long-term amidst NAND memory market cycles
- Maintain long-term partnerships with our global NAND flash suppliers and with our valued module customers

ABOUT PHISON

Phison Electronics Corp. (TPEX:8299) is a global leader in NAND Flash controller IC and storage solutions. We provide a variety of services from controller design, system integration, IP licensing to total turnkey solutions, covering applications across SSD (PCIe/SATA/PATA), eMMC, UFS, SD and USB interfaces, reaching out to consumer, industrial and enterprise markets. As an active member of industry associations, Phison is on the Board of Directors for SDA, ONFI, UFSA and a contributor for JEDEC, PCI-SIG, MIPI, NVMe and IEEE-SA.

To know more about Phison, please visit Phison Website or Phison Q&A for details.

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