

Deployed **291** distinct process technologies,
and manufactured **12,302** products
for **535** customers

Produced **26%** of the world's
semiconductor output value
(excluding memory) in 2021

Advanced technologies (7-nanometer and beyond)
accounted for **50%** of total wafer revenue

Total wafer shipments were
14.2 mn 12-inch equivalent wafers

張忠謀大樓
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1. Letter to Shareholders

Dear Shareholders,

2021 was a year full of challenges and opportunities for TSMC, as the COVID-19 pandemic persisted against a backdrop of strong semiconductor industry growth. Although the wide availability of vaccines has provided much-needed protection, outbreaks from new variants of the virus continued to lead to heavy health institution overloads, sporadic lockdowns and global supply chain disruptions in 2021. TSMC took stringent precautions to protect the health and safety of our employees, while safeguarding our fab operations to ensure we continue to support our customers amidst the pandemic. At the same time, global demand for semiconductors exceeded supply, driven by concerns of supply chain disruptions during the pandemic, and the accelerated digital transformation brought in by COVID-remote lifestyle. Thus, semiconductor shortages became an issue for many areas of the global supply chain in 2021.

To fulfill TSMC's mission of being the global logic IC industry's trusted technology and capacity provider, we focused diligently on improving our productivity and increasing our fab operations quality, to generate more wafer output from our existing capacity to support the fast-growing demand from our customers. We also continued to enhance our service, enrich our R&D infrastructure, expand our capacity, and invest to support our customers' growth. Our capital spending increased to US\$30 billion in 2021. Through our relentless efforts, we delivered a twelfth-consecutive year of record revenue, thanks to strong demand for our industry-leading advanced and specialty technologies, and our 2021 annual revenue increased 24.9% year-over-year in US dollar terms.

We believe TSMC is entering a period of higher structural growth, as the multi-year megatrends of 5G and High Performance Computing (HPC)-related applications are expected to fuel massive demand for computation power, which expand the use of leading edge technologies. The structural increase in the long-term market demand profile will drive growth across our smartphone, HPC, IoT and Automotive platforms, and TSMC is working closely with our customers to plan our capacity, and accelerating our investments in both leading edge and specialty technologies to support their demand.

We are also expanding our global manufacturing footprint in the U.S., Japan and China to better serve our customers, reach for global talents, and sustain and enhance our competitive advantages. We are also aggressively accelerating our digital transformation in our company operations to support our fast expansion.

At the same time, we are committed to achieving a sustainable and proper return that enables us to invest to support our customers' growth. Our pricing strategy will remain strategic, not opportunistic, to reflect our value creation. We will also work diligently in our fab operations, and with our suppliers, to deliver on cost improvements. By taking such actions, we can continue to invest to support our customers' growth, and deliver long-term profitable growth for our shareholders.

To address the insatiable demand for energy-efficient computing power, customers rely on TSMC not only for reliable capacity, but also a predictable pace of technology development.

In its second year of volume ramp, our N5 technology has proven to be the industry's most competitive leading edge technology. N5 demand continued to be very strong, driven by smartphone and HPC applications, and represented 19% of our total wafer revenue in 2021.

Our 3-nanometer technology development is on track with good progress, and we have developed complete platform support for HPC and smartphone applications in preparation for volume production in the second half of 2022.

Our 2nm development program is on track, including a new transistor structure, and we expect our N2 to deliver the best technology maturity, performance and cost for our customers when it is introduced.

In addition, to improve system level performance, TSMC continued to offer new 3DFabric™ design solutions, including TSMC-SolC™ (System on Integrated Chip) for 3D chip stacking, and InFO (Integrated Fan Out) and CoWoS® (Chip on Wafer on Substrate) for 2.5D advanced packaging, to drive greater system performance, greater energy efficiency, greater compute density, smaller form factor and more cost effectiveness for our customers.

Highlights of TSMC's accomplishments in 2021:

- Total wafer shipments were 14.2 million 12-inch equivalent wafers as compared to 12.4 million 12-inch equivalent wafers in 2020.
- Advanced technologies (7-nanometer and beyond) accounted for 50 percent of total wafer revenue, up from 41 percent in 2020.
- We deployed 291 distinct process technologies, and manufactured 12,302 products for 535 customers.
- TSMC produced 26 percent of the world semiconductor excluding memory output value in 2021, as compared to 24 percent in the previous year.

2021 Financial Performance

Consolidated revenue reached NT\$1,587.42 billion, an increase of 18.5 percent over NT\$1,339.26 billion in 2020. Net income was NT\$596.54 billion and diluted earnings per share were NT\$23.01. Both increased 15.2 percent from the 2020 level of NT\$517.89 billion net income and NT\$19.97 diluted EPS.

TSMC generated net income of US\$21.35 billion on consolidated revenue of US\$56.82 billion, which increased 21.3 percent and 24.9 percent respectively from the 2020 level of US\$17.60 billion net income and US\$45.51 billion consolidated revenue.

Gross profit margin was 51.6 percent as compared with 53.1 percent in 2020, while operating profit margin was 40.9 percent compared with 42.3 percent a year earlier. Net profit margin was 37.6 percent, a decrease of 1.1 percentage points from 2020's 38.7 percent.

In 2021, the Company further raised its total cash dividend payments to NT\$10.25 per share, up from NT\$10.0 a year ago.

Technological Developments

In order to provide our customers with industry-leading technologies, we are committed to investments in R&D. In 2021, we increased our investment in R&D to US\$4.46 billion to extend our technology leadership, and enable the global pool of innovators to unleash their innovations and create value for the semiconductor industry.

Our N3 technology will use FinFET transistor structure, to deliver the best technology maturity, performance and density for our customers. Its volume production is scheduled for second half of 2022. We also introduced N3E as an extension to our N3 family, with enhanced performance, power and yield. N3E volume production is scheduled for one year after N3. With our technology leadership and strong customer demand, we are confident that our N3 family will be another large and long-lasting node for TSMC.

To further enhance our N5 family's performance, power and density, we also introduce N4P and N4X technologies, targeting next wave 5nm products. N4P offers 11% performance boost as compared to N5, while N4X is an offering tailored for workload-intensive HPC applications. N4X is the first in the 'X' lineage of TSMC's extreme performance semiconductor technologies, with a performance boost of 15% over N5. Our first N4P product tape-out is scheduled for the second half of 2022, and N4X is expected to enter risk production in the first half of 2023.

2nm technology has entered the technology development phase in 2021, focusing on test vehicle design and implementation, mask making, and Si pilot runs.

TSMC's 3DFabric™ design solutions will complement our transistor scaling to improve system-level performance. For TSMC-SolC™, TSMC successfully demonstrated Chip on Wafer (CoW) technology with good electrical performance on a customer product in 2021. The CoWoS®-S, featuring a new embedded deep trench capacitor and an interposer up to 3-reticle size, was qualified in 2021. It enables more logic and high bandwidth memory (HBM) integration for customers' high performance computing applications. For InFO, TSMC successfully qualified our 7th generation InFO-PoP Gen-7 for mobile applications with enhanced thermal performance. We also initiated high-volume manufacturing of our 3rd generation of InFO-oS Gen-3 to enable larger package size and higher bandwidth.

TSMC's ecosystem, the Open Innovation Platform® (OIP), empowers our 535 distinct customers to design in a safe and secure cloud environment, to unleash their innovations with fast time-to-market. We also worked with our ecosystem partners to expand our libraries and silicon IP portfolio to over 40,000 items in 2021. More than 38,000 technology files and over 2,600 process design kits, from 0.5-micron to 3-nanometer, were made available to our customers.

Environmental, Social and Governance

As a global semiconductor industry leader, we are deeply aware that the impact of our actions ripples out to affect customers, suppliers, the communities where we live and operate, consumers around the world, and the global climate and environment. With this responsibility in mind, we are focused on driving changes in Green Manufacturing, Responsible Supply Chain, Inclusive Workplace, Talent Development and Caring for the Underprivileged. In 2021, we also approved the issuance of restricted stock awards, to better align our executives' compensation with shareholder interests and our ESG achievements.

In 2021, TSMC committed to the goal of Net Zero Emissions by 2050, while setting the short-term goal of Zero Growth in Emissions by 2025. By actively implementing emission reduction measures, the Company works to make its carbon emissions reduced to the 2020 level by 2030. We also published our Task Force on Climate-related Financial Disclosures (TCFD) Report, becoming an industry leader in climate disclosure.

To expand our influence in our massive global supply chain, we established the TSMC Supplier Sustainability Academy through our Supply Online 360 platform. The platform provides free learning resources to suppliers, and avails those resources to the general public. By designating required courses and tracking training status, the Company was able to ensure that tier-1 suppliers continued to improve their sustainability management capabilities, and help our suppliers adhere to their labor rights.

We are committed to diversity and inclusion, including gender diversity. Increasing female representation in our Company is an important focus, and we have introduced programs targeting female hiring, retention, and promotions to maximize our female employee's potential and valuable contributions to TSMC and society.

TSMC continues to invest in STEM education and semiconductor related research, as the collaboration between industry and academia is critical to nurture and create a sustainable talent pipeline for the semiconductor industry. TSMC is working closely with top universities in Taiwan and overseas, to set up semiconductor programs to help students seamlessly bridge the knowledge they learn at schools and the real practice of the industry. We also believe TSMC's global footprint expansion will not only enable us to better support our customers, but also give us more opportunities to reach for global talents.

Facing the global threats of the COVID-19 pandemic, TSMC has been devoting its knowledge and global logistics resources to support the worldwide anti-pandemic effort. In 2021, amidst the initial COVID outbreak in Taiwan, TSMC successfully purchased five million doses of BioNTech 162b2 vaccine and donated them to the Taiwan Centers for Disease Control (CDC) of the Ministry of Health and Welfare. The TSMC Charity Foundation also donated contactless testing stations to hospitals to protect healthcare workers. Extending its reach beyond Taiwan, the Charity Foundation donated 1,000 oxygen generators to India, offering relief as a severe wave of infections taxed the country's medical infrastructure.

Corporate Developments

In December 2021, TSMC established a subsidiary, Japan Advanced Semiconductor Manufacturing, Inc. (JASM), in Kumamoto, Japan, with Sony Semiconductor Solutions Corporation and DENSO Corporation participating as minority shareholders. JASM will construct and operate a fab that utilizes 12/16- and 22/28-nanometer technology to address strong global market demand for specialty technologies. Production is targeted to begin by the end of 2024.

Honors and Awards

TSMC received recognition for achievements in innovation, corporate governance, sustainability, investor relations and overall excellence in management from organizations including *Forbes*, *Fortune Magazine*, *Asiamoney*, *FinanceAsia*, *CommonWealth Magazine*, and the Taiwan Stock Exchange. TSMC was also recognized by *TIME Magazine* as "2021 TIME100 Most Influential Companies." In sustainability, we were chosen once again as a component of the Dow Jones Sustainability Indices, becoming the only semiconductor company to be selected for 21 consecutive years. We also received MSCI ESG Research's AAA Rating, S&P Global's "The Sustainability Yearbook Award 2021" Silver Class, ISS ESG's "Prime" status in the ESG Corporate Rating, and *Corporate Knight's* 2021 "Global 100 Most Sustainable Corporations". Meanwhile, we remained a major component in various MSCI ESG and FTSE4Good indices. In investor relations, TSMC continued to receive multiple awards from *Institutional Investor Magazine*.

Outlook

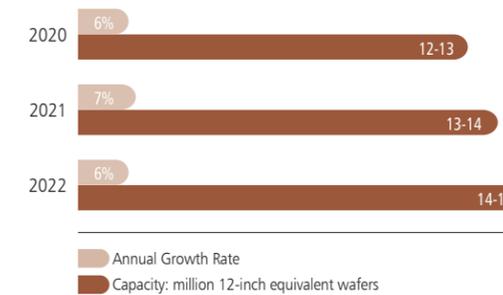
Although COVID-19 and cyclical-related uncertainties may persist in the near-term, the trend of technology becoming more pervasive and essential in people's lives, and the acceleration of digital transformation, is only becoming stronger. The semiconductor industry value in the supply chain is increasing. Semiconductor technology is becoming a foundational technology for the modern economy.

In the 5G era, an intelligent and more connected world will drive device unit volume growth, and more importantly, substantial semiconductor content enrichment is happening in HPC, smartphone, automotive and IoT applications. Our semiconductor manufacturing excellence will serve as an open platform for innovation, enabling more and more new applications and usage models, to create higher value for end-users at a faster rate than is possible today.

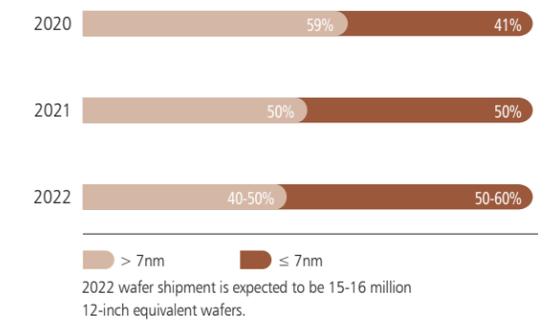
With TSMC's leadership in advanced and specialty technologies and 3DFabric™ solutions, our position as the world's largest, reliable and effective capacity provider, and our deep collaborative relationship with customers, we are well-positioned to capture the growth from these favorable industry megatrends.

With our dedication to sound corporate governance, we will continue to make decisions that are in the best interests of the Company, and deliver long-term profitable growth for our shareholders. We will continue to focus on capturing our value, so that even as we shoulder a greater burden of capex investment for the industry, we can continue to invest to support our customers' growth, and earn a sustainable and proper return.

Capacity Plan



Wafer Sales Plan



We recognize the important role of TSMC in the global semiconductor industry, and our impact to many of the world's economies. Our position as an industry leader has raised us to a new level of challenges, and with them, a new level of rewards, and we do not take such a responsibility lightly. We will hold steadfast to our dedicated foundry business model, and collaborate with all the IC innovators to unleash innovation. We will not deviate from our core values of Integrity, Commitment, Innovation and Customer Trust, which have faithfully guided us through the past 35 years.

As TSMC enters a new era of higher growth, we are excited about the opportunities ahead of us. We are honored that our shareholders have chosen to join us on this journey, and look forward to a long and prosperous future together.



Mark Liu
Chairman

C.C. Wei
Chief Executive Officer