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NYSE: TSM

TSMC Annual Report 2018 (I)



TSMC Vision, Mission & Core Values

Vision Our vision is to be the most advanced and largest technology and foundry services provider to fabless companies and IDMs, and in partnership with them, to forge a powerful competitive force in the semiconductor industry.

To realize our vision, we must have a trinity of strengths:

1. be a technology leader, competitive with the leading IDMs
2. be the manufacturing leader
3. be the most reputable, service-oriented and maximum-total-benefits silicon foundry

Mission Our mission is to be the trusted technology and capacity provider of the global logic IC industry for years to come.

Core Values **Integrity**
Integrity is our most basic and most important core value. We tell the truth. We believe the record of our accomplishments is the best proof of our merit. Hence, we do not brag. We do not make commitments lightly. Once we make a commitment, we devote ourselves completely to meeting that commitment. We compete to our fullest within the law, but we do not slander our competitors and we respect the intellectual property rights of others. With vendors, we maintain an objective, consistent, and impartial attitude. We do not tolerate any form of corrupt behavior or politicking. When selecting new employees, we place emphasis on the candidates’ qualifications and character, not connections or access.

Commitment

TSMC is committed to the welfare of customers, suppliers, employees, shareholders, and society. These stakeholders all contribute to TSMC’s success, and TSMC is dedicated to serving their best interests. In return, TSMC hopes all these stakeholders will make a mutual commitment to the Company.

Innovation

Innovation is the wellspring of TSMC’s growth, and is a part of all aspects of our business, from strategic planning, marketing and management, to technology and manufacturing. At TSMC, innovation means more than new ideas, it means putting ideas into practice.

Customer Trust

At TSMC, customers come first. Their success is our success, and we value their ability to compete as we value our own. We strive to build deep and enduring relationships with our customers, who trust and rely on us to be part of their success over the long term.

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Letter to Shareholders

Dear Shareholders,

2018 was a year of important milestones for TSMC. 2018 was our seventh consecutive year of record revenue, net income and earnings per share. We ramped our 7-nanometer technology to high volume successfully, at least a full year ahead of any other semiconductor player. We have strong customer engagement and tape out activity across diversified applications. For the first time in history, a most advanced logic technology, as an open platform, was available for the whole semiconductor industry. With the strongest technology portfolio, the widest coverage of customers and the largest addressable market, we are poised in a better position than ever to catch the future growth opportunities for TSMC.

In today's world, we see digital computation becoming increasingly ubiquitous. We see massive devices being connected, generating higher volumes of data. We see many new applications and products are all embedded with AI (artificial intelligence). Semiconductors are becoming ever more pervasive. The need for higher performance, lower power and a greater degree of system integration will drive further product advancements that TSMC will help enable.

The rapid ramp up of our 7-nanometer technology in 2018 allowed us to capture all leading smartphone launches and many more mobile and high performance computing applications. In 2018, our second generation 7-nanometer technology (N7+) entered risk production and is scheduled for volume production in 2019. N7+ will be the industry's first commercially available EUV (extreme ultraviolet) process technology. At the same time, we continue our advanced technology development on 5-nanometer and target for volume production in the first half of 2020. Our advanced packaging solutions, with follow-on generations of InFOs (Integrated Fan-Out) and CoWoS® (Chip on Wafer on Substrate), continue to lead the industry in providing the most advanced system-level solutions.

Highlights of TSMC's accomplishments in 2018:

- Total wafer shipments increased 2.9 percent from 2017 to reach 10.8 million 12-inch equivalent wafers.
- Advanced technologies (28-nanometer and beyond) accounted for 63 percent of total wafer revenue, up from 58 percent in 2017.
- We deployed 261 distinct process technologies, and manufactured 10,436 products for 481 customers.
- TSMC's market share in the total semiconductor foundry segment rose successively during the last nine years and reached 56 percent in 2018.

2018 Financial Performance

Consolidated revenue reached NT\$1,031.47 billion, an increase of 5.5 percent over NT\$977.45 billion in 2017. Net income was NT\$351.13 billion and diluted earnings per share were NT\$13.54. Both increased 2.3 percent from the 2017 level of NT\$343.11 billion net income and NT\$13.23 diluted EPS.

TSMC generated net income of US\$11.64 billion on consolidated revenue of US\$34.20 billion, which increased 3.3 percent and 6.5 percent respectively from the 2017 level of US\$11.27 billion net income and US\$32.11 billion consolidated revenue.

Gross profit margin was 48.3 percent compared with 50.6 percent in 2017, while operating profit margin was 37.2 percent compared with 39.4 percent a year earlier. Net profit margin was 34.0 percent, a decrease of 1.1 percentage points from 2017's 35.1 percent.

TSMC further raised its cash dividend payment to NT\$8.0 per share for 2017 profit distribution from NT\$7.0 in the prior year.

Technological Developments

In 2018, we continued to increase our R&D investment to US\$2.85 billion to expand our technology offerings and to extend our technology leadership.

We leveraged our leadership in technology at 28-nanometer and developed 22-nanometer technologies to further enhance performance and density in 2018. Our 22ULP (ultra-low power) and 22ULL (ultra-low leakage) technologies are suitable for a wide range of applications in IoT (Internet of Things), RF (Radio Frequency) and wearable devices. We also extended our 16-nanometer technologies to 12FFC, which provides further enhancement in power, performance, and density. On specialty technologies, 16FFC RF has proven to be able to provide the foundry's first volume produced 5G mobile network chips based on FinFET in 2018.

In 2018, we successfully ramped up our 7-nanometer technology and set a new industry record in production ramp. More than 40 customer product tape-outs have been completed and we expect to receive more than 100 additional product tape-outs in 2019. The 7nm customer products include mobile devices, game consoles, AI, CPUs, GPUs and networking devices. Our second generation 7nm (N7+) technology entered risk production in August 2018, and will be the industry's first commercially available EUV process technology.

Our 5-nanometer technology development is well on-track for risk production in the second quarter of 2019. We have made significant progress in transistor and interconnect performance, yield learning and reliability qualification. Customer product tape-outs are scheduled in the first half of 2019, with volume production next year. We expect to see a significant number of customers leverage our 5-nanometer to establish leadership positions for their products. Furthermore, our 3-nanometer technology has entered the full development stage.

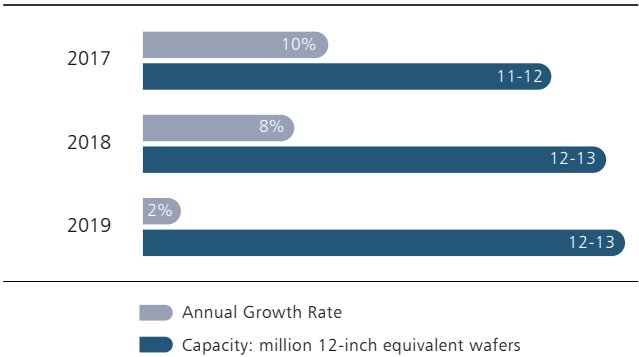
TSMC has been offering advanced packaging technology to integrate advanced SoCs, high bandwidth memories, and integrated passive device to enhance system-level performance. In 2018, we offered the 4th generation InFO solutions with finer interconnect line width and spacing to enable both mobile and high performance computing products. TSMC's CoWoS® offers a platform for heterogeneous integration with increasing interposer sizes. In May 2018, we announced TSMC-SolC™ (System-on-Integrated Chips) solution, a clear industry-leading 3D IC packaging solution, integrating multiple heterogeneous chiplets with close proximity to deliver even higher system performance.

TSMC's ecosystem, the Open Innovation Platform® (OIP), is an important factor in empowering customers to unleash their innovations with fast time-to-market. In October 2018, we launched our virtual design environment (VDE) that allows our customers to conduct their design activities in a secure and safe cloud environment that significantly increases their design productivity. We continued to work with our ecosystem partners to expand our libraries and silicon IP portfolio to more than 20,000 items. More than 9,000 technology files and over 300 process design kits are available to customers via TSMC-Online which saw more than 100,000 customer downloads in 2018.

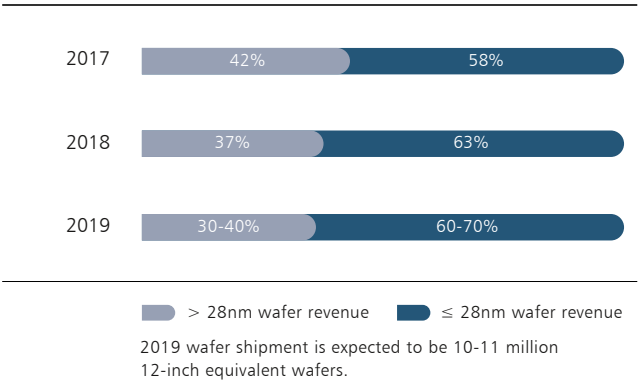
Corporate Developments

After having led the company for over 31 years, TSMC's Founder, Dr. Morris Chang, retired from the Company after the Annual Shareholders' Meeting on June 5, 2018. At the meeting, TSMC shareholders elected a new Board of Directors, which then convened to elect Dr. Mark Liu as Chairman and Dr. C.C. Wei as Chief Executive Officer (CEO) and Vice Chairman.

Capacity Plan



Wafer Sales Plan



Honors and Awards

TSMC received recognition for achievements in innovation, business information disclosure, corporate governance, sustainability, investor relations and overall excellence in management from organizations including *Forbes*, *Fortune Magazine*, *CommonWealth Magazine*, *The Nikkei*, Thomson Reuters, PricewaterhouseCoopers, RobecoSAM and the Taiwan Stock Exchange. TSMC continued to receive multiple awards from *Institutional Investor Magazine* and *IR Magazine*. We were chosen once again as a component of the Dow Jones Sustainability Indices, becoming the only semiconductor company to be selected for 18 consecutive years. TSMC was also rated “Prime” by Institutional Shareholder Services, and “Leader” by Sustainalytics for our performance in sustainability. Meanwhile, we remained a major component in both MSCI ESG and FTSE4Good Emerging Index, reflecting our ongoing commitment to sustainability and corporate social responsibility.

Outlook

2019 is a year we face business headwinds from weakening global macroeconomic conditions and trade tensions between countries. TSMC will be working on the fundamentals of our business and will accelerate our technology differentiation. We will also strengthen our cybersecurity and proprietary information protection. When the clouds pass, we resolve to emerge as a stronger semiconductor force.

We believe the ongoing megatrend of 5G and AI will fuel the future growth of the semiconductor industry. With the broadest and most advanced technology portfolios, the relentless pursuit of manufacturing excellence and trusted customer relationships, TSMC is best-positioned to lead the industry to provide the most advanced and comprehensive solutions for future applications in the semiconductor sector.

TSMC’s four core values of Integrity, Commitment, Innovation and Customer Trust remain as the cornerstone of our Company culture. They will continue to guide our every aspect in the way we do business as we navigate towards future opportunities. We will continue to commit to world-class governance, sustainability, and good returns to our shareholders. We thank you for your trust and commitment to us, and look forward to a long and profitable future together.



Mark Liu
Chairman

C.C. Wei
Chief Executive Officer

Company Profile

2.1 An Introduction to TSMC

Established in 1987 and headquartered in Hsinchu Science Park, Taiwan, TSMC pioneered the pure-play foundry business model by focusing solely on manufacturing customers' products. By choosing not to design, manufacture or market any semiconductor products under its own name, the Company ensures that it never competes directly with its customers. Today, TSMC is the world's largest semiconductor foundry, manufacturing 10,436 different products using 261 distinct technologies for 481 different customers in 2018.

With a large and diverse global customer base, TSMC-manufactured semiconductors cover a wide range of applications in the computer, communications, consumer, industrial and standard segments and are used in a variety of end markets including mobile devices, high performance computing, automotive electronics and the Internet of Things (IoT). Strong diversification helps to smooth fluctuations in demand, which, in turn, helps the Company maintain higher levels of capacity utilization and profitability.

Annual capacity of the manufacturing facilities managed by TSMC and its subsidiaries exceeded 12 million 12-inch equivalent wafers in 2018. These facilities include three 12-inch wafer GIGAFAB® fabs, four 8-inch wafer fabs, and one 6-inch wafer fab – all in Taiwan – as well as one 12-inch wafer fab at a wholly owned subsidiary, TSMC Nanjing Company Limited, and two 8-inch wafer fabs at wholly owned subsidiaries, WaferTech in the United States and TSMC China Company Limited.

TSMC provides customer service, account management and engineering services through offices in North America, Europe, Japan, China, and South Korea. At the end of 2018, the Company and its subsidiaries employed more than 48,000 people.

The Company is listed on the Taiwan Stock Exchange (TWSE) under ticker number 2330, and its American Depositary Shares (ADSs) are traded on the New York Stock Exchange (NYSE) under the symbol TSM.

2.2 Market/Business Summary

2.2.1 TSMC Achievements

In 2018, TSMC maintained its leading position in the foundry segment of the global semiconductor industry, with an estimated market share of 56%, despite intense competition from both established players and relatively new entrants to the business.

Leadership in advanced process technologies is a key factor in the Company's strong market position. In 2018, 63% of TSMC's wafer revenue came from advanced manufacturing processes (defined as geometries of 28nm and smaller), up from 58% in 2017.

TSMC offers the foundry segment's broadest technology portfolio and continues to invest in advanced and specialty technologies to provide customers more added value. This is a differentiating competitive advantage for TSMC.

In 2018, the Company either developed or introduced the following:

Logic Technology

- 5nm FinFET (fin field-effect transistor) technology development continued to progress smoothly, and volume production of this leading-edge technology is planned for the first half of 2020. Compared to 7nm FinFET technology, 5nm FinFET offers over 15% speed improvement or 30% power reduction. In addition, 5nm FinFET technology is optimized upfront for both mobile applications and high performance computing devices.
- 7nm FinFET Plus (N7+) technology entered risk production in August 2018 as planned as TSMC received customer product tape-outs and completed product verification. N7+ is the first commercially available EUV-enabled foundry process technology in the world. Compared to 7nm FinFET technology, N7+ offers approximately 20% greater logic density and 10% power reduction.

- 7nm FinFET technology entered volume production in the second quarter of 2018. Customer adoption was strong and with more than 40 product tape-outs received by the end of 2018. With its superior value proposition, these tape-outs came from a wide spectrum of applications including mobile devices, game consoles, artificial intelligence, central processing units, graphic processing units and networking devices. Compared to 16nm FinFET technology, 7nm FinFET offers approximately a 35% speed improvement or a 65% power reduction, as well as more than three times the logic density. In addition, 7nm FinFET technology can be optimized for mobile applications and high performance computing devices. 7nm FinFET technology also set a new Company record in terms of production ramp-up speed.
- 12nm FinFET Compact technology (12FFC), which entered volume production in 2017, is TSMC's latest family offering following 16nm FinFET Plus technology (16FF+) and 16nm FinFET Compact technology (16FFC). 12FFC drives die size and power consumption to the best levels of the foundry's 16/14nm technologies. 16FF+, which first entered volume production in 2015, is aimed at customers in high performance market segments, including mobile, server, graphics, and cryptocurrency. The cost-effective 16FFC, in volume production since 2016, can maximize die cost scaling by incorporating optical shrink and process simplification at the same time. Both 16FFC and 12FFC can satisfy customer needs in mainstream and ultra-low-power (ULP) market segments, including low-end to mid-range mobile phones, consumer electronics, digital TVs and the IoT. With innovative standard cell structures, 12FFC can also be used in more advanced applications. So far, 16FF+/16FFC/12FFC have received a total of more than 300 product tape-outs, most of which have been first-time silicon successes.
- 22nm ultra-low leakage (22ULL) technology development was completed and entered risk production in fourth quarter of 2018 as planned to support IoT and wearable devices applications. New ULL device and ULL SRAM (static random access memory) can provide lower power consumption compared to 40ULP and 55ULP solutions.
- 22nm ultra-low power (22ULP) technology was developed based on TSMC's industry-leading 28nm technology and completed all process qualifications in the fourth quarter of

2018. Compared to 28nm high performance compact (28HPC) technology, 22ULP provides 10% area reduction with more than 30% speed gain or more than 30% power reduction for applications including image processing, digital TVs, set-top boxes, smartphones and consumer products.

- 28nm high performance compact plus (28HPC+) technology had accumulated more than 230 product tape-outs as of the end of 2018. 28HPC+ technology provides further performance enhancement or power reduction in mainstream smartphone, digital TV, storage, audio and SoC (System-on-Chip) applications. Compared to 28HPC technology, 28HPC+ technology improves device performance by 15% or reduces leakage by 50%.
- 40nm ULP technologies received over 30 product tape-outs in 2018. These technologies target the IoT and wearable devices applications, such as wireless connectivity, application processors and sensor hub applications. In addition, TSMC uses its leading 40nm ULP low Vdd (Low Operating Voltage) technology to produce the world's lowest energy consumption solutions for IoT devices and for wearable connected devices. Still under development are new enhanced analog devices that will enrich the 40ULP platform to support customers for more analog design needs in the future.
- 55nm ultra-low power (55ULP) technology volume production continued and accumulated more than 60 customer tape-outs as of 2018. Compared to 55nm Low Power (55LP) process, 55ULP can significantly increase battery life for IoT applications. In addition, it integrates RF (radio frequency) and eFlash (embedded flash) to simplify customers' SoC designs.

Specialty Technology

- 16FF+ technology began production for customer applications in the automotive industry in 2017. 16FFC Foundation IPs (intellectual properties) passed the Automotive Electronic Council AEC-Q100 Grade-1 qualification and were certified for functional safety standard ISO 26262 ASIL-B. In addition, TSMC 9000A was introduced for automotive IP management to complete the automotive ecosystem with third-party IP vendors. TSMC continues to develop 7nm automotive foundation IPs, and plans to have them qualified for AEC-Q100 Grade-2 by the second half of 2019.

- 16FFC RF led the foundry to start volume production of the fifth generation (5G) mobile network chips for customers in the first half of 2018. This technology has been extended to the next generation Wireless Local Area Network (WLAN 802.11ax) and Millimeter Wave (mmWave) applications, as well as to wireless connectivity applications such as smartphones using the 5G mobile network. As TSMC continues to advance 16FFC RF technology, this more cost-effective technology will be used in more applications such as radar and AR/VR, to reduce chip power consumption and die size.
- 22nm RF (22ULP/ULL RF) technology extended its support for ultra-low leakage devices, magnetic random access memory (MRAM), and resistive random access memory (RRAM) in 2018, in addition to high f_t (cut-off frequency) devices. This further supports chip development for 5G mmWave mobile communication and IoT applications.
- 28nm RF (28HPC+ RF) technology delivered the foundry's first RF process design kit (PDK) in 2018, providing support for 110GHz mmWave and 150°C automotive grade and so on for 5G mmWave RF and automotive radar product designs.
- 40nm ULP eFlash began volume production in 2016 for applications such as wireless MCU (Microcontroller Unit), IoT devices, wearable devices, and high performance MCU. In 2018, this technology passed AEC-Q100 automotive Grade-1 qualification in 2018 for both high-speed and low-power IPs.
- 40nm ULP embedded resistive random access memory (RRAM) technology, which began risk production at the end of 2017, completed consumer grade qualification test for 10,000 cycles of endurance in 2018. This technology is fully CMOS (Complementary Metal Oxide Semiconductor) logic compatible for PDK and IP re-use for applications including wireless MCU, IoT and wearable devices.
- 22nm ULL magnetic random access memory (MRAM) technology progressed well, demonstrated reflow capability and passed JEDEC 168 hours high-temperature operating life (HTOL) reliability validation at the end of 2018. Through IP customization, MRAMs can serve various applications, such as artificial intelligence and eFlash replacement for MCU.

- 12-inch 0.13 μ m BCD (Bipolar-CMOS-DMOS) Plus technology, which began production in the second half of 2017, saw remarkable wafer shipment growth in 2018. Compared to the prior 0.13 μ m BCD technology, this technology provides superior performance competitiveness and cost effectiveness for power management applications in high-end smartphones.
- 0.18 μ m BCD third generation, which started volume production in the second half of 2017, passed AEC-Q100 Grade-1 qualification in 2018 and is expected to pass AEC-Q100 Grade-0 qualification in 2019. This technology provides superior cost competitiveness compared to the second generation BCD.
- GaN on silicon technology, which began volume production in 2017, saw remarkable wafer shipment growth in 2018. TSMC continues to develop new GaN technologies, including GaN IC with driver integration, automotive grade GaN, and GaN RF power amplifier, to support customers' diverse system chip designs for various market applications.
- Setting the trend for the smartphone organic light emitting diode (OLED) panel development, TSMC launched a world-leading 40nm high-voltage (HV) technology. This technology provides world-leading logic and SRAM density for customers to design more competitive OLED drivers.
- As near infrared (NIR) technology is critical to machine vision, TSMC focused on improving its CMOS image sensor (CIS) NIR QE (quantum efficiency) to >35%. This breakthrough greatly reduces total system power consumption and increases sensor sensitivity, enabling more innovative applications of machine vision in smartphones, automotive, industrial, and home devices.
- TSMC successfully delivered the world's first CMOS-MEMS (Micro-electromechanical Systems) monolithic capacitive barometer, which features sensitivity to altitude changes as small as 5 cm and fits in a package of slightly less than 1 mm², for various system applications, including personal activity tracking and indoor navigation.

Advanced Packaging Technology

- InFO-PoP (Integrated Fan-Out Package-on-Package) technology, which integrates 7nm SoC (System-on-Chip) and DRAM (dynamic random access memory) for advanced mobile device applications, began volume production in the second quarter of 2018.
- CoWoS® (Chip on Wafer on Substrate) technology that heterogeneously integrates a 7nm SoC and the second generation high bandwidth memory (HBM2) successfully completed qualification and began production in the second half of 2018 for high performance computing applications.
- In addition to CoWoS®, InFO-oS (Integrated Fan-Out on Substrate) technology integrating multiple 16nm SoC chips began production in the first quarter of 2018.
- Fine pitch Cu bump for flip chip packaging on 7nm silicon started volume production for both advanced mobile device and high performance computing applications in the first quarter of 2018. Moreover, 16nm silicon in WLCSP (wafer level chip scale packaging) technologies started volume production in the fourth quarter of 2018 for IoT applications, in addition to the existing ≥28nm products for high-end smartphones.

2.2.2 Market Overview

TSMC estimates that the worldwide semiconductor market excluding memory in 2018 was US\$334 billion in revenue, representing a healthy 8% year-over-year growth, after a strong year in 2017. In the foundry segment of the semiconductor industry, total revenue was US\$61 billion in 2018, up 6% year-over-year and slightly below the 8% growth achieved in 2017.

2.2.3 Industry Outlook, Opportunities and Threats

Industry Demand and Supply Outlook

Back-to-back years of growth in the foundry segment were driven mainly by healthy market demand. For 2019, TSMC forecasts the total semiconductor market excluding memory growth to be flat or slightly down. Over the longer term, however, fueled by increasing semiconductor content in electronic devices, continuing market share gains by fabless companies, gradual increases in integrated device manufacturer (IDM) outsourcing, and expanding in-house application-specific integrated circuits (ASIC) from systems companies, the Company expects foundry segment revenue to outpace the mid-single-digit compound annual growth rate projected for the overall semiconductor market excluding memory from 2017 through 2022.

As an upstream supplier in the semiconductor supply chain, the foundry segment is tightly correlated with the market health of the three “C” sectors, communications, computers and consumer electronics.

• Communications

For the communications sector, smartphone unit shipments were down 4% in 2018, the first decline in smartphone history, due to the high penetration in several developed countries and China, as well as to prolonged replacement cycle. TSMC projects the low-single-digit decline to continue in the smartphone market in 2019. Still, the continuing transition to 4G/LTE, LTE-Advanced and 5G NR (new radio), together with improved performance, longer battery life, biosensors and more AI features will all continue to propel smartphone sales. Plus, the increasing popularity of low-end smartphones in emerging countries will also drive growth in this sector.

Low-power IC is an essential requirement among handset manufacturers, and SoC design, in which TSMC is already the leader, is the preferred solution due to its optimized cost, power and form factor (device footprint and thickness) potential. The migration to advanced process technologies will continue to accelerate, spurred by the appetite for higher performance to run AI applications, various complex software routines and higher resolution video.

• Computer

After a 3% decline in 2017, the computer sector’s overall unit shipment fell marginally by 1% year-over-year in 2018. The decline was due to personal computer’s prolonged replacement cycle and consumer usage moving towards mobile computing, largely offset by business PC demand and positive growth in server units.

The computer sector is projected to continue its low-single-digit unit decline in 2019. However, several factors are expected to help buoy demand in this sector, including increasing form varieties, the business adoption of new operating systems, and consumer replacements of aging PCs; as well as growing high performance applications such as gaming PC, machine learning and blockchain.

All these require lower power and higher performance CPU, GPU, HDD Controller, and ASICs, which will drive the computer sector towards richer silicon content and more advanced process technologies.

• Consumer

The consumer sector’s unit shipments fell 4% in 2018. TVs and TV game consoles showed positive growth; set-top boxes declined due to worldwide economic uncertainties, while the rest of the sector – MP3 players, digital cameras and hand-held game consoles – continued to be cannibalized by smartphones.

A continued drop in consumer electronics is expected in 2019. Certain sub-segments such as 4K (UHD) TVs and set-top boxes should achieve positive growth within the sector, while next generation 8K TVs will also be launched. In addition, AI functions such as picture quality improvement and voice control will be increasingly incorporated in TVs. With its broad array of advanced technology offerings, TSMC expects to take advantage of these market trends.

Supply Chain

The electronics industry features a long and complex supply chain, the elements of which are correlated and highly interdependent. At the upstream manufacturing level, IC vendors need to have sufficient and flexible supply deliveries to handle fluctuating demand dynamics. Foundry vendors play an important role to ensure the health and effectiveness of the supply chain. As a leader in the foundry segment, TSMC provides advanced technologies and large-scale capacity to complement the innovations created along the downstream chain.

2.2.4 TSMC Position, Differentiation and Strategy

Position

TSMC is the worldwide semiconductor foundry leader for both advanced and specialty process technologies, commanding a 56% market share in 2018. Net revenue by geography, based mainly on the country in which customers are headquartered, was: 62% from North America; 9% from the Asia Pacific region, excluding China and Japan; 17% from China; 7% from Europe, the Middle East and Africa; and 5% from Japan. Net revenue by end-product application was: 14% from the computer sector, 56% from communications, 7% from consumer products, and 23% from industrial and standard products.

Differentiation

TSMC’s leadership position is based on three defining competitive strengths and a business strategy rooted in the Company’s heritage. The Company distinguishes itself from the competition through its technology leadership, manufacturing excellence and customer trust.

As a technology leader, TSMC is consistently first among dedicated foundries to provide next-generation, leading-edge technologies. The Company has also established its leadership on more mature technology nodes by applying the lessons learned on leading-edge technology development to enrich its specialty technologies. Beyond process technology, TSMC has established frontend and backend integration capabilities that create the optimum power/performance/area “sweet spot” and result in faster time-to-production.

TSMC, well known for its industry-leading manufacturing management capabilities, extends that leadership through its Open Innovation Platform® and Grand Alliance initiatives. The TSMC Open Innovation Platform® initiative quickens the pace of innovation in the semiconductor design community and among its ecosystem partners, as well as the Company’s own IP, design implementation and design for manufacturing capabilities, process technology and backend services. A key element is a set of ecosystem interfaces and collaborative components initiated and supported by TSMC that more efficiently empower innovation throughout the supply chain and drive the creation and sharing of new revenue and profits. The TSMC Grand Alliance is one of the most powerful forces for innovation in the semiconductor industry, bringing together customers, electronic design automation (EDA) partners, IP partners, and key equipment and material suppliers at a new, higher level of collaboration. Its objective is to help customers, alliance members and TSMC win business and increase competitiveness.

The foundation for customer trust is a commitment TSMC made when it opened for business in 1987 to never compete with its customers. As a result, TSMC has never owned or marketed a single semiconductor product, but instead has focused all of its resources on becoming the trusted foundry for its customers.

Strategy

TSMC is confident that its differentiating strengths will enable it to prosper from the foundry segment’s many attractive growth opportunities. In light of the rapid growth in four major markets, namely mobile, high performance computing, automotive electronics, and the Internet of Things, and the fact that focus of customer demand is shifting from process-technology-centric to product-application-centric, TSMC has constructed four different technology platforms to provide customers with the most comprehensive and competitive logic process technologies, specialty technologies, IPs, and packaging and testing technologies to shorten customers’ time-to-design and time-to-market.

Mobile platform: TSMC offers leading process technologies such as 5nm FinFET, 7nm FinFET Plus, 7nm FinFET, 10nm FinFET, 16nm FinFET Plus (16FF+), and 20nm SoC logic process technologies, as well as comprehensive IPs for premium product applications to further enhance chip performance, reduce power consumption, and decrease chip size. From low-end to high-end product applications, TSMC offers leading process technologies such as 12nm FinFET Compact technology (12FFC), 16nm FinFET Compact technology (16FFC), 28nm high performance compact (28HPC), 28nm high performance mobile compact plus (28HPC+), and 22nm ultra-low power (22ULP) logic process technologies, in addition to comprehensive IPs, to satisfy customer needs for high performance and low-power chips. Furthermore, for premium, high-end, mid-end, and low-end product applications, TSMC also offers the most competitive, leading-edge specialty technologies, including RF, embedded flash memory, emerging memory technologies, power management, sensors, and display chips as well as advanced packaging technologies such as the leading Integrated Fan-Out (InFO) technology.

High performance computing platform: TSMC provides customers with leading process technologies such as 5nm FinFET, 7nm FinFET Plus, 7nm FinFET and 16nm FinFET, as well as comprehensive IPs including high-speed interconnect IPs, to meet

customers’ high performance computing and communication requirements. TSMC also offers multiple advanced packaging technologies such as CoWoS®, InFO, and 3D IC technologies to enable homogeneous and heterogeneous chip integration to meet customers’ performance, power, and system footprint requirements. TSMC will continue to optimize its high performance computing platform offerings to help customers capture market growth driven by data explosion and application innovation.

Automotive electronics platform: TSMC offers industry’s leading automotive technology to support the three megatrends – safety, connectivity and green – in the automotive industry. TSMC is also the industry leader in providing a robust automotive IP ecosystem, which covers 16nm FinFET first and extends to 7nm FinFET, for advanced driver-assistance systems (ADAS), the most computation demanding system in the automotive industry. In addition to the advanced logic technology platform, TSMC offers broad and competitive specialty technologies, including 40nm embedded flash memory, 28nm and 22nm mmWave RF, high sensitivity CMOS Image/LiDAR sensors, and power management IC technologies. All these automotive technologies are applied to TSMC’s automotive process qualification standards based on AEC-Q100 standards.

Internet of Things platform: TSMC provides industry’s leading and comprehensive ultra-low power (ULP) technology platform to support innovations for IoT and wearable applications. TSMC’s industry-leading offerings, including 55nm ULP, 40nm ULP, 28nm ULP, 22nm ULP/Ultra-low leakage (ULL), have been widely adopted by various IoT and wearable applications. TSMC also extends its low Vdd (Low Operating Voltage) offerings for extreme low-power applications. To support the ever-increasing demand in IoT edge computing and wireless connectivity, TSMC also offers the most competitive and comprehensive leading-edge specialty technologies in RF, embedded flash memory, emerging memory, sensors, and display chips, as well as multiple advanced packaging technologies including leading InFO technology.

TSMC continually strengthens its core competitiveness and deploys both short-term and long-term technology and business development plans, and assists customers in taking on the challenges of short product cycles and intense competition in the electronic products market to meet ROI and growth objectives.

• Short-Term Semiconductor Business Development Plan

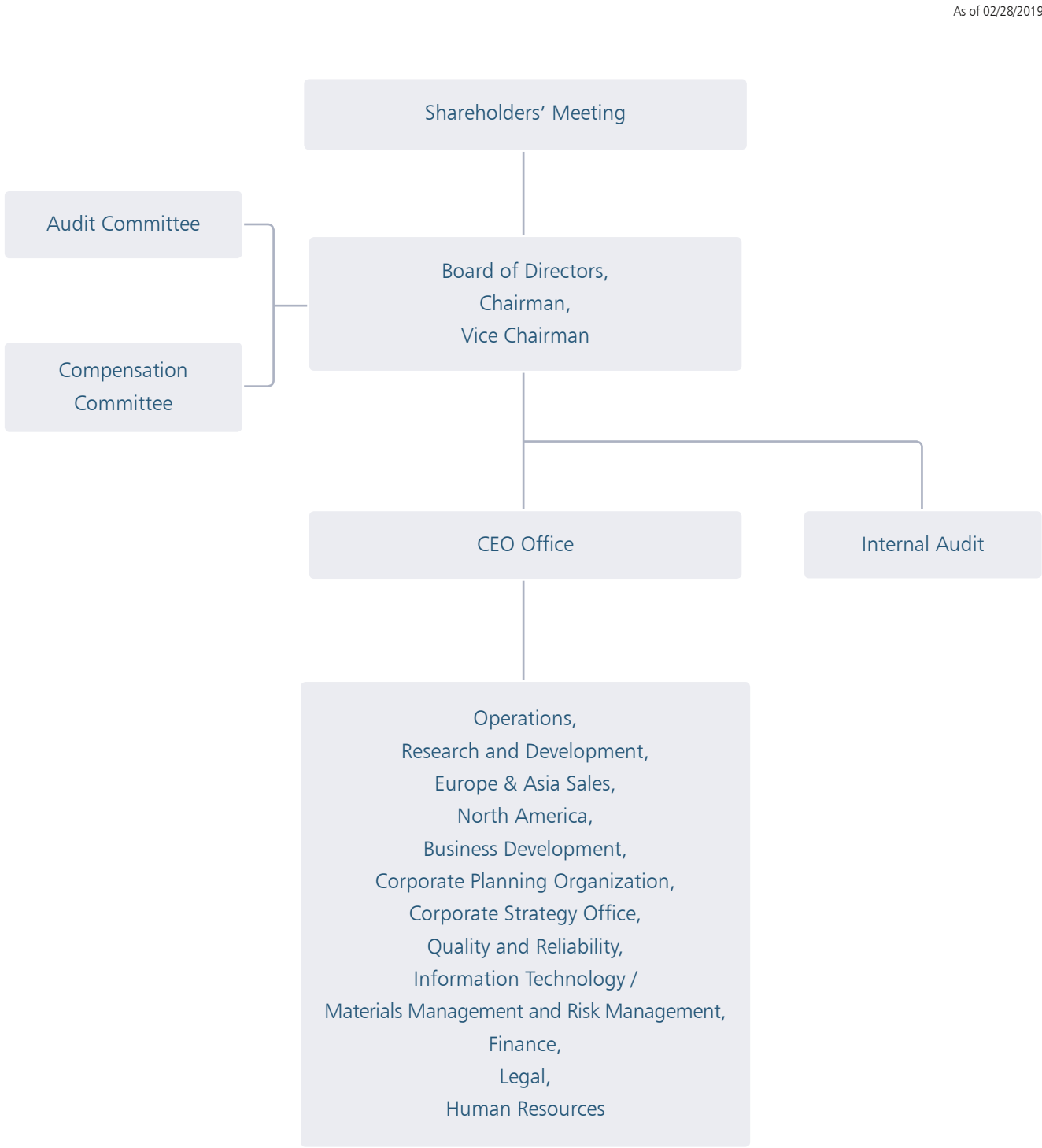
- 1. Substantially ramp up the business and sustain advanced technology market share with continually increased capacity and R&D investments.
- 2. Maintain mainstream technology market share by expanding business to new customers and market segments with off-the-shelf technologies.
- 3. Continue to enhance the competitive advantages of TSMC’s platforms in mobile, high performance computing, automotive electronics, and IoT design ecosystems so as to expand TSMC’s dedicated foundry services in these product applications.
- 4. Further expand TSMC’s business and service infrastructure into emerging and developing markets.

• Long-Term Semiconductor Business Development Plan

- 1. Continue developing leading-edge technologies at a pace consistent with Moore’s Law.
- 2. Broaden specialty business contributions by further developing derivative technologies.
- 3. Provide more integrated services, covering system-level integration design, design technology definition, design tool preparation, wafer processing, and backend services, all of which deliver more value to customers through optimized solutions.

2.3 Organization

2.3.1 Organization Chart



2.3.2 Major Corporate Functions

Operations

- Operations including all fabs in Taiwan and overseas, and manufacturing technology development; product development, specialty technology development, advanced packaging technology development, production and service integrations, and support and service for customers in Asia, Europe, and North America

Research and Development

- Advanced technology development, exploratory research, as well as design and technology platform development

Europe & Asia Sales

- Sales, market development, technical marketing, field technical support and service, and business operations for customers in Europe and Asia, including China, Japan, Korea and Taiwan

North America

- Sales, market development, field technical solutions and business operations for customers in North America

Business Development

- Business development identifies market directions and new applications that shape the technology roadmap and portfolios for the Company. It also provides key support in strengthening customer relationship along with the company branding management

Corporate Planning Organization

- Planning for production and demand; the integration of business processes, corporate pricing, market analysis and forecasting

Corporate Strategy Office

- Corporate strategy formation and implementation

Quality and Reliability

- Assurance of the quality and reliability of the Company's products via resolving reliability issues at new technology development stage, improving and managing product quality at production stage, providing solutions to resolve customers' quality related issues and providing services for advanced materials and failure analysis

Information Technology

- Integration of the Company's technology and business IT systems; infrastructure development, communication services and assurance of IT security and service quality, enabling organizations to apply Big Data and Machine Learning to improve the Company's productivity and accelerate R&D delivery

Materials Management and Risk Management

- Procurement, warehousing, import and export, and logistics support; also environmental protection, industrial safety, occupational health, and risk management

Internal Audit

- Inspection and review of TSMC's internal control system, its adequacy in design and effectiveness in operation with independent risk assessment to ensure compliance with TSMC's policies and procedures as well as with external regulations

Finance and Spokesperson

- Corporate finance, accounting, operation resources planning and corporate communications; with the head of the organization also serving as Company spokesperson

Legal

- Corporate legal affairs including regulatory compliances, commercial transactions, patents and management of other intellectual properties, litigation, etc.

Human Resources

- Personnel, management and organizational development, as well as proprietary information protection and physical security management

2.4 Board Members

2.4.1 Information Regarding Board Members

As of 02/28/2019

Title/Name (Note 1)	Gender	Nationality or Place of registration	Date Elected	Term Expires	Date First Elected	Shareholding When Elected		Current Shareholding		Spouse & Minor Shareholding		Selected Education, Past Positions & Current Positions at Non-profit Organizations	Selected Current Positions at TSMC and Other Companies
						Shares	%	Shares	%	Shares	%		
Chairman Mark Liu (Note 2)	Male	U.S.	06/05/2018	06/04/2021	06/08/2017	12,913,114	0.05%	12,913,114	0.05%	-	-	Bachelor Degree in Electrical Engineering, National Taiwan University Master Degree and Ph.D. in Electrical Engineering & Computer Science, University of California, Berkeley Former President, Worldwide Semiconductor Manufacturing Corp. Former Senior Vice President, Advanced Technology Business, TSMC Former Senior Vice President, Operations, TSMC Former Executive Vice President and Co-Chief Operating Officer, TSMC Former President and Co-CEO, TSMC	None
Vice Chairman C.C. Wei (Note 3)	Male	R.O.C.	06/05/2018	06/04/2021	06/08/2017	7,179,207	0.03%	7,179,207	0.03%	261	0.00%	Bachelor and Master Degrees in Electrical Engineering, National Chiao Tung University Ph.D. in Electrical Engineering, Yale University Former Senior Vice President, Chartered Semiconductor Manufacturing Ltd. Former Senior Vice President, Mainstream Technology Business, TSMC Former Senior Vice President, Business Development, TSMC Former Executive Vice President and Co-Chief Operating Officer, TSMC Former President and Co-CEO, TSMC Chairman, Taiwan Semiconductor Industry Association (TSIA) Director, TSMC Charity Foundation	CEO, TSMC
Director F.C. Tseng (Note 4)	Male	R.O.C.	06/05/2018	06/04/2021	05/13/1997	34,472,675	0.13%	34,472,675	0.13%	132,855	0.00%	Bachelor Degree in Electrical Engineering, National Chengkung University Master Degree in Electrical Engineering, National Chiao Tung University Ph.D. in Electrical Engineering, National Chengkung University Honorary Ph.D., National Chiao Tung University Honorary Ph.D., National Tsing Hua University Former President, Vanguard International Semiconductor Corp. Former President, TSMC Former Deputy CEO, TSMC Former Vice Chairman, TSMC Former Director, National Culture and Arts Foundation, R.O.C. Chairman, TSMC Education and Culture Foundation Director, Cloud Gate Culture and Arts Foundation	Chairman of: - TSMC China Company Ltd. (a nonpublic company) - Global UniChip Corp. Vice Chairman, Vanguard International Semiconductor Corp. Independent Director, Chairman of Audit Committee & Compensation Committee member, Acer Inc.
Director National Development Fund, Executive Yuan (Note 5) Representative: Mei-ling Chen	Female	R.O.C.	06/05/2018	06/04/2021	12/10/1986 11/07/2017 (Note 6)	1,653,709,980	6.38%	1,653,709,980	6.38%	-	-	LL.B., National Chengchi University LL.M., National Taiwan University LL.D., National Chengchi University Former Director General, Department of Legal Affairs, Ministry of Justice, R.O.C. Former Chairperson of Legal Affairs Committee & concurrently Chairperson of Petitions and Appeals Committee, Executive Yuan, R.O.C. Former Deputy Secretary-General, Executive Yuan, R.O.C. Former Secretary-General, Tainan City Government, R.O.C. Former Secretary-General, Executive Yuan, R.O.C. Former Associate Professor, Department of Law, Chinese Culture University Minister without Portfolio, Executive Yuan & concurrently Minister, National Development Council, R.O.C.	None
Independent Director Sir Peter L. Bonfield	Male	UK	06/05/2018	06/04/2021	05/07/2002	-	-	-	-	-	-	Bachelor Degree in Engineering, Loughborough University Honours Degree in Engineering, Loughborough University Former Chairman and CEO, ICL Plc Former CEO and Chairman of the Executive Committee, British Telecommunications Plc Former Vice President, the British Quality Foundation Former Director, Mentor Graphics Corp., U.S. Former Director, Sony Corp., Japan Former Director, L.M. Ericsson, Sweden Former Chairman, GlobalLogic Inc., U.S. (a nonpublic company) Former Senior Advisor to Hampton Group, London Fellow of the Royal Academy of Engineering Chair of Council and Senior Pro-Chancellor, Loughborough University, UK Board Member, EastWest Institute, New York	Chairman, NXP Semiconductors N.V., the Netherlands Member, The Longreach Group Advisory Board, HK Board Mentor, CMI, UK Senior Advisor to Alix Partners, London

(Continued)

Title/Name (Note 1)	Gender	Nationality or Place of registration	Date Elected	Term Expires	Date First Elected	Shareholding When Elected		Current Shareholding		Spouse & Minor Shareholding		Selected Education, Past Positions & Current Positions at Non-profit Organizations	Selected Current Positions at TSMC and Other Companies
						Shares	%	Shares	%	Shares	%		
Independent Director Stan Shih	Male	R.O.C.	06/05/2018	06/04/2021	04/14/2000	1,480,286	0.01%	1,480,286	0.01%	16,116	0.00%	BSEE & MSEE, National Chiao Tung University Honorary EE Ph.D., National Chiao Tung University Honorary Doctor of Technology, The Hong Kong Polytechnic University Honorary Fellowship, University of Wales, Cardiff, UK Honorary Doctor of International Law, Thunderbird, American Graduate School of International Management, U.S. Co-Founder, Chairman Emeritus, Acer Group Former Chairman & CEO, Acer Group Former Director, Qisda Corp. Former Director, Wistron Corp. Former Chairman, National Culture and Arts Foundation, R.O.C. Director, Public Television Service Foundation, R.O.C. Council member of Asian Corporate Governance Associate (ACGA) Chairman, Stans Foundation Chairman, Cloud Gate Culture and Arts Foundation	Director & Honorary Chairman, Acer Inc. Director of: - Egis Technology Inc. - Nan Shan Life Insurance Co., Ltd. (a non-listed company) - Chinese Television System Inc. (a non-listed company) - Digitimes Inc. (a nonpublic company)
Independent Director Kok-Choo Chen	Female	R.O.C.	06/05/2018	06/04/2021	06/09/2011	-	-	-	-	5,120	0.00%	Inns of Court School of Law, England Barrister-at-law, England Advocate & Solicitor, Singapore Attorney-at-law, California, U.S. Lawyer, Tan, Rajah & Cheah, Singapore, 1969-1970 Lawyer, Sullivan & Cromwell, New York, U.S., 1971-1974 Lawyer, Heller, Erhman, White & McAuliffe, San Francisco, California, U.S., 1974-1975 Partner, Ding & Ding Law Offices, Taiwan, 1975-1988 Partner, Chen & Associates Law Offices, Taiwan, 1988-1992 Vice-President, Echo Publishing, Taiwan, 1992-1995 President, National Culture and Arts Foundation, R.O.C., 1995-1997 Senior Vice-President & General Counsel, TSMC, 1997-2001 Founder & Executive Director of Taipei Story House, 2003-2015 Advisor, Executive Yuan, R.O.C., 2009-2016 Director, National Culture and Arts Foundation, R.O.C., 2011-2016 Chairman, National Performing Arts Center, 2014-2017 Lecturer, Nanyang University, Singapore, 1970-1971 Associate Professor, Soochow University, 1981-1998 Chair Professor, National Tsing Hua University, 1999-2002 Professor, National Chengchi University, 2001-2004 Professor, Soochow University, 2001-2008 Founder and Executive Director, Museum207 (located in Taipei) Director, Republic of China Female Cancer Foundation	None
Independent Director Michael R. Splinter	Male	U.S.	06/05/2018	06/04/2021	06/09/2015	-	-	-	-	-	-	Bachelor and Master Degrees in Electrical Engineering, University of Wisconsin Madison Honorary Ph. D in Engineering, University of Wisconsin Madison Former Executive Vice President of Technology and Manufacturing group, Intel Corp. Former Executive Vice President of Sales and Marketing, Intel Corp. Former CEO, Applied Materials, Inc. Former Chairman, Applied Materials, Inc. Former Director, The NASDAQ OMX Group, Inc. Former Director, Silicon Valley Leadership Group Former Director, Semiconductor Equipment and Materials International (SEMI) Director, University of Wisconsin Foundation Chairman of the Board, US-Taiwan Business Council	Chairman of the Board, NASDAQ, Inc. Director of: - Meyer Burger Technology Ltd., Switzerland - Pica8, Inc., U.S. (a nonpublic company) - Gogoro Inc., Cayman Islands (a nonpublic company) General Partner, WISC Partners LP

Remarks:
1. No member of the Board of Directors held TSMC shares by nominee arrangement.
2. No member of the Board of Directors had a spouse or relative within two degrees of consanguinity serving as a manager or director at TSMC.

Note 1: Founder and former Chairman Dr. Morris Chang retired after the Annual Shareholders’ Meeting on June 5, 2018. Mr. Thomas J. Engibous resigned as an Independent Director due to health reasons, effective January 1, 2019.
Note 2: Dr. Mark Liu was elected by the Board of Directors as Chairman on June 5, 2018.
Note 3: Dr. C.C. Wei was elected by the Board of Directors as Chief Executive Officer (CEO) and Vice Chairman on June 5, 2018.
Note 4: Former Vice Chairman Dr. F.C. Tseng is Director effective June 5, 2018.
Note 5: Major Shareholder of TSMC’s Director that is an Institutional Shareholder.

Director that is an Institutional Shareholder of TSMC	Top 10 Shareholders
National Development Fund, Executive Yuan	Not Applicable

Major Institutional shareholders of National Development Fund: Not Applicable.
Note 6: Ms. Mei-ling Chen was appointed as the representative of National Development Fund on November 7, 2017.

2.4.2 Remuneration Paid to Directors (Note 1)

Unit: NT\$

Title/Name	Director's Remuneration								Compensation Earned by a Director Who is an Employee of TSMC or of TSMC's Consolidated Entities										(A+B+C+D+E+F+G) as a % of Net Income (Note 8)		Compensation Paid to Directors from Non-consolidated Affiliates
	Base Compensation (A)		Severance Pay and Pensions (B) (Note 6)		Compensation to Directors (C)		Allowances (D) (Note 7)		(A+B+C+D) as a % of Net Income		Base Compensation, Bonuses, and Allowances (E) (Note 7)		Severance Pay and Pensions (F) (Note 6)		Employees' Profit Sharing Bonus (G)				(A+B+C+D+E+F+G) as a % of Net Income (Note 8)		
	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC		From All Consolidated Entities		From TSMC	From All Consolidated Entities	
															Cash	Stock (Fair Market Value)	Cash	Stock (Fair Market Value)			
Founder and Former Chairman Morris Chang (Note 2)	11,416,772	11,416,772	216,289	216,289	122,068,200	122,068,200	1,023,339	1,023,339	0.0384%	0.0384%	-	-	-	-	-	-	-	-	0.0384%	0.0384%	-
Chairman Mark Liu (Note 3)	8,173,235	8,173,235	144,710	144,710	140,520,500	140,520,500	1,104,330	1,104,330	0.0427%	0.0427%	45,328,784	45,328,784	92,520	92,520	41,152,680	-	41,152,680	-	0.0674%	0.0674%	-
Vice Chairman C.C. Wei (Note 4)	-	-	-	-	-	-	-	-	-	-	124,932,402	124,932,402	237,230	237,230	111,412,930	-	111,412,930	-	0.0674%	0.0674%	-
Director F.C. Tseng (Note 5)	4,881,362	4,881,362	121,950	121,950	9,600,000	9,600,000	1,738,731	1,738,731	0.0047%	0.0047%	-	-	-	-	-	-	-	-	0.0047%	0.0047%	6,776,858
Director National Development Fund, Executive Yuan Representative: Mei-ling Chen	-	-	-	-	9,600,000	9,600,000	-	-	0.0027%	0.0027%	-	-	-	-	-	-	-	-	0.0027%	0.0027%	-
Independent Director Sir Peter L. Bonfield	-	-	-	-	14,494,240	14,494,240	-	-	0.0041%	0.0041%	-	-	-	-	-	-	-	-	0.0041%	0.0041%	-
Independent Director Stan Shih	-	-	-	-	12,000,000	12,000,000	-	-	0.0034%	0.0034%	-	-	-	-	-	-	-	-	0.0034%	0.0034%	-
Independent Director Thomas J. Engibous	-	-	-	-	14,494,240	14,494,240	-	-	0.0041%	0.0041%	-	-	-	-	-	-	-	-	0.0041%	0.0041%	-
Independent Director Kok-Choo Chen	-	-	-	-	12,000,000	12,000,000	-	-	0.0034%	0.0034%	-	-	-	-	-	-	-	-	0.0034%	0.0034%	-
Independent Director Michael R. Splinter	-	-	-	-	14,494,240	14,494,240	-	-	0.0041%	0.0041%	-	-	-	-	-	-	-	-	0.0041%	0.0041%	-
Total	24,471,369	24,471,369	482,949	482,949	349,271,420	349,271,420	3,866,400	3,866,400	0.1077%	0.1077%	170,261,186	170,261,186	329,750	329,750	152,565,610	-	152,565,610	-	0.1997%	0.1997%	6,776,858

*Other than disclosure in the above table, Directors remunerations earned by providing services (e.g. providing consulting services as a non-employee) to TSMC and all consolidated entities in the 2018 financial statements: Advisor Fee to Dr. F.C. Tseng NT\$9,347,601.

Note 1: Remuneration policies, standards/packages, procedures, the linkage to operating performance and future risk exposure: The base compensation for the Chairman, Vice-Chairman and directors are determined in accordance with the procedures set forth in TSMC's Articles of Incorporation. The Articles of Incorporation also provides that the compensation to directors shall be no more than 0.3% of annual profits and directors who also serve as executive officers of TSMC are not entitled to receive compensation to directors. The distribution of compensation to directors shall be made in accordance with TSMC's "Rules for Distribution of Compensation to Directors".

Note 2: Founder and Former Chairman Dr. Morris Chang retired after the Annual Shareholders' Meeting on June 5, 2018.

Note 3: Dr. Mark Liu was elected by the Board of Directors as Chairman on June 5, 2018. The data of "Director's Remuneration" is for the period from June 5 to December 31. The data of "Compensation Earned by a Director Who is an Employee of TSMC" is for the period from January 1 to June 4 when he served as President and Co-CEO of TSMC.

Note 4: Dr. C.C. Wei was elected by the Board of Directors as Chief Executive Officer (CEO) and Vice Chairman on June 5, 2018.

Note 5: Former Vice Chairman Dr. F.C. Tseng is Director effective June 5, 2018. The data of "Base Compensation (A)" and "Severance Pay and Pensions (B)" are for the period from January 1 to June 5 when he served as Vice Chairman.

Note 6: Pensions funded according to applicable law. In accordance with TSMC Procedure of Retirement, the pension payment to Dr. Morris Chang amounts to NT\$76,171,995.

Note 7: The above-mentioned figures include expenses for Company cars and gasoline reimbursement, but do not include compensation paid to Company drivers (totaled NT\$5,796,206).

Note 8: Total remuneration paid to the directors from TSMC and from all consolidated entities in 2017, including their employee compensation, both accounted for 0.2435% of 2017 net income.

2.5 Management Team

2.5.1 Information Regarding Management Team

As of 02/28/2019

Title Name (Note 1)	Gender	Nationality	On-board Date (Note 2)	Shareholding		Spouse & Minor		TSMC Shareholding by Nominee Arrangement (Shares)		Education and Selected Past Positions	Selected Current Positions at Other Companies	Managers Who are Spouses or within Second-degree Relative of Consanguinity to Each Other		
				Shares	%	Shares	%	Shares	%			Title	Name	Relation
Chief Executive Officer C.C. Wei	Male	R.O.C.	02/01/1998	7,179,207	0.03%	261	0.00%	-	-	Ph.D., Electrical Engineering, Yale University, U.S. President and Co-Chief Executive Officer, TSMC Executive Vice President and Co-Chief Operating Officer, TSMC Senior Vice President, Business Development, TSMC Senior Vice President, Mainstream Technology Business, TSMC Senior Vice President, Chartered Semiconductor Manufacturing Ltd.	None	None	None	None
Senior Vice President, Chief Financial Officer/ Spokesperson Finance, Europe & Asia Sales Lora Ho	Female	R.O.C.	06/01/1999	4,511,080	0.02%	2,230,268	0.01%	-	-	Master, Business Administration, National Taiwan University, Taiwan Senior Director, Accounting, TSMC Vice President & CFO, TI-Acer Semiconductor Manufacturing Corp.	Director and/or Supervisor, TSMC subsidiaries President, TSMC subsidiaries	None	None	None
Senior Vice President Research and Development/ Technology Development Wei-Jen Lo	Male	R.O.C.	07/01/2004	1,444,127	0.01%	-	-	-	-	Ph.D., Solid State Physics and Surface Chemistry, University of California, Berkeley, U.S. Vice President, Research and Development, TSMC Vice President, Manufacturing Technology Operations, TSMC Vice President, Advanced Technology Business, TSMC Vice President, Operations II, TSMC Director, Advanced Technology Development and CTM Plant Manager, Intel Corp.	None	None	None	None
Senior Vice President Corporate Strategy Office Rick Cassidy	Male	U.S.	11/14/1997	-	-	-	-	-	-	Bachelor, Engineering Technology, United States Military Academy at West Point, U.S. Chief Executive Officer, TSMC North America President of TSMC North America Vice President of TSMC North America Account Management	Director, TSMC subsidiary	None	None	None
Senior Vice President Operations/ Product Development Y.P. Chin	Male	R.O.C.	01/01/1987	6,922,122	0.03%	2,193,107	0.01%	-	-	Master, Electrical Engineering, National Cheng Kung University, Taiwan Vice President, Product Development Operations, TSMC Vice President, Advanced Technology and Business, TSMC Senior Director, Product Engineering and Services, TSMC	None	None	None	None
Senior Vice President Research and Development/ Technology Development Y.J. Mii	Male	R.O.C.	11/14/1994	1,000,419	0.00%	-	-	-	-	Ph.D., Electrical Engineering, University of California, Los Angeles, U.S. Vice President, Technology Development, TSMC TSMC Senior Director, R&D Platform I Division, TSMC	None	Director	Wayne Yeh	brother in law
Senior Vice President Information Technology and Materials Management & Risk Management J.K. Lin	Male	R.O.C.	01/01/1987	12,518,018	0.05%	1,073,387	0.00%	-	-	Bachelor, Science, National Changhua University of Education, Taiwan Vice President, Mainstream Fabs and Manufacturing Technology Operations, TSMC Senior Director, Mainstream Fabs Operations, TSMC	None	None	None	None
Senior Vice President Operations/ Fab Operations J.K. Wang	Male	R.O.C.	02/11/1987	2,553,947	0.01%	160,844	0.00%	-	-	Master, Chemical Engineering, National Cheng Kung University, Taiwan Vice President, 300mm Fabs Operations, TSMC Senior Director, 300mm fabs Operations, TSMC	Director, TSMC subsidiaries	None	None	None
Vice President Quality and Reliability N.S. Tsai	Male	R.O.C.	03/01/2000	1,925,180	0.01%	1,103,253	0.00%	-	-	Ph.D., Material Science, Massachusetts Institute of Technology, U.S. Senior Director, Assembly Test Technology & Service, TSMC Vice President, Operations, Vanguard International Semiconductor Corp.	None	None	None	None
Vice President Corporate Planning Organization Irene Sun	Female	R.O.C.	10/01/2003	420,709	0.00%	-	-	-	-	Ph.D., Materials Science and Engineering, Cornell University, U.S. Senior Director, Corporate Planning Organization, TSMC	None	None	None	None
Vice President Research and Development/ Technology Development Cliff Hou	Male	R.O.C.	12/15/1997	352,532	0.00%	60,802	0.00%	-	-	Ph.D., Electrical Engineering, Syracuse University, U.S. Vice President, Design and Technology Platform, TSMC Senior Director, Design and Technology Platform, TSMC	Director, TSMC subsidiaries Director, TSMC affiliate President, TSMC subsidiaries	None	None	None
Vice President and General Counsel Legal Sylvia Fang	Female	R.O.C.	03/20/1995	700,285	0.00%	69,112	0.00%	384,000	0.00%	Master of Comparative Law, School of Law, University of Iowa Attorney-at-law, Taiwan Associate General Counsel, TSMC Senior Associate, Taiwan International Patent and Law Office (TIPL0)	Director and/or Supervisor, TSMC subsidiaries	None	None	None

(Continued)

Title Name (Note 1)	Gender	Nationality	On-board Date (Note 2)	Shareholding		Spouse & Minor		TSMC Shareholding by Nominee Arrangement (Shares)		Education and Selected Past Positions	Selected Current Positions at Other Companies	Managers Who are Spouses or within Second-degree Relative of Consanguinity to Each Other		
				Shares	%	Shares	%	Shares	%			Title	Name	Relation
Vice President Human Resources Connie Ma	Female	R.O.C.	06/01/2014	117,000	0.00%	-	-	-	-	EMBA, International Business Management, National Taiwan University Director of Human Resources, TSMC Senior Vice President of Global Human Resources, Trend Micro Inc.	None	None	None	None
Vice President Operations/ Fab Operations Y.L. Wang	Male	R.O.C	06/01/1992	218,535	0.00%	1,135,529	0.00%	-	-	Ph.D., Electrical Engineering, National Chiao Tung University, Taiwan Vice President, Technology Development, TSMC Vice President, Fab 14B Operations, TSMC Senior Director, Fab 14B Operations, TSMC	Director, TSMC subsidiary Director, TSMC affiliate	None	None	None
Vice President Research and Development/ Integrated Interconnect & Packaging Doug Yu	Male	R.O.C.	12/28/1994	225,000	0.00%	-	-	-	-	PhD, Materials Engineering, Georgia Institute of Technology, USA Senior Director of Integrated Interconnect & Packaging Division in R&D, TSMC	None	None	None	None
Vice President and TSMC Fellow Operations/ Product Development/ More-than-Moore Technologies Alexander Kalnitsky	Male	U.S.	06/15/2009	-	-	-	-	-	-	PhD, Electrical Engineering, Carleton University, Canada Senior Director of More-than-Moore Technologies Division in R&D, TSMC	None	None	None	None
Vice President Business Development Kevin Zhang	Male	U.S.	11/01/2016	-	-	-	-	-	-	PhD, Electrical Engineering, Duke University, USA Vice President, Design and Technology Platform, TSMC Vice President, Technology and Manufacturing Group, Intel Corp.	None	None	None	None
Vice President and TSMC Fellow Operations/ Product Development T.S. Chang (Note 3)	Male	R.O.C.	02/06/1995	200,781	0.00%	-	-	-	-	PhD, Electrical Engineering, National Tsing Hua University Vice President, Fab 12B Operations, TSMC Senior Director, Fab 12B Operations, TSMC	None	None	None	None
Vice President Research and Development/ Technology Development/ N3 Platform Development Division Michael Wu (Note 3)	Male	R.O.C.	12/09/1996	478,501	0.00%	194,943	0.00%	-	-	PhD, Electrical Engineering, University of Wisconsin-Madison, USA Senior Director of N3 Platform Development Division in R&D, TSMC	None	None	None	None
Vice President Research and Development/ Technology Development/ Pathfinding Min Cao (Note 3)	Male	U.S.	07/29/2002	363,152	0.00%	4,470	0.00%	-	-	PhD, Physics, Stanford University, USA Senior Director of Pathfinding Division in R&D, TSMC	None	None	None	None
Vice President Research and Development/ Corporate Research H.-S. Philip Wong (Note 4)	Male	U.S.	07/02/2018	-	-	-	-	-	-	PhD, Electrical Engineering, Lehigh University, U.S. Willard R. and Inez Kerr Bell Professor in the School of Engineering, Stanford University Senior Manager, IBM Research	None	None	None	None
Vice President Operations/ Product Development/ Advanced Packaging Technology and Service Marvin Liao (Note 5)	Male	R.O.C.	06/06/2002	50,485	0.00%	-	-	220,000	0.00%	PhD, Materials Science, University of Texas-Arlington, U.S. Senior Director, Backend Technology and Service Operations, TSMC Vice President, Chartered Semiconductor Manufacturing Ltd.	None	None	None	None
Vice President Operations/ Fab Operations/ Fab 15B Y.H. Liaw (Note 6)	Male	R.O.C.	08/03/1988	370,000	0.00%	-	-	420,000	0.00%	Master of Chemical Engineering, National Tsing Hua University Senior Director, Fab 15B Operations, TSMC	None	None	None	None

Note 1: Senior Vice President and Chief Information Officer Dr. Stephen T. Tso retired, effective March 1, 2018. Vice President and Chief Technology Officer Dr. Jack Sun retired, effective August 1, 2018.
Vice President M.C. Tzeng retired, effective November 1, 2018. Vice President Dr. Been-Jon Woo retired, effective January 1, 2019.

Note 2: On-board date means the official date joining TSMC.

Note 3: Dr. T.S. Chang, Dr. Michael Wu and Dr. Min Cao were promoted to Vice President, effective February 13, 2018.

Note 4: Dr. H.-S. Philip Wong was promoted to Vice President, effective August 14, 2018.

Note 5: Dr. Marvin Liao was promoted to Vice President, effective November 13, 2018.

Note 6: Mr. Y.H. Liaw was promoted to Vice President, effective February 19, 2019.

2.5.2 Compensation Paid to CEO and Vice Presidents (Note 1)

Unit: NT\$

Title	Name	Salary (A)		Severance Pay and Pensions (B) (Note 7)		Bonuses and Allowances (C) (Note 8)		Employees' Profit Sharing Bonus (D)				(A+B+C+D) as a % of Net Income (Note 9)		Compensation Received from Non-consolidated Affiliates
		From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC	From All Consolidated Entities	From TSMC		From All Consolidated Entities		From TSMC	From All Consolidated Entities	
								Cash	Stock (Fair Market Value)	Cash	Stock (Fair Market Value)			
Chief Executive Officer	C.C. Wei	9,489,190	9,489,190	237,230	237,230	115,443,212	115,443,212	111,412,930	-	111,412,930	-	0.0674%	0.0674%	
Senior Vice President, Chief Financial Officer/ Spokesperson	Lora Ho	5,546,520	5,546,520	138,663	138,663	46,733,828	46,733,828	45,165,372	-	45,165,372	-	0.0278%	0.0278%	
Senior Vice President and Chief Information Officer	Stephen T. Tso (Note 2)	83,846,866	96,724,358	2,089,955	2,430,964	528,905,242	614,642,918	489,485,137	-	489,485,137	-	0.3145%	0.3427%	100,000
Senior Vice President	Wei-Jen Lo													
Senior Vice President	Rick Cassidy													
Senior Vice President	Y.P. Chin													
Senior Vice President	Y.J. Mii													
Senior Vice President	J.K. Lin													
Senior Vice President	J.K. Wang													
Vice President	M.C. Tzeng (Note 2)													
Vice President and Chief Technology Officer	Jack Sun (Note 2)													
Vice President	N.S. Tsai													
Vice President	Irene Sun													
Vice President	Cliff Hou													
Vice President	Been-Jon Woo (Note 2)													
Vice President and General Counsel	Sylvia Fang													
Vice President	Connie Ma													
Vice President	Y.L. Wang													
Vice President	Doug Yu													
Vice President and TSMC Fellow	Alexander Kalnitsky													
Vice President	Kevin Zhang													
Vice President and TSMC Fellow	T.S. Chang (Note 3)													
Vice President	Michael Wu (Note 3)													
Vice President	Min Cao (Note 3)													
Vice President	H.-S. Philip Wong (Note 4)													
Vice President	Marvin Liao (Note 5)													
Vice President	Y.H. Liaw (Note 6)													
Total (Note 10)		98,882,576	111,760,068	2,465,848	2,806,857	691,082,282	776,819,958	646,063,439	-	646,063,439	-	0.4097%	0.4379%	100,000

Note 1: Compensation policy, standards/packages, procedures, the linkage to operating performance and future risk exposure: The total compensation paid to the executive officers is decided based on their job responsibility, contribution, company performance and projected future risks the Company will face. It is reviewed by the Compensation Committee then submitted to the Board of Directors for approval.

Note 2: Senior Vice President and Chief Information Officer Dr. Stephen T. Tso retired, effective March 1, 2018. Vice President and Chief Technology Officer Dr. Jack Sun retired, effective August 1, 2018. Vice President M.C. Tzeng retired, effective November 1, 2018. Vice President Dr. Been-Jon Woo retired, effective January 1, 2019.

Note 3: Dr. T.S. Chang, Dr. Michael Wu and Dr. Min Cao were promoted to Vice President, effective February 13, 2018.

Note 4: Dr. H.-S. Philip Wong was promoted to Vice President, effective August 14, 2018.

Note 5: Dr. Marvin Liao was promoted to Vice President, effective November 13, 2018.

Note 6: Mr. Y.H. Liaw was promoted to Vice President, effective February 19, 2019. Therefore, his 2018 compensation data is not disclosed.

Note 7: Pensions funded according to applicable law. In accordance with TSMC Procedure of Retirement, the pension payment to Dr. Stephen T. Tso, Mr. M.C. Tzeng, Dr. Jack Sun and Dr. Been-Jon Woo amounts to NT\$60,776,545.

Note 8: The above-mentioned figures include the expense for the employees' cash bonuses distributed in June, August, November 2018 & February 2019, Company cars and gasoline reimbursement, but do not include compensation paid to Company drivers (totaled NT\$351,672).

Note 9: Total compensation paid to the executive officers from TSMC in 2017 accounted for 0.4820% of 2017 net income. Total compensation paid to the executive officers from all consolidated entities in 2017 accounted for 0.5109% of 2017 net income.

Note 10: These amounts do not include Dr. Mark Liu's compensation for the period from January 1 to June 4 when he served as President and Co-CEO of TSMC (please refer to "2.4.2 Remuneration Paid to Directors" on page 23 of this Annual Report for the "Compensation Earned by a Director Who is an Employee of TSMC"). Including Dr. Mark Liu's January 1 to June 4 compensation as President and Co-CEO, the total compensation paid to the executive officers from TSMC in 2018 accounted for 0.4343% of 2018 net income, and the total compensation paid to the executive officers from all consolidated entities in 2018 accounted for 0.4625% of 2018 net income.

Compensation Paid to CEO and Vice Presidents

	2018	
	From TSMC	From All Consolidated Entities and Non-consolidated Affiliates
NT\$0 ~ NT\$1,999,999	Rick Cassidy	None
NT\$2,000,000 ~ NT\$4,999,999	None	None
NT\$5,000,000 ~ NT\$9,999,999	Marvin Liao	Marvin Liao
NT\$10,000,000 ~ NT\$14,999,999	H.-S. Philip Wong	H.-S. Philip Wong
NT\$15,000,000 ~ NT\$29,999,999	Stephen T. Tso	Stephen T. Tso
NT\$30,000,000 ~ NT\$49,999,999	Jack Sun, Irene Sun, Been-Jon Woo, Connie Ma, Y.L. Wang, Doug Yu, T.S. Chang, Michael Wu, Min Cao	Jack Sun, Irene Sun, Been-Jon Woo, Connie Ma, Y.L. Wang, Doug Yu, T.S. Chang, Michael Wu, Min Cao
NT\$50,000,000 ~ NT\$99,999,999	Lora Ho, Y.P. Chin, Y.J. Mii, M.C. Tzeng, N.S. Tsai, J.K. Lin, J.K. Wang, Cliff Hou, Sylvia Fang, Alexander Kalnitsky, Kevin Zhang	Lora Ho, Rick Cassidy, Y.P. Chin, Y.J. Mii, M.C. Tzeng, N.S. Tsai, J.K. Lin, J.K. Wang, Cliff Hou, Sylvia Fang, Alexander Kalnitsky, Kevin Zhang
Over NT\$100,000,000	C.C. Wei, Wei-Jen Lo	C.C. Wei, Wei-Jen Lo
Total	26	26

2.5.3 Employees’ Profit Sharing Bonus Paid to Management Team

Unit: NT\$

Title	Name	Stock (Fair Market Value)	Cash	Total Employees’ Profit Sharing Bonus	Total Employees’ Profit Sharing Bonus Paid to Management Team as a % of Net Income
Chief Executive Officer	C.C. Wei	-	111,412,930	111,412,930	0.0317%
Senior Vice President, Chief Financial Officer/ Spokesperson	Lora Ho	-	45,165,372	45,165,372	0.0129%
Senior Vice President and Chief Information Officer	Stephen T. Tso (Note 1)	-	489,485,137	489,485,137	0.1394%
Senior Vice President	Wei-Jen Lo				
Senior Vice President	Rick Cassidy				
Senior Vice President	Y.P. Chin				
Senior Vice President	Y.J. Mii				
Senior Vice President	J.K. Lin				
Senior Vice President	J.K. Wang				
Vice President	M.C. Tzeng (Note 1)				
Vice President and Chief Technology Officer	Jack Sun (Note 1)				
Vice President	N.S. Tsai				
Vice President	Irene Sun				
Vice President	Cliff Hou				
Vice President	Been-Jon Woo (Note 1)				
Vice President and General Counsel	Sylvia Fang				
Vice President	Connie Ma				
Vice President	Y.L. Wang				
Vice President	Doug Yu				
Vice President and TSMC Fellow	Alexander Kalnitsky				
Vice President	Kevin Zhang				
Vice President and TSMC Fellow	T.S. Chang (Note 2)				
Vice President	Michael Wu (Note 2)				
Vice President	Min Cao (Note 2)				
Vice President	H.-S. Philip Wong (Note 3)				
Vice President	Marvin Liao (Note 4)				
Vice President	Y.H. Liaw (Note 5)				
Total (Note 6)		-	646,063,439	646,063,439	0.1840%

Note 1: Senior Vice President and Chief Information Officer Dr. Stephen T. Tso retired, effective March 1, 2018. Vice President and Chief Technology Officer Dr. Jack Sun retired, effective August 1, 2018.
Vice President M.C. Tzeng retired, effective November 1, 2018. Vice President Dr. Been-Jon Woo retired, effective January 1, 2019.
Note 2: Dr. T.S. Chang, Dr. Michael Wu and Dr. Min Cao were promoted to Vice President, effective February 13, 2018.
Note 3: Dr. H.-S. Philip Wong was promoted to Vice President, effective August 14, 2018.
Note 4: Dr. Marvin Liao was promoted to Vice President, effective November 13, 2018.
Note 5: Mr. Y.H. Liaw was promoted to Vice President, effective February 19, 2019. Therefore, his 2018 compensation data is not disclosed.
Note 6: Excluding the amount NT\$41,152,680 paid to Dr. Mark Liu for the period from January 1 to June 4 when he served as President and Co-CEO of TSMC (please refer to “2.4.2 Remuneration Paid to Directors” on page 23 of this Annual Report for the “Compensation Earned by a Director Who is an Employee of TSMC”). Including Dr. Mark Liu’s January 1 to June 4 compensation as President and Co-CEO, the total amount paid to the executive officers in 2018 was NT\$687,216,119, accounted for 0.1957% of 2018 net income.



Corporate Governance

3.1 Overview

TSMC advocates and acts upon the principles of operational transparency and respect for shareholder rights. We believe that the basis for successful corporate governance is a sound and effective Board of Directors. In line with this principle, the TSMC Board delegates various responsibilities and authority to two Board Committees, Audit Committee and Compensation Committee. Each Committee has a written charter approved by the Board. Each Committee's chairperson regularly reports to the Board on the activities and actions of the relevant committee.

2018 Corporate Governance Awards and Ratings

Organization	Awards
Dow Jones Sustainability Indices (DJSI)	Dow Jones Sustainability World Index for the 18 th consecutive year Dow Jones Sustainability Emerging Markets Index
MSCI ESG Indexes	MSCI ACWI ESG Leaders Index component MSCI ACWI SRI Index component
FTSE4Good Index	FTSE4Good Emerging Index component FTSE4Good TIP Taiwan ESG Index component
Thomson Reuters	Top 100 Global Technology Leaders
Nikkei	Nikkei Asia 300 Indexes
IR Magazine	Best Investor Relations (Awards by region/Taiwan)
FORTUNE	Fortune Global 500
Institutional Investor Magazine	Most Honored Company (Technology/Semiconductors) – All-Asia
Forbes	World's Best Employers
CommonWealth Magazine	Corporate Social Responsibility Award
Asiamoney	Overall Most Outstanding Company in Taiwan Most Outstanding Company in Taiwan – Semiconductors & Semiconductor Equipment Sector
Sustainalytics	Rated an ESG "Leader" within the Semiconductor Industry
Taiwan Institute of Sustainable Energy	The Most Prestigious Sustainability Awards – Top Ten Domestic Corporates Taiwan Top 50 Corporate Responsibility Report Awards – IT & IC Manufacturing Industry
Taiwan Stock Exchange	Top 5% in Corporate Governance Evaluation of Listed Companies for the 4 th consecutive year

3.2 Board of Directors

Board Structure

After having led the Company for over 31 years, TSMC’s Founder, Dr. Morris Chang, retired from the Company after the Annual Shareholders’ Meeting on June 5, 2018. At the meeting, TSMC shareholders elected a new Board of Directors, which then convened to elect Dr. Mark Liu as Chairman and Dr. C.C. Wei as Chief Executive Officer (CEO) and Vice Chairman, completing the transition of responsibilities.

As of the end of 2018, TSMC’s Board of Directors consists of nine distinguished members with a great breadth of experience as world-class business leaders or professionals. We deeply rely on them for their diverse knowledge, personal perspectives, and solid business judgment. Five of those nine members are Independent Directors: former British Telecommunications Chief Executive Officer, Sir Peter L. Bonfield; Co-Founder, Chairman Emeritus of the Acer Group, Mr. Stan Shih; former Texas Instruments Inc. Chairman of the Board, Mr. Thomas J. Engibous; former Chairman of National Performing Arts Center and former Advisor of Executive Yuan, R.O.C., Ms. Kok-Choo Chen; and former Chairman of Applied Materials, Inc., Mr. Michael R. Splinter. The number of Independent Directors exceeds 50% of the total number of Directors, and two Directors are female. Mr. Thomas J. Engibous resigned as Independent Director, Audit Committee member and Compensation Committee member of TSMC due to health reasons, effective January 1, 2019. There will be a by-election for one Independent Director at the 2019 Annual Shareholders’ Meeting. The Board approved the nomination of Moshe N. Gavrielov as a candidate for Independent Director at its meeting in the first quarter of 2019. The number of Independent Directors will continue to exceed 50% of the total number of Directors.

Board Responsibilities

Inheriting the spirit of TSMC’s Founder, Dr. Morris Chang’s philosophy on corporate governance, under the leadership of Chairman Dr. Mark Liu and CEO & Vice Chairman Dr. C.C. Wei, TSMC’s Board of Directors takes a serious and forthright approach to its duties and is a dedicated, competent and independent Board.

The Board’s primary duty is to supervise the Company’s compliance with relevant laws and regulations, financial transparency, timely disclosure of material information, and maintaining of the highest integrity. TSMC’s Board of Directors strives to perform these responsibilities through its Audit Committee and the Compensation Committee, the hiring of a financial expert consultant for the Audit Committee, and coordination with our Internal Audit department.

The second duty of the Board of Directors is to evaluate the management’s performance and to appoint and dismiss officers of the Company when necessary. TSMC’s management has maintained a healthy and functional communication with the Board of Directors, has been devoted in executing guidance of

the Board, and is dedicated in running the business operations, all to achieve the best interests for TSMC shareholders.

The third duty of the Board of Directors is to resolve important, concrete matters, such as capital appropriations, investment activities, dividends, etc.

The fourth duty of the Board of Directors is to provide guidance to the management team of the Company. Quarterly, TSMC’s management reports to the Board on a variety of subjects. The management also reviews the Company’s business strategies with the Board and updates TSMC’s Board on the progress of those strategies, obtaining Board guidance as appropriate.

Selection and Election of Directors

TSMC envisions the membership of its esteemed Board of Directors to be composed of highly ethical professionals with the necessary knowledge, experience and understanding from diverse backgrounds. TSMC envisions its Board to be composed of as many independent directors as possible, and the independence of each independent director candidate is also considered and assessed under relevant laws. Therefore, TSMC composes its Board with world-class candidates who are/were international or local business leaders in the high-tech industry, prestigious academics or other professionals excelling in their chosen field of expertise.

Directors shall be elected pursuant to the candidate nomination system specified in Article 192-1 of the R.O.C. Company Law. The tenure of office for Directors shall be three years. The independence of each independent director candidate is also considered and assessed under relevant law such as the Taiwan “Regulations Governing Appointment of Independent Directors and Compliance Matters for Public Companies”. Under R.O.C. law, in which TSMC was incorporated, any shareholders holding one percent or more of our total outstanding common shares may nominate their own candidate to stand for election as a Board member. This democratic mechanism allows our shareholders to become involved in the selection and nomination process of Board candidates. The final slate of candidates is put to the shareholders for voting at the relevant annual shareholders’ meeting.

There are no limits on the number of terms that a director may serve. We believe the Company benefits from the contributions of directors who have over their years of dedicated service acquired unique insights into the operations and financial developments of the Company. The Company reviews the appropriateness of each director’s continued service to ensure there are new viewpoints available to the Board.

Directors’ Compensation

According to our Articles of Incorporation, not more than 0.3 percent of our annual profits (defined under local law) after recovering any losses incurred in prior years, if any, may be distributed as compensation to our directors. In addition, directors who also serve as executive officers of the Company are not entitled to receive any director compensation.

Directors’ Professional Qualifications and Independent Analysis

According to the relevant requirements set by Taiwan’s Securities and Futures Bureau, the professional qualifications and independence status of the Company’s Board members are listed in the table below.

Name	Criteria	Meet the Following Professional Qualification Requirements, Together with at Least Five Years Work Experience			Criteria (Note)										Number of Other Taiwanese Public Companies Concurrently Serving as an Independent Director
		An Instructor or Higher Position in a Department of Commerce, Law, Finance, Accounting, or Other Academic Department Related to the Business Needs of the Company in a Public or Private Junior College, College or University	A Judge, Public Prosecutor, Attorney, Certified Public Accountant, or Other Professional or Technical Specialists Who Has Passed a National Examination and Been Awarded a Certificate in a Profession Necessary for the Business of the Company	Have Work Experience in the Area of Commerce, Law, Finance, or Accounting, or Otherwise Necessary for the Business of the Company	1	2	3	4	5	6	7	8	9	10	
Mark Liu Chairman			V	V	V		V	V	V	V	V	V	V	V	0
C.C. Wei Vice Chairman			V		V	V	V	V	V	V	V	V	V	V	0
Mei-ling Chen Director	V		V	V	V	V	V	V	V	V	V	V	V		0
F.C. Tseng Director			V	V			V	V	V	V		V	V	V	1
Sir Peter L. Bonfield Independent Director			V	V	V	V	V	V	V	V	V	V	V	V	0
Stan Shih Independent Director			V	V	V	V	V	V	V	V	V	V	V	V	0
Kok-Choo Chen Independent Director	V	V	V	V	V	V	V	V	V	V	V	V	V	V	0
Michael R. Splinter Independent Director			V	V	V	V	V	V	V	V	V	V	V	V	0

Note:
Directors, during the two years before being elected and during the term of office, meet any of the following situations, please tick the appropriate corresponding boxes:
1. Not an employee of the company or any of its affiliates;
2. Not a director or supervisor of the company or any of its affiliates. The same does not apply, however, in cases where the person is an independent director of the company, its parent company, or any subsidiary, as appointed in accordance with the laws of Taiwan or with the laws of the country of the parent company or subsidiary;
3. Not a natural-person shareholder who holds shares, together with those held by the person’s spouse, minor children, or held by the person under others’ names, in an aggregate amount of one percent or more of the total number of issued shares of the company or ranks as one of its top ten shareholders;
4. Not a spouse, relative within the second degree of kinship, or lineal relative within the third degree of kinship, of any of the above persons in the preceding three subparagraphs;
5. Not a director, supervisor, or employee of a corporate/institutional shareholder that directly holds five percent or more of the total number of issued shares of the company or ranks as of its top five shareholders;
6. Not a director, supervisor, officer, or shareholder holding five percent or more of the shares of a specified company or institution that has a financial or business relationship with the company;
7. Not a professional individual who, or an owner, partner, director, supervisor, or officer of a sole proprietorship, partnership, company, or institution that, provides commercial, legal, financial, accounting services or consultation to the company or to any affiliate of the company, or a spouse thereof, provided that this restriction does not apply to any member of the compensation committee who exercises powers pursuant to Article 7 of the “Regulations Governing the Establishment and Exercise of Powers of Compensation Committees of Companies whose Stock is Listed on the TWSE or Traded on the GTSM”;
8. Not having a marital relationship, or a relative within the second degree of kinship to any other director of the company;
9. Not been a person of any conditions defined in Article 30 of the Company Law; and
10. Not a governmental, juridical person or its representative as defined in Article 27 of the Company Law.

3.2.1 Audit Committee

The Audit Committee assists the Board in fulfilling its oversight of the quality and integrity of the accounting, auditing, reporting, and financial control practices of the Company.

The Audit Committee is responsible to review the following major matters:

- Financial reports;
- Auditing and accounting policies and procedures;
- Internal control systems and including related policies and procedures;
- Material asset or derivatives transactions;
- Material lending funds, endorsements or guarantees;
- Offering or issuance of any equity-type securities;
- Derivatives and cash investments;
- Legal compliance;
- Related-party transactions and potential conflicts of interests involving executive officers and directors;
- Ombudsman reports;
- Fraud prevention and investigation reports;
- IT security;
- Corporate risk management;
- Performance, independence, qualification of independent auditor;
- Hiring or dismissal of an attesting CPA, or the compensation given thereto;
- Appointment or discharge of financial, accounting, or internal auditing officers;
- Assessment of Committee Charter and fulfillment of Audit Committee duties; and
- Assessment of the Committee’s performance, etc.

Under R.O.C. law, the membership of Audit Committee shall consist of all independent directors. TSMC’s Audit Committee satisfies this statutory requirement. The Committee also engaged a financial expert consultant in accordance with the rules of the U.S. Securities and Exchange Commission. The Audit Committee annually conducts self-evaluation to assess the Committee’s performance and identify areas for further attention.

TSMC’s Audit Committee is empowered by its Charter to conduct any study or investigation it deems appropriate to fulfill its responsibilities. It has direct access to TSMC’s internal auditors, the Company’s independent auditors, and all employees of the Company. The Committee is authorized to retain and oversee special legal, accounting, or other consultants as it deems appropriate to fulfill its mandate. The Audit Committee Charter is available on TSMC’s corporate website.

3.2.2 Compensation Committee

The Compensation Committee assists the Board in discharging its responsibilities related to TSMC’s compensation and benefits policies, plans and programs, and in the evaluation and compensation of TSMC’s directors of the Board and executives.

The members of the Compensation Committee are appointed by the Board as required by R.O.C. law. According to TSMC’s Compensation Committee Charter, the Committee shall consist of no fewer than three independent directors of the Board. The Compensation Committee is comprised of all independent directors, and the Board appointed former Chief Executive Officer of Xilinx, Inc., Mr. Moshe N. Gavrielov, as a member of the Compensation Committee on November 13, 2018. The Chairman of the Board and the Chief Executive Officer are invited by the Committee to attend all meetings and are excused from the Committee’s discussion of their own compensation.

TSMC’s Compensation Committee is authorized by its Charter to retain an independent consultant to assist in the evaluation of CEO, or executive officer compensation. The Compensation Committee Charter is available on TSMC’s corporate website.

Compensation Committee Members’ Professional Qualifications and Independent Analysis

According to the relevant requirements set by Taiwan’s Securities and Futures Bureau, the professional qualifications and independence status of the Company’s Compensation Committee members are listed in the table below.

Name Title	Criteria	Meet the Following Professional Qualification Requirements, Together with at Least Five Years Work Experience			Criteria (Note 1)								Number of Other Taiwanese Public Companies Concurrently Serving as a Compensation Committee Member
		An Instructor or Higher Position in a Department of Commerce, Law, Finance, Accounting, or Other Academic Department Related to the Business Needs of the Company in a Public or Private Junior College, College or University	A Judge, Public Prosecutor, Attorney, Certified Public Accountant, or Other Professional or Technical Specialists Who Has Passed a National Examination and Been Awarded a Certificate in a Profession Necessary for the Business of the Company	Have Work Experience in the Area of Commerce, Law, Finance, or Accounting, or Otherwise Necessary for the Business of the Company	1	2	3	4	5	6	7	8	
Michael R. Splinter Independent Director				V	V	V	V	V	V	V	V	V	0
Sir Peter L. Bonfield Independent Director				V	V	V	V	V	V	V	V	V	0
Stan Shih Independent Director				V	V	V	V	V	V	V	V	V	0
Kok-Choo Chen Independent Director	V	V		V	V	V	V	V	V	V	V	V	0
Moshe N. Gavrielov (Note 2)				V	V	V	V	V	V	V	V	V	0

Note 1: Compensation Committee Members, during the two years before being elected or during the term of office, meet any of the following situations, please tick the appropriate corresponding boxes:

1. Not an employee of the company or any of its affiliates;
2. Not a director or supervisor of the company or any of its affiliates. The same does not apply, however, in cases where the person is an independent director of the company, its parent company, or any subsidiary, as appointed in accordance with the laws of Taiwan or with the laws of the country of the parent company or subsidiary;
3. Not a natural-person shareholder who holds shares, together with those held by the person’s spouse, minor children, or held by the person under others’ names, in an aggregate amount of one percent or more of the total number of issued shares of the company or ranks as one of its top ten shareholders;
4. Not a spouse, relative within the second degree of kinship, or lineal relative within the third degree of kinship, of any of the above persons in the preceding three subparagraphs;
5. Not a director, supervisor, or employee of a corporate/institutional shareholder that directly holds five percent or more of the total number of issued shares of the company or ranks as of its top five shareholders;
6. Not a director, supervisor, officer, or shareholder holding five percent or more of the shares of a specified company or institution that has a financial or business relationship with the company;
7. Not a professional individual who, or an owner, partner, director, supervisor, or officer of a sole proprietorship, partnership, company, or institution that, provides commercial, legal, financial, accounting services or consultation to the company or to any affiliate of the company, or a spouse thereof;
8. Not been a person of any conditions defined in Article 30 of the Company Law.

Note 2: The Board appointed Mr. Moshe N. Gavrielov (former Chief Executive Officer of Xilinx, Inc.) as a member of the Compensation Committee on November 13, 2018.

3.2.3 Director and Committees Members’ Attendance

Each Director is expected to attend every Board meeting and the committees meeting on which he or she serves. In 2018, the average Board Meeting attendance rate was 86% and the attendance rate for the Audit Committee and Compensation Committee’s Meetings were 80% and 75% respectively.

Board of Directors Meeting Status

TSMC’s Chairman of the Board of Directors convened four regular meetings and one special meeting in 2018. The directors’ attendance status is as follows.

Title	Name	Attendance in Person	By Proxy	Attendance Rate in Person (%)	Notes
Founder/Former Chairman	Morris Chang	2	0	100%	Retired (Note 1)
Chairman	Mark Liu	5	0	100%	Renewal of office (Note 1)
Vice Chairman	C.C. Wei	5	0	100%	Renewal of office (Note 1)
Director	National Development Fund, Executive Yuan Representative: Mei-ling Chen	3	2	60%	Renewal of office (Note 1)
Director	F.C. Tseng	5	0	100%	Renewal of office (Note 1)
Independent Director	Sir Peter L. Bonfield	5	0	100%	Renewal of office (Note 1)
Independent Director	Stan Shih	5	0	100%	Renewal of office (Note 1)
Independent Director	Thomas J. Engibous	1	4	20%	Renewal of office (Note 1 and Note 2)
Independent Director	Kok-Choo Chen	4	1	80%	Renewal of office (Note 1)
Independent Director	Michael R. Splinter	5	0	100%	Renewal of office (Note 1)

Annotations:
A. (1) Securities and Exchange Act §14-3 resolutions:

Meeting Dates	Resolution	Any Independent Director Had a Dissenting Opinion or Qualified Opinion
2018 2 nd Regular Meeting June 5 & 6	● approving amendments to TSMC’s internal control related policies and procedures	None
2018 4 th Regular Meeting November 12 & 13	● approving the proposed 2019 service fees and out-of-pocket expenses for Deloitte & Touche, TSMC’s independent auditor	
2019 1 st Regular Meeting February 18 & 19	● approving amendments to TSMC’s “Procedures for Acquisition or Disposal of Assets” ● approving amendments to TSMC’s “Procedures for Financial Derivatives Transactions”	

(2) There were no other written or otherwise recorded resolutions on which an independent director had a dissenting opinion or qualified opinion in 2018.
B. Recusals of Directors due to conflicts of interests in 2018: Directors recused themselves from the discussion and voting of their compensation resolution.
C. Measures taken to strengthen the functionality of the Board:
- Four of the eight current Directors are Independent Directors. The number of Independent Directors is 50% of the total number of Directors.
- The Chairman of the Board of Directors is not executive officer of the Company.
- TSMC Board delegates various responsibilities and authority to two Board Committees, Audit Committee and Compensation Committee. Each Committees chairperson regularly reports to the Board on the activities and actions of the relevant committee.

Note 1: TSMC’s 14th Board of Directors was elected at TSMC’s Annual Shareholders’ Meeting on June 5, 2018. Their respective tenures are from June 5 2018 to June 4, 2021. TSMC’s Founder, Dr. Morris Chang retired after the meeting.

Note 2: Mr. Thomas J. Engibous’ attendance rate in 2018 for TSMC’s Board and Committee meetings was affected by a personal medical condition that prevented him from traveling long distances. Mr. Engibous participated in one special meeting held via video-conference. He received updates on important matters considered by the Board at the meetings he was unable to attend, which allowed him to continue providing his insight to the Company throughout the year. Mr. Engibous resigned as Independent Director of TSMC due to health reasons, effective January 1, 2019.

Audit Committee Meeting Status

Sir Peter L. Bonfield, Chairman of the Audit Committee, convened four regular meetings and one special meeting in 2018. The Committee members and consultant’s attendance status is shown in the following table. In addition to these meetings, the Committee members and Financial Expert Consultant participated in three telephone conferences to discuss the Company’s Annual Report to be filed with the Taiwan and U.S. authorities and investor conference materials with management.

Title	Name	Attendance in Person	By Proxy	Attendance Rate in Person (%)	Telephone Conferences	Attendance Rate of Telephone Conferences (%)	Notes
Chair	Sir Peter L. Bonfield	5	0	100%	3	100%	Renewal of office (Note 1)
Member	Stan Shih	5	0	100%	3	100%	Renewal of office (Note 1)
Member	Thomas J. Engibous	1	4	20%	2	67%	Renewal of office (Note 1 and Note 2)
Member	Kok-Choo Chen	4	1	80%	3	100%	Renewal of office (Note 1)
Member	Michael R. Splinter	5	0	100%	3	100%	Renewal of office (Note 1)
Financial Expert Consultant	J.C. Lobbezoo	5	0	100%	3	100%	None

Annotations:
A. (1) Resolutions related to Securities and Exchange Act §14-5:

Meeting Dates	Resolution	Any Independent Director Had a Dissenting Opinion or Qualified Opinion
2018 1 st Regular Meeting February 12	● approving the 2017 annual financial statements ● approving 2017 Statement of Internal Control System	None
2018 2 nd Regular Meeting June 5	● approving amendments to TSMC’s internal control related policies and procedures	
2018 3 rd Regular Meeting August 13	● approving the 2018 second quarter financial statements	
2018 4 th Regular Meeting November 12	● approving the proposed 2019 service fees and out-of-pocket expenses for TSMC’s independent auditor	
2019 1 st Regular Meeting February 18	● approving the 2018 annual financial statements ● approving 2018 Statement of Internal Control System ● approving amendments to TSMC’s “Procedures for Acquisition or Disposal of Assets” ● approving amendments to TSMC’s “Procedures for Financial Derivatives Transactions”	

(2) There was no other resolutions which was not approved by the Audit Committee but was approved by two thirds or more of all directors in 2018.
B. There were no recusals of independent directors due to conflicts of interests in 2018.
C. Descriptions of the communications between the independent directors, the internal auditors, and the independent auditors in 2018 (which should include the material items, channels, and results of the audits on the corporate finance and/or operations, etc.):
(1) The internal auditors have sent the audit reports to the members of the Audit Committee periodically, and presented the findings of all audit reports in the quarterly meetings of the Audit Committee. The head of Internal Audit will immediately report to the members of the Audit Committee any material matters. During 2018, the head of Internal Audit did not report any such material matters. The communication channel between the Audit Committee and the internal auditor functioned well.
(2) The Company’s independent auditors have presented the findings of their quarterly review or audits on the Company’s financial results. Under applicable laws and regulations, the independent auditors are also required to immediately communicate to the Audit Committee any material matters that they have discovered. During 2018, the Company’s independent auditors did not report any irregularity. The communication channel between the Audit Committee and the independent auditors functioned well.
The communications between the independent directors, the internal auditors, and the independent auditors are listed in the table below.

Meeting Dates	Communications between the Independent Directors and the Internal Auditors	Communications between the Independent Directors and the Independent Auditors
2018 1 st Regular Meeting February 12	● reviewing the Internal Auditor’s report (closed door) ● reviewing report on SOX 404 self-testing results for the year 2017 ● reviewing and approving 2017 Statement of Internal Control System	● reviewing any audit problems or difficulties and management’s response in connection with 2017 annual financial statements (closed door) ● reviewing regulatory developments ● reviewing external auditor relationship (i.e. qualification, performance and independence) ● reviewing report on IFRS 16 adoption status
2018 2 nd Regular Meeting June 5	● reviewing the Internal Auditor’s report (closed door) ● reviewing and approving amendments to TSMC’s internal control related policies and procedures	● reviewing any review problems or difficulties and management’s response in connection with 2018 first quarter financial statements (closed door) ● reviewing regulatory developments ● reviewing the result of CPA evaluation questionnaire ● reviewing report on IFRS 16 adoption status
2018 3 rd Regular Meeting August 13	● reviewing the Internal Auditor’s report (closed door) ● reviewing Internal Audit and Information Technology Managements’ report on August 3 rd computer virus incident	● reviewing any review problems or difficulties and management’s response in connection with 2018 second quarter financial statements (closed door) ● reviewing regulatory developments
2018 4 th Regular Meeting November 12	● reviewing the Internal Auditor’s report (closed door) ● reviewing and approving the 2019 internal audit plan	● reviewing any review problems or difficulties and management’s response in connection with 2018 third quarter financial statements (closed door) ● reviewing regulatory developments
2019 1 st Regular Meeting February 18	● reviewing the Internal Auditor’s report (closed door) ● reviewing report on SOX 404 self-testing results for the year 2018 ● reviewing and approving 2018 Statement of Internal Control System	● reviewing any audit problems or difficulties and management’s response in connection with 2018 annual financial statements (closed door) ● reviewing regulatory developments ● reviewing external auditor relationship (i.e. qualification, performance and independence)
Result: all of above matters were reviewed and approved by the Audit Committee whereupon independent directors raised no objection.		

Note 1: Sir Peter L. Bonfield, Stan Shih, Thomas J. Engibous, Kok-Choo Chen and Michael R. Splinter were elected as TSMC’s independent directors and became members of the Compensation Committee on June 5, 2018. Their respective tenures are from June 5 2018 to June 4, 2021.

Note 2: Mr. Thomas J. Engibous’ attendance rate in 2018 for TSMC’s Board and Committee meetings was affected by a personal medical condition that prevented him from traveling long distances. Mr. Engibous participated in one special meeting held via video-conference and three meetings held via tele-conference. Mr. Engibous resigned as Audit Committee member of TSMC due to health reasons, effective January 1, 2019.

Compensation Committee Meeting Status

Mr. Michael R. Splinter, Chairman of the Compensation Committee, convened four regular meetings in 2018. The Committee members’ attendance status is as follows:

Title	Name	Attendance in Person	By Proxy	Attendance Rate in Person (%)	Notes
Chair	Michael R. Splinter	4	0	100%	Renewal of office (Note 1)
Member	Sir Peter L. Bonfield	4	0	100%	Renewal of office (Note 1)
Member	Stan Shih	4	0	100%	Renewal of office (Note 1)
Member	Thomas J. Engibous	0	4	0%	Renewal of office (Note 1 and Note 2)
Member	Kok-Choo Chen	3	1	75%	Renewal of office (Note 1)
Member	Moshe N. Gavrielov	-	-	-	New office assumed (Note 3)

Annotations:
A. There was no recommendation of the Compensation Committee which was not adopted or was modified by the Board of Directors in 2018.
B. There were no written or otherwise recorded resolutions on which a member of the Compensation Committee had a dissenting opinion or qualified opinion.

Note 1: At the meeting of June 5, 2018, TSMC’s Board of Directors approved the appointment of all five independent directors, Michael R. Splinter, Sir Peter L. Bonfield, Stan Shih, Thomas J. Engibous and Kok-Choo Chen, as members of the Compensation Committee. Their respective tenures are from June 5 2018 to June 4, 2021.
Note 2: Mr. Thomas J. Engibous’ attendance rate in 2018 for TSMC’s Board and Committee meetings was affected by a personal medical condition that prevented him from traveling long distances. Mr. Engibous resigned as Compensation Committee member of TSMC due to health reasons, effective January 1, 2019.
Note 3: At the meeting of November 13, 2018, TSMC’s Board of Directors appointed Mr. Moshe N. Gavrielov (former Chief Executive Officer of Xilinx, Inc.) as a member of the Compensation Committee.

3.3 Major Decisions of Shareholders’ Meeting and Board Meetings

3.3.1 Major Resolutions of Shareholders’ Meeting and Implementation Status

TSMC held 2018 Annual Shareholders’ Meeting in Hsinchu, Taiwan on June 5, 2018. At the meeting, shareholders present in person or by proxy approved the following resolutions:

- (1) The 2017 Business Report and Financial Statements. Consolidated revenue totaled NT\$977.45 billion and net income was NT\$343.11 billion, with diluted earnings per share of NT\$13.23;
- (2) The distribution of a NT\$8 cash dividend per common share;
- (3) The revisions to the Articles of Incorporation; and
- (4) Election of nine Directors (including five Independent Directors).

Implementation Status

All the resolutions of the Shareholders’ Meeting have been fully implemented in accordance with the resolutions.

The nine newly elected directors were Mark Liu, C.C. Wei, Mei-ling Chen (Representative of National Development Fund, Executive Yuan), F.C. Tseng, Sir Peter L. Bonfield (Independent Director), Stan Shih (Independent Director), Thomas J. Engibous (Independent Director), Kok-Choo Chen (Independent Director), and Michael R. Splinter (Independent Director).

3.3.2 Major Resolutions of Board Meetings

During 2018 and as of the date of this Annual Report, major resolutions approved at Board meetings are summarized below:

- (1) Board Meeting of February 12 & 13, 2018:
 - approving 2017 business report and financial statements;
 - approving distribution of 2017 profits, and cash dividends, employee cash bonus and employee profit sharing;
 - approving capital appropriations of approximately US\$2,834 million for purposes including: 1. Installation, upgrading and expanding advanced technology capacity; 2. Conversion of logic capacity to specialty technology; 3. Second quarter 2018 R&D capital investments and sustaining capital expenditures;
 - convening the 2018 Annual Shareholders’ Meeting, at which shareholders held an election for TSMC’s nine-member Board of Directors, including five Independent Directors;
 - approving the promotions of Dr. T.S. Chang, Dr. Michael Wu, and Dr. Min Cao as Vice Presidents; and
 - in gratitude to Dr. Morris Chang, conferring on Dr. Chang the title of “Founder” beginning June 5, 2018.

- (2) Special Board Meeting of April 20, 2018:
 - approving nine candidates for Board of Directors, including four current Directors, Mr. F.C. Tseng, Ms. Mei-ling Chen, Mr. Mark Liu, and Mr. C.C. Wei, as well as five current Independent Directors, Sir Peter L. Bonfield, Mr. Stan Shih, Mr. Thomas J. Engibous, Ms. Kok-Choo Chen, and Mr. Michael R. Splinter. These nine candidates for Board of Director stood for election at TSMC’s Annual Shareholders’ Meeting on June 5, 2018.
- (3) Regular Board Meeting of June 5 & 6, 2018:
 - approving capital appropriation of approximately US\$2,314.6 million for purposes including: 1. Fab facility construction; 2. Expansion and upgrading of advanced technology capacity; 3. Procurement of advanced technology equipment; 4. Expansion of advanced packaging capacity; 5. Conversion of certain mature process technology capacity to specialty process capacity; 6. Third quarter 2018 R&D capital investments and sustaining capital expenditures;
 - approving a donation of US\$5,625,000 to the University of California, Berkeley Foundation to support the establishment of a master’s program for the Management of Technology Innovation at University of California, Berkeley, and provide a dedicated Morris Chang Distinguished Chair to conduct the program; and
 - setting July 1, 2018 as the record date for common stock shareholders entitled to participate in distribution of 2017 profits in the form of cash dividend.
- (4) Regular Board Meeting of August 13 & 14, 2018:
 - approving capital appropriations of approximately US\$4,488.09 million for purposes including: 1. Construction of fab facilities; 2. Installation, expansion, and upgrade of advanced technology capacity; 3. Conversion of logic capacity to specialty technology capacity; 4. Conversion of mature technology capacity to specialty technology capacity; 5. Expansion and upgrade of specialty technology capacity; 6. Expansion of advanced packaging technology capacity; 7. Fourth quarter 2018 R&D capital investments and sustaining capital expenditures;
 - approving the capital injection of not more than US\$2 billion to TSMC Global Ltd., a wholly-owned BVI subsidiary, for the purpose of reducing foreign exchange hedging costs; and
 - approving the appointment of Dr. H.-S. Philip Wong as Vice President.
- (5) Regular Board Meeting of November 12 & 13, 2018:
 - approving capital appropriations of approximately US\$3,364.40 million for purposes including: 1. Construction of fab facilities; 2. Installation, expansion, and upgrade of advanced technology capacity; 3. Upgrade of specialty technology capacity; 4. Conversion of logic capacity to specialty technology capacity; 5. First quarter 2019 R&D capital investments and sustaining capital expenditures;
 - approving capital appropriation of approximately US\$17,320,000 for capitalized leased assets in the first half of 2019;
 - approving the appointment of Mr. Moshe N. Gavrielov as a member of the Compensation Committee, effective November 13, 2018; and
 - approving the promotions of Mr. J.K. Lin and Mr. J.K. Wang as Senior Vice Presidents, and Dr. Marvin Liao as Vice President.
- (6) Board Meeting of February 18 & 19, 2019:
 - approving 2018 business report and financial statements;
 - approving distribution of 2018 profits, and cash dividends, employee cash bonus and employee profit sharing;
 - approving capital appropriations of approximately US\$3,728.9 million for purposes including: 1. Installation of advanced technology capacity; 2. Conversion of logic capacity to specialty technology capacity; 3. Second quarter 2019 R&D capital investments and sustaining capital expenditures;
 - approving capital appropriation of approximately US\$4.91million to increase the budget for capitalized leased assets in the first half of 2019;
 - convening the 2019 Annual Shareholders’ Meeting, at which shareholders will hold a by-election for one independent director; and
 - approving the promotion of Mr. Y.H. Liaw as Vice President.

3.3.3 Major Issues of Record or Written Statements Made by Any Director Dissenting to Important Resolutions Passed by the Board of Directors during 2018 and as of the Date of this Annual Report: None.

3.4 Taiwan Corporate Governance Implementation as Required by Taiwan Financial Supervisory Commission

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Explanation	
1. Does Company follow "Taiwan Corporate Governance Implementation" to establish and disclose its corporate governance practices?		V	TSMC has always followed excellent corporate governance practices, provided the utmost in operational transparency and safeguarded shareholders' equity. Although the Company does not have a formal code of practice for corporate governance, however TSMC has always been highly regarded as the industry leader in implementing comprehensive corporate governance practices. In addition, the Company also has a world-class Board of Directors. The Company believes that corporate governance is based on integrity, professional management and implementation. TSMC has been proving its excellent corporate governance in its operating performance and continued winning of domestic and international awards on best corporate governance company.	Same as explanation
2. Shareholding Structure & Shareholders' Rights (1) Does Company have Internal Operation Procedures for handling shareholders' suggestions, concerns, disputes and litigation matters. If yes, has these procedures been implemented accordingly? (2) Does Company possess a list of major shareholders and beneficial owners of these major shareholders? (3) Has the Company built and executed a risk management system and "firewall" between the Company and its affiliates? (4) Has the Company established internal rules prohibiting insider trading on undisclosed information?	V		(1) TSMC has designated appropriate departments, such as Corporate Communication Division, the SEC Compliance Department, Legal Department, etc., to handle shareholder suggestions, concerns, disputes or litigation matters. (2) TSMC tracks the shareholdings of directors, officers, and top ten shareholders. (3) TSMC has set up internal rules in the Company's Internal Control System and Affiliated Corporations Management. (4) TSMC has established its "Insider Trading Policy" that applies to all employees, officers and members of the Board of Directors of the Company and to any other person having a duty of trust or confidence, with respect to transactions in the Company's securities. This policy prohibits any insider trading and the Company regularly provides internal training on this issue.	None
3. Composition and Responsibilities of the Board of Directors (1) Has the Company established a diversification policy for the composition of its Board of Directors and has it been implemented accordingly? (2) Other than the Compensation Committee and the Audit Committee which are required by law, does the Company plan to set up other Board committees? (3) Has the Company established methodology for evaluating the performance of its Board of Directors, on an annual basis?	V		(1) The members of TSMC Board of Directors are nominated via a rigorous selection process. It not only considers diverse backgrounds, professional competence and experience, but also attaches great importance to his/her personal reputation on ethics and leadership. Presently, the Company's Board of Directors consists of eight members who possess world-class managerial and/or professional experiences. We rely on each directors' knowledge, personal insight and business judgment. Two female directors currently sit on the Board of Director, and half of our Board consists of independent directors. (2) Audit Committee (founded in 2002): consists of all independent directors; Compensation Committee (founded in 2003): consists of all independent directors and the Board appointed former Chief Executive Officer of Xilinx, Inc., Mr. Moshe N. Gavrielov, as a member of the Compensation Committee on November 13, 2018; CSR Committee (founded in 2011): is formed by the Company's management team and reports to the Board of Directors. (3) As TSMC's corporate governance concept, the Board of Director's primary responsibility is to supervise, evaluate the management's performance and dismiss officers of the Company when necessary, resolve the important, concrete matters and provide guidance to the management team. TSMC's Board of Directors consists of distinguished members with a great breadth of experience as world-class business leaders or professionals and adhere high ethical standards and commitment to the Company. Each quarter's Board Meeting is last for two days. Company's resolutions are determined in board meeting, also business strategy and future orientation are discussed in the meeting, in order to create best interest for shareholders. Based on TSMC's operating performance and local/ international awards of best corporate governance, it certainly proves the Company's excellent performance of Board of Directors. Also, TSMC's audit committee performs self-evaluation and discusses future issues of concern by questionnaire on annual basis.	None
(4) Does the Company regularly evaluate its external auditors' independence?	V		(4) The Audit Committee annually evaluates the independence of external auditors and reports the same to the Board of Directors.	

(Continued)

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Explanation	
4. Does the Company established a full- (or part-) time corporate governance unit or personnel to be in charge of corporate governance affairs (including but not limited to furnish information required for business execution by directors, handle matters relating to board meetings and shareholders' meetings according to laws, handle corporate registration and amendment registration, record minutes of board meetings and shareholders meetings, etc.)?	V		The Chairman appointed the current General Counsel as the Company's Board secretariat. TSMC's Corporate & Compliance Legal Division, which directly reports to the General Counsel, is in charge of assisting in related affairs, including furnishing information required for business decisions by Directors, handling matters relating to Board meetings, Committees meetings and Shareholders' meetings and recording minutes of relevant meetings, etc. The SEC Compliance Department is responsible for handling corporate registration and amendment registration. All application documents needs to be reviewed by Legal and approved by the General Counsel.	None
5. Has the Company established a means of communicating with its Stakeholders (including but not limited to shareholders, employees, customers, suppliers, etc.) or created a Stakeholders Section on its Company website? Does the Company respond to stakeholders' questions on corporate responsibilities?	V		Depending on the situation, the Company's Corporate Communication Division, SEC Compliance department, Human Resources department, Customer Service department and Procurement department will communicate with stakeholders. We also have publicly disclosed the contact information of our corporate spokesperson and relevant departments. Also, we have a stakeholder section on our corporate website to address our corporate social responsibilities and any other issues. For details, please refer to "7. Corporate Social Responsibility" on page 115-132 of this Annual Report and "Materiality Analysis and Stakeholder Communication" of TSMC's CSR Report.	None
6. Has the Company appointed a professional registrar for its Shareholders' Meetings?	V		We have appointed China Trust as our registrar for our Shareholders' Meetings	None
7. Information Disclosure (1) Has the Company established a corporate website to disclose information regarding its financials, business and corporate governance status? (2) Does the Company use other information disclosure channels (e.g. maintaining an English-language website, designating staff to handle information collection and disclosure, appointing spokespersons, webcasting investors conference etc.)?	V		(1) TSMC discloses its financials business and corporate governance status on its website at http://www.tsmc.com (in Chinese and English). TSMC's American Depositary Receipt (ADR) is listed on the New York Stock Exchange (NYSE). As a foreign issuer, TSMC must comply with NYSE's rules. We have been operating in accordance with NYSE listing standards, and have been disclosing the major differences between our corporate governance practices and U.S. corporate governance practices. Please see https://www.tsmc.com/download/ir/NYSE_Section_303A.pdf (2) TSMC has designated appropriate departments (e.g. the Corporate Communication Division, the SEC Compliance Department, etc.) to handle the collection and disclosure of information as required by the relevant laws and regulations of Taiwan and other jurisdictions. TSMC has designated spokespersons as required by relevant regulations. TSMC webcasts live investor conferences.	None
8. Has the Company disclosed other information to facilitate a better understanding of its corporate governance practices (e.g. including but not limited to employee rights, employee wellness, investor relations, supplier relations, rights of stakeholders, directors' training records, the implementation of risk management policies and risk evaluation measures, the implementation of customer relations policies, and purchasing insurance for directors)?	V		(1) For employee rights and employee wellness, please refer to "5.5 Human Capital" on page 82-87 of this Annual Report. (2) For investor relations, supplier relations and rights of stakeholders, please refer to "7. Corporate Social Responsibility" on page 115-132 of this Annual Report. (3) For Directors' training records, please refer to "Continuing Education/Training of Directors in 2018" on page 44 of this Annual Report. (4) For Risk Management Policies and Risk Evaluation, please refer to "6.3 Risk Management" on page 100-112 of this Annual Report. (5) For Customer Relations Policies, please refer to "5.4 Customer Trust" on page 80-82 of this Annual Report. (6) TSMC maintains D&O Insurance for its directors and officers.	None
9. The improvement status for the result of Corporate Governance Evaluation announced by Taiwan Stock Exchange				
TSMC was ranked in top 5% in Corporate Governance Evaluation in 2017 and 2018. The implementation status regarding below three non-scoring items: (1) Establishment a formal code of practice for corporate governance: as the explanation of Assessment Item 1 of this table, although the Company does not have a formal code of practice for corporate governance, however TSMC has always been highly regarded as the industry leader in implementing comprehensive corporate governance practices. In addition, the Company also has a world-class Board of Directors. The Company believes that corporate governance is based on integrity, professional management and implementation. TSMC has been proving its excellent corporate governance in its operating performance and continued winning of domestic and international awards on best corporate governance company. (2) Training of Directors: TSMC's Board of Directors consists of distinguished members with a great breadth of experience as world-class business leaders or professionals. The Company continually arranges relevant training for Directors during Board meetings, and Directors also participate relevant course as needed. For details, please refer to the below table "Continuing Education/Training of Directors in 2018". (3) D&O Insurance and Report to the Board: TSMC maintains D&O Insurance for its directors and reported to the Board in February, 2019.				

Continuing Education/Training of Directors in 2018

The major training methods of Directors include:

- At quarterly Board meetings, TSMC management presents updates on the Company’s business, regulatory developments and other information;
- The Company arranges speeches on politics, economics, regulatory compliance, etc.;
- At quarterly Audit Committee meetings, TSMC’s General Counsel and the Company’s independent auditors provide regulatory update reports; and
- Directors participate in externally-provided training courses as needed.

In addition, from time to time, Directors are invited by other parties to give speeches on corporate governance and related topics.

Name	Date	Host by	Training/Speech Title	Duration
Mark Liu (Note)	09/05	SEMI Taiwan Ministry of Science and Technology	SEMICON Taiwan 2018 – IC60 Master Forum Speech: Vision X Foundry – IC Technology – The Roadmap Going Forward (0.5 hour)	1 day
C.C. Wei	09/05	SEMI Taiwan Ministry of Science and Technology	SEMICON Taiwan 2018 – IC60 Master Forum	1 day
F.C. Tseng	03/21	Taiwan Corporate Governance Association	Current Development Trends in Corporate Governance and the IPO Outlook under Taiwan's Capital Markets	3 hours
	08/02		Artificial Intelligence and the Future	3 hours
	08/08		Important Regulatory Updates	1.5 hours
	11/07		International Trade Outlook in 2019 – Starting from Observations of the US-China Trade Conflict	1.5 hours
	12/03		Transforming Taiwan Companies	3 hours
Sir Peter L. Bonfield	02/11	Hampton Group	The Next 50 Years: Fostering Innovation Through Global Collaboration	0.25 hour
	10/05	Diligent Corp.	Discussion Group on Corporate Governance Issues	1 day
Stan Shih	03/21	Taiwan Corporate Governance Association	Current Development Trends in Corporate Governance and the IPO Outlook under Taiwan's Capital Markets	3 hours
	05/09		International Political & Economic Situation's Impact on the Telecommunication Industry in Taiwan	3 hours
	08/08		Important Regulatory Updates	1.5 hours
	11/07		International Trade Outlook in 2019 – Starting from Observations of the US-China Trade Conflict	1.5 hours
	08/29	Taiwan Insurance Institute	Anti-Money Laundering and Counter-Terrorism Financing Regulatory Analysis	2 hours
Kok-Choo Chen	11/27	Taiwan Corporate Governance Association	The Impact of Revised R.O.C. Company Law on Corporate Governance, Internal Control and Responsibility of Directors and Supervisors	3 hours
Michael R. Splinter	05/15 05/16	Investor AB	Activist Investors	2 days
	09/13 09/14 09/15		Board Management	3 days
Mark Liu C.C. Wei F.C. Tseng Sir Peter L. Bonfield Stan Shih Michael R. Splinter Mei-ling Chen	08/14	TSMC	A Pragmatic Review of the Power Supply in Taiwan's Energy Transition Plan by Dr. Chi-Yuan, Liang Chair Professor, National Central University	1 hour
Mark Liu C.C. Wei F.C. Tseng Sir Peter L. Bonfield Stan Shih Kok-Choo Chen Michael R. Splinter	11/13	TSMC	The Unprecedented Geopolitical Situation in East Asia and Its Impact on Taiwan by Dr. Chi Su Chairman, Taipei Forum	1 hour

Note: Selected speeches on corporate governance and related topics.

Continuing Education/Training of Management in 2018

Name/Title	Date	Host by	Training/Speech Title	Duration
Lora Ho Senior Vice President and Chief Financial Officer	03/05	Taiwan Depository & Clearing Corporation	100% E-Voting in 2018 and Enhancement of Corporate Values	6 hours
	08/02	Taiwan Coporate Goverance Association	Artificial Intelligence and the Future	3 hours
Sylvia Fang Vice President and General Counsel	06/01	Klynveld Peat Marwick Goerdeler Law Firm	Technology Innovation and New Operations Management Model – How to Use Blockchain and Smart Contract to Protect Trade Secrets and IPs	2.5 hours
	06/08	Microsoft Taiwan Taiwan Technology Industry Legal Officers Association Klynveld Peat Marwick Goerdeler Accounting Firm	Corporate's Way to Comply Fully with GDPR – How Corporate Implement Information Security and Corporate Transformation to Create Its Global Competitiveness	5 hours
	08/09	Institute for Information Industry	Expert Forum on Legal Issues in Protecting Sensitive Technology Outsourced for Research and Development	2 hours
	08/16	Chinese National Federation of Industries	Seminar: Prof. Mark Schultz from Southern Illinois University to Have a Dialogue with Taiwan's Industry (1) How to Improve Trade Secret Laws Globally (2) Creating a Global Trade Secret Federation to Support These Efforts	2.5 hours
	09/07	Lee and Li Attorneys-at-Law	Forum on Key Points and Practical Impacts of the Amended Company Law	4 hours
	10/03	Intellectual Property Office Taiwan Trade Secret Protection Association	2018 Cross-Strait Trade Secret Investigation and Litigation Practice Forum	8 hours
	11/03 11/04	Intellectual Property Research Institute of Xiamen University Taiwan Trade Secret Protection Association	2018 Cross-Strait Trade Secrets Protection Forum	2 days
Cliff Hou Vice President, Research and Development/ Technology Development	08/02	Taiwan Corporate Governance Association	Artificial Intelligence and the Future	3 hours
	08/31		Legal Liability of Insider Trading and Related Case Study	3 hours
Jessica Chou Senior Director, Accounting Division	05/17	Taiwan Accounting Research and Development Foundation	Analysis and Implications of IFRS 16 – Leases	3 hours
			Corporate Governance Practices: Analyzing the Practical Issues in “Supply Chain Management” Strategies and Exploring the Application Trend of “IoT”	3 hours
	08/31		Seminar: How Corporate Works with Its Auditors on Reviewing Financial Statements	3 hours
			Exploring the Types and Legal Liabilities of Special Breach of Trust Crimes and Relevant Cases Study	3 hours
John Liang Director, Internal Audit	08/15	Taiwan Computer Audit Association	How to Apply Data Analysis and AI to Internal Auditing	6 hours
	12/04	Taiwan Accounting Research and Development Foundation	Practices of Audit Management and Control of Business Cost Saving and Competitive Strategy	6 hours

3.5 Code of Ethics and Business Conduct

Ethics at TSMC

“Integrity” is TSMC’s most important core value. TSMC strictly adheres to the highest standards of integrity and promotes good ethical behavior to sustain the hard-earned trust and confidence of its shareholders, customers, suppliers, employees and the general public – constantly and vigilantly promoting integrity, fairness, and transparency in all that we say and do. We have zero tolerance for corruption, refrain from bribery, fraud, waste of corporate assets, and prohibit the advancement of personal interests at the expense of or in conflict with TSMC. At the heart of our corporate governance culture is the “TSMC Ethics and Business Conduct Policy” (“Ethics Code”). The Ethics Code requires that each employee bear a heavy personal responsibility to preserve and to protect TSMC’s ethical values and reputation. At the same time, we have formulated the “TSMC’s Supplier Code of Conduct” as well to ensure our suppliers understand and follow the Ethics Code and together fulfill our corporate social responsibilities.

Major Ethics Code Obligations

- Do not advance personal interests at the expense of or in conflict with the Company;
- Refrain from corruption, unfair competition, fraud, collusion, and waste or abuse of corporate assets;
- Avoid any efforts improperly to influence the decisions of anyone, including government officials, agencies, as well as TSMC’s customers and suppliers;
- Do not undertake any practices detrimental to TSMC, to the environment, or to society;
- Procure all of our raw materials from socially responsible sources;
- Protect proprietary information of TSMC and our customers; and
- Abide by the letter of all applicable laws, rules and regulations.

Intellectual Property Protection: In order to build and sustain an environment of innovation, technology leadership, and sustainable profitable growth, the Ethics Code requires that TSMC promotes business relationships founded upon an unwavering respect for the intellectual property rights, proprietary information and trade secrets of TSMC, our customers, and others.

Public Disclosures: TSMC’s officers, especially our CEO, CFO, and General Counsel, with oversight from our Board, are responsible for the full, fair, accurate, timely, and understandable financial

accounting and financial disclosure in reports and documents filed by the Company with securities authorities and in all TSMC public communications and disclosures. TSMC has a variety of measures in place to ensure compliance with these disclosure obligations.

Any modification to the Ethics Code requires the approval of our Audit Committee to ensure our ethics compliance program is independently reviewed against corporate best practices.

Ethics Code Implementation

High Standard Ethical Culture: Our ethics program is implemented in four ways by all of TSMC’s employees, officers and Board members. First, TSMC’s management sets the “tone from the top” by acting in accordance with the Ethics Code so that they may be an example to all stakeholders. Second, working-level managers are responsible for ensuring their staff’s understanding of and compliance with applicable rules and regulations. Third, TSMC encourages an environment of open communications in discussing any questions related to the Ethics Code. Any employee may consult his or her direct supervisors, Human Resources or Legal to obtain timely advice. Lastly, TSMC requires all employees to stay vigilant and report any noncompliance by anyone to their supervisors, the function head of Human Resources, the responsible corporate senior management appointed by CEO that oversees the Ombudsman system, or to the Chairman of the Company’s Audit Committee directly.

Self-Assessment of All Departments and Employees: Self-assessment of all departments and employees is an important part of our ethics compliance program. All departments and subsidiaries of TSMC are required to conduct Control Self-Assessment (CSA) tests annually to review employees’ awareness of the Ethics Code. The CSA results are reviewed to track the results of our compliance program. In addition, all employees must disclose any matters that cause, or may cause, actual or potential conflict of interest. In addition to this proactive disclosure requirement, employees with specific job grades or job responsibilities must annually declare any relationships that may constitute a conflict of interest, which enables TSMC to take necessary arrangements and report the results to the Audit Committee.

Internal Auditing: The Internal Auditor of TSMC plays a critical role in ensuring the Company’s compliance with the Ethics Code and relevant rules and regulations. To ensure that our

financial, managerial, and operating information is accurate, reliable, and timely and that our employees’ actions are in compliance with applicable policies, standards, procedures, laws and regulations, our Internal Auditor conducts audits of various control points within the Company in accordance with its annual audit plan approved by the Board of Directors and subsequently reports its audit findings and remedial issues to the Board and management on a regular basis.

Training and Promotion: To promote awareness to our employees of their responsibilities under the Ethics Code, we publish our Ethics Code and related policies and documents on our intranet and, provide training courses, posters, and emails. In addition, we provide an introductory training course on the Ethics Code which is available to all employees online, as well as face-to-face training courses delving into more specific ethics-related topics for targeted employees. In 2018, there were about 41,900 attendances completed ethics-related training courses at TSMC and its subsidiaries.

In addition to our internal compliance efforts, we expect and assist our business partners such as customers and suppliers, and any other entities with whom we deal (include consultants or third party agents who act for or on behalf of TSMC) to recognize and understand TSMC’s ethical standards to fulfill our responsibilities as a corporate citizen. For instance, we require all of our suppliers to declare in writing that they will respect and comply with TSMC’s ethical standards and culture. TSMC is a full member of the Responsible Business Alliance (“RBA”, formerly the (Electronic Industry Citizenship Coalition, EICC)), dedicated to electronics supply chain sustainability. In addition to adopting the RBA Code of Conduct at all of its facilities, TSMC applied the RBA’s standards to enhance our audit program of our suppliers and relevant business partners. We provide training and communicate our ethical culture to our suppliers through live seminars to prevent any unethical conduct and detect any sign of Ethics Code violations. In 2018, we held two TSMC Responsible Supply Chain Forums to restate and communicate our ethical requirements with 313 suppliers participating in the program. We also exchange views on appropriate business conduct and TSMC’s ethical standards with our customers as part of customer audit programs.

Reporting Channels and Whistleblower Protection To ensure that our conduct meets relevant legal requirements and the highest ethical standards under the Ethics Code, TSMC provides multiple channels for reporting business conduct

concerns. First of all, our Audit Committee approved and we have implemented the “Complaint Policy and Procedures for Certain Accounting and Legal Matters” and “Procedures for Ombudsman System” that allow employees or any whistleblowers with relevant evidence to report any financial, legal, or ethical irregularities anonymously through either the Ombudsman or directly to the Audit Committee. TSMC maintains additional internal reporting channels for our employees. To foster an open culture of ethics compliance, we encourage our employees and the third parties we do business with to report any suspected noncompliance with law or relevant TSMC policy.

TSMC treats any complaint and the investigation thereof in a confidential and sensitive manner, and strictly prohibits any form of retaliation against any individual who in good faith reports or helps with the investigation of any complaint.

Due to the open reporting channels, TSMC receives reports on various issues from employees and external parties such as our customers and suppliers from time to time. Below is a summary of the Number of Reported Incidents. We did not receive any report related to finance or accounting matters in 2018.

	FY 2016	FY 2017	FY 2018
Incidents reported to the Audit Committee Whistleblower System	1	2	1 (Note 1)
Incidents reported to the Ombudsman System	80	79	106 (Note 2)
Incidents reported to the “Irregular Business Conduct Reporting”	35	32	43 (Note 2)
Total incidents investigated as founded	2	4	1 (Note 3)
Sexual Harassment Investigation Committee	5	7	3
Total incidents investigated as founded	5	3	3 (Note 4)

Note 1: The case from whistleblower system is not related to ethics matters.
Note 2: Among the 149 cases, 14 cases related to ethics matters.
Note 3: After investigation, 1 case is related to ethics matters, and the employee involved confirmed his violation of the Ethics Code and quit during the period of investigation.
Note 4: After the investigation by TSMC’s Sexual Harassment Investigation Committee, 3 employees involved in these 3 cases received severe discipline from the Company.

Ethics Code Violation Disciplinary Action We do not tolerate any violation of the Ethics Code and treat every possible violation incident seriously. Any violator of the Ethics Code (or relevant regulations) will be severely disciplined to the full extent of our policies and the law, up to and including immediate dismissal, termination of business relationship, and judicial prosecution as appropriate.

3.5.1 Taiwan Corporate Conduct and Ethics Implementation as Required by the Taiwan Financial Supervisory Commission

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Summary	
1. Establishment of Corporate Conduct and Ethics Policy and Implementation Measures (1) Does the company have bylaws and publicly available documents addressing its corporate conduct and ethics policy and measures, and the commitment regarding implementation of such policy from the Board of Directors and the management team? (2) Does the company establish relevant policies which are duly enforced to prevent unethical conduct and provide implementation procedures, guidelines, consequence of violation and complaint procedures in such policies? (3) Does the company establish appropriate compliance measures for the business activities prescribed in paragraph 2, article 7 of the Ethical Corporate Management Best Practice Principles for TWSE/GTSM Listed Companies and any other such activities associated with high risk of unethical conduct?	V		(1) Integrity is the most important core value of TSMC's culture. TSMC is committed to acting ethically in all aspects of our business. We have established TSMC Code of Ethics and Business Conduct (the "Ethics Code") to require that each employee bears a heavy personal responsibility to uphold TSMC's ethics value. For more details on the Ethics Code and the measures that TSMC Board of Directors (the "Board") and the management team take to ensure compliance of the Ethics Code please refer to TSMC's Annual Report and the Corporate Social Responsibility Report. (2) At the heart of our corporate governance culture is the Ethics Code that applies to TSMC and its subsidiaries, and this Ethics Code requires that each employee bears a heavy personal responsibility to preserve and to protect TSMC's ethical values and reputation and to comply with various applicable laws and regulations. Specific requirements under the Ethics Code could be found in our Annual Report. In addition, to educate and remind our employees of their responsibilities under the Ethics Code, we publish our Ethics Code, relevant policies and documents on our intranet and promote its awareness through training courses, posters, and internal news articles. Furthermore, to ensure that our conduct meets relevant legal requirements and the highest ethical standards under the Ethics Code, TSMC provides multiple channels for reporting business conduct concerns. Please refer to Assessment Item 3 for details. We do not tolerate any violation of the Ethics Code and treat every possible violation incident seriously. Any violator of the Ethics Code (or relevant regulations) will be severely punished to the full extent of our policies and the law, including immediate dismissal in accordance with TSMC Employee Recognition, Disciplinary and Ombudsman Procedure, termination of business relationship, and judicial prosecution as appropriate. (3) Under the framework of the Ethics Code, TSMC has established a regulatory compliance program that includes policies, guidelines and procedures in other policy areas, including: Anti-corruption, Anti-harassment/discrimination, Anti-trust (unfair competition), Environment, Export Control, Financial Reporting/ Internal Controls, Insider Trading, Intellectual Property, Proprietary Information Protection ("PIP"), Personal Data Protection, Record Retention and Disposal, as well as procuring certain raw materials from socially responsible sources ("Conflict-free Minerals"). The above-mentioned policies are crucial in facilitating overall compliance with the Ethics Code. TSMC, its employees and its subsidiaries are expected to fully understand and comply with all laws and regulations that govern our businesses, as well as relevant policies, guidelines and procedures, and make ethical decisions in every circumstance. The Internal Auditor of TSMC also plays a critical role in ensuring the Company's compliance with the Ethics Code and relevant rules and regulations. To ensure that our financial, managerial, and operating information is accurate, reliable, and timely and that our employee's actions are in compliance with applicable policies, standards, procedures, laws and regulations, our Internal Auditor conducts audits of various control points within the Company in accordance with its annual audit plan approved by the Board of Directors and subsequently reports its audit findings and remedial issues to the Board and Management on a regular basis.	None

(Continued)

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Summary	
2. Ethic Management Practice (1) Does the company assess the ethics records of whom it has business relationship with and include business conduct and ethics related clauses in the business contracts? (2) Does the company set up a unit which is dedicated to or tasked with promoting the company's ethical standards and reports directly to the Board of Directors with periodical updates on relevant matters? (3) Does the company establish policies to prevent conflict of interests, provide appropriate communication and complaint channels and implement such policies properly? (4) To implement relevant policies on ethical conducts, does the company establish effective accounting and internal control systems that are audited by internal auditors or CPA periodically? (5) Does the company provide internal and external ethical conduct training programs on a regular basis?	V		(1) We expect and assist our customers, suppliers, business partners, and any other entities with whom we deal (such as consultant or third party agents who act for or on behalf of TSMC) to understand and act in accordance with TSMC's ethical standards. For instance, as for our suppliers, we require all of them to declare in writing that they will not engage in any fraud or any unethical conduct when dealing with us or our officers and employees. In addition to periodic audit, we provide training and communicate our ethical culture to our suppliers through live seminars to prevent any unethical conduct. We exchange views on appropriate business conduct and TSMC's ethical standards with our customers as part of customer audit programs. (2) TSMC's Board of Directors strives to perform the responsibilities of supervising the corporate conduct and ethics compliance practice through the Audit Committee and the Compensation Committee, the hiring of a financial expert consultant for the Audit Committee, and coordination with the Internal Audit department. The General Counsel and the Corporate & Compliance Legal Division (which directly reports to the General Counsel) promotes, with other divisions, the Company's ethical standards, and the General Counsel reports quarterly to the Board on the implementation status. In addition, both the responsible senior manager appointed by the CEO to oversee the Ombudsmen system and Internal Auditors update the Board on ethical standards and compliance issues on a regular basis. Moreover, TSMC's officers, especially our CEO, CFO, and General Counsel, with oversight from our Board, are responsible for the full, fair, accurate, timely, and understandable financial accounting and financial disclosure in reports and documents filed by the Company with securities authorities and in all TSMC public communications and disclosures. (3) TSMC requires newly hired employees to declare any conflict of interest situation as appropriate. In addition, all employees must disclose any matters that have, or may have, the appearance of undermining the Ethics Code (such as any actual or potential conflict of interest). Furthermore, key employees and senior officers must periodically declare their compliance status with the Ethics Code according to relevant procedures. (4) TSMC continues maintaining the integrity of its financial reporting processes and controls and establishes appropriate internal control systems for preventing higher potential unethical conduct, and the Internal Auditors formulate annual audit plans based on the results of the risk assessment and subsequently reports its audit findings and remedial issues to the Board and Management on a regular basis. In addition, all departments and subsidiaries of TSMC are also required to conduct Control Self-Assessment (CSA) tests annually to review the effectiveness of the internal control system. (5) Training is a major component of our compliance program, conducted throughout the year to refresh TSMC's employees' commitment to ethical conduct, and to get updated information on laws and regulations related to their daily operations. As for our suppliers, we communicate our ethical culture to our business partners through live seminars to ensure their fully understanding of our commit to ethical conduct.	None
3. Implementation of Complaint Procedures (1) Does the company establish specific complaint and reward procedures, set up conveniently accessible complaint channels, and designate responsible individuals to handle the complaint received? (2) Does the company establish standard operation procedures for investigating the complaints received and ensuring such complaints are handled in a confidential manner? (3) Does the company adopt proper measures to prevent a complainant from retaliation for his/her filing a complaint?	V		(1) TSMC's Audit Committee approved and TSMC has implemented the "Complaint Policy and Procedures for Certain Accounting and Legal Matters" and "Procedures for Ombudsman System" that allow employees or any whistleblowers with relevant evidence to report any financial, legal, or ethical irregularities anonymously through either the Ombudsman or directly to the Audit Committee. TSMC also requires all employees to stay vigilant and whistle-blow any noncompliance by anyone to their supervisors, the function head of Human Resources, the responsible corporate Vice President that oversees the Ombudsmen system, or to the Chairman of the Company's Audit Committee directly. (2) TSMC treats any complaint and the investigation thereof in a confidential and sensitive manner, as is clearly stated in our bylaws. (3) TSMC strictly prohibits any form of retaliation against any individual who in good faith reports or helps with the investigation of any complaint, as is clearly stated in our bylaws.	None
4. Information Disclosure Does the company disclose its guidelines on business ethics as well as information about implementation of such guidelines on its website and Market Observation Post System ("MOPS")?	V		Our internal website provides guidelines and informative articles on ethics and honorable business conduct (in both Chinese and English) for employees' easy access. In addition, TSMC discloses relevant policies and information in its Annual Report (which is also available at the MOPS) and CSR Report (available at: http://www.tsmc.com)	None

(Continued)

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Summary	
5. If the company has established corporate governance policies based on Ethical Corporate Management Best Practice Principles for TWSE/GTSM Listed Companies, please describe any discrepancy between the policies and their implementation.				
TSMC has established the Ethics Code to require that all employees, officers and board members comply with the Ethics Code and the other policies and procedures. There is no discrepancy between the Ethics Code, including its affiliate policies and procedures, and its implementation. For more details, please refer to “3.5 Code of Ethics and Business Conduct” on page 46-50 of this Annual Report.				
6. Other important information to facilitate better understanding of the company's corporate conduct and ethics compliance practices (e.g., review the company's corporate conduct and ethics policy).				
For details on the implementation of TSMC's Corporate Conduct and Ethics, please refer to “3.5 Code of Ethics and Business Conduct” on page 46-50 of this Annual Report.				

3.6 Regulatory Compliance

TSMC’s compliance systems are comprised of a series of legislation monitoring, developing and implementation of effective compliance policies and programs, training, and maintaining open reporting channels.

Legislative Monitoring

TSMC operates in many countries. To comply with governing legislation, applicable laws, regulations and regulatory expectations, we closely monitor domestic and foreign government policies and regulatory developments that could materially impact TSMC’s business and financial operations. Our Legal organization periodically updates our relevant internal departments, management and the Audit Committee of applicable regulatory changes so that internal teams ensure compliance with new regulatory requirements in a timely manner. We are also a proactive advocate for legislative and regulatory reform, and our comments and recommendations on legal reforms to the government have been accepted constructively. TSMC is increasingly dedicated to identifying potential regulatory issues and will continue to be involved in advocating public policy changes that foster a positive and fair business environment.

Policy and Compliance Program Development and Implementation

Under the framework of the Ethics Code, TSMC has established a regulatory compliance program that includes policies, guidelines and procedures in different compliance areas, including: Anti-corruption, Anti-harassment/discrimination, Employment Regulations, Antitrust (unfair competition), Environment, Export Control, Financial Reporting, Internal Controls, Insider Trading, Intellectual Property, Proprietary Information Protection (“PIP”), Personal Data Protection, Record Retention and Disposal, as well as procuring certain raw materials from socially responsible sources (“Conflict-free Minerals”). It is our belief that these policies are crucial in strengthening overall compliance with the Ethics Code and compliance program. TSMC, its employees and its subsidiaries are expected to fully understand and comply with all laws and regulations that govern our businesses, as well as relevant policies, guidelines and procedures, and make ethical decisions in every circumstance.

Compliance Awareness Training

Training is a major component of our regulatory compliance program, conducted throughout the year to refresh TSMC’s employees’ commitment to ethical conduct, and to get updated information on laws and regulations related to their daily operations. Highlights of our training include:

- Awareness promotion emails to employees, posters at our facilities, and news articles, compliance guidelines, tips and FAQs which our employees can access through our intranet;
- Live seminars focusing on specific topics such as Anti-Corruption, PIP, Intellectual Property, Personal Data Protection, Export Control Management and Antitrust. Training is made mandatory for those employees whose jobs are especially relevant to a particular topic to ensure sufficient awareness of relevant laws and internal policies;
- On-line learning programs updated frequently to provide most up-to-date information and timely and flexible access for employees to understand the law and key compliance issues, covering topics of Anti-Corruption, Antitrust, Anti-harassment, Insider Trading, Export Control Management, PIP, and Personal Data Protection among others;
- External training, in Taiwan and abroad, for TSMC’s Legal team to receive current developments of new laws and regulations, and for its lawyers to comply with applicable continuing legal education requirements. External experts are also invited to give in-house lectures on key issues.

Reporting Channels

TSMC provides multiple channels for reporting business conduct concerns to ensure that our conduct meets relevant legal requirements and the highest ethical standards under the Ethics Code. For more details about the reporting channels, please refer to “3.5 Code of Ethics and Business Conduct” on page 46-50 of this Annual Report.

Major Accomplishments

In 2018, TSMC achieved several major accomplishments in regulatory compliance:

- Public Promotion Activities: In addition to fulfilling our obligations on regulatory compliance matters, TSMC exercised its civic duties as a responsible corporate citizen by advising the local government on law and policy reform, including urging the Government to amend certain outdated laws and regulations, which we believe were inconsistent with global practice, to improve Taiwan’s investment environment and economic development. In 2018, TSMC continued to advocate the importance of intellectual property protection and attended relevant events. In addition, TSMC advised the government agencies on the amendment of several laws like the Company Law, the Securities and Exchange Act, and environmental protection-related laws.
- Internal Training: In 2018, TSMC offered a wide range of training courses covering topics of Anti-Corruption, Antitrust, Anti-harassment, Insider Trading, Export Control Management, PIP, and Personal Data Protection among others. These courses were all developed and conducted by internal and external experts and legal professionals. In order to ensure that all TSMC employees understand and comply with relevant requirements, TSMC actively promoted compliance through various channels in 2018, including: (1) providing an annual compulsory online course covering various important regulatory compliance topics – a total of about 30,000 employees completed this training course; (2) focusing on the technical personnel of the production lines in Taiwan’s fabs through communication meetings and multiple communication methods to promote the anti-corruption guidelines of TSMC – a total of more than 8,500 employees participated; (3) in response to the international interest in the protection of personal data, providing three face-to-face training courses, updated online courses, posters, e-mail and other publicity activities to strengthen the awareness of relevant departments on this topic – a total of more than 1,900 employees completed the updated online course.
- Export Compliance: TSMC’s export management system (EMS) and policy have been in place for a number of years, and are continuously maintained to ensure compliance with

all applicable regulations covering the export of information, technologies, products, materials and equipment. Our EMS was certified in September 2012 by the Bureau of Foreign Trade, the Taiwan regulator, as a qualified ICP (Internal Compliance Program) exporter. In 2018, TSMC successfully extended the validity period of its ICP certificate to October 2021 and was awarded in September for its outstanding international business export/import business record in 2017 from the Bureau of Foreign Trade. In addition, TSMC implements “No ECCN, No Shipment” control and customers are required to provide end use and export control classification number (ECCN) of their products, among other required information, for TSMC to apply for applicable export licenses. To further enhance relevant employees’ awareness on the export control requirements incurred by technology transfers, in 2018 we provided several face-to-face communication sessions to approximately 160 employees in relevant functions.

- Supplier Management: In 2018, TSMC held two TSMC Responsible Supply Chain Forums for Taiwanese and overseas suppliers with a business location in Taiwan. During the meetings, practical experiences were shared and exchanged on various important issues such as ethics code, labor rights, environmental protection and occupational safety, with a total of 313 suppliers participating.
- Conflict-Free Supply Chain: As a recognized global leader in the hi-tech supply chain, we acknowledge our corporate social responsibility to strive to procure conflict-free minerals in an effort to recognize humanitarian and ethical social principles that protect the dignity of all persons. Meanwhile, we have implemented a series of compliance safeguards in accordance with industry leading practices. In 2018, TSMC has made continued progress to ensure a conflict-free supply chain, and our conflict-free minerals compliance program has also been highly ranked by several independent third party rating agencies.
- Personal Data Protection: Because of the importance of personal data protection, TSMC established the Rules of Privacy and Personal Data Protection to specify personal data can only be processed for legitimate purposes and describe the guidelines of personal data processing. TSMC also provides a Privacy and Cookies Policy online for its websites. In addition, a personal data protection taskforce composed of Legal, Human Resources, and IT divisions was established to assist in the implementation of and monitoring compliance with the rules. Relevant divisions (such as Human Resources) may also designate more detailed requirements for their business needs. See above for the internal training and promotion activities on personal data protection in 2018.

3.7 Internal Control System Execution Status

3.7.1 Statement of Internal Control System

Taiwan Semiconductor Manufacturing Company Limited

Statement of Internal Control System

February 19, 2019

Based on the findings of a self-assessment, Taiwan Semiconductor Manufacturing Company Limited (TSMC) states the following with regard to its internal control system during the year 2018:

1. TSMC’s Board of Directors and management are responsible for establishing, implementing, and maintaining an adequate internal control system. Our internal control is a process designed to provide reasonable assurance over the effectiveness and efficiency of our operations (including profitability, performance and safeguarding of assets), reliability, timeliness, transparency of our reporting, and compliance with applicable rulings, laws and regulations.
2. An internal control system has inherent limitations. No matter how perfectly designed, an effective internal control system can provide only reasonable assurance of accomplishing its stated objectives. Moreover, the effectiveness of an internal control system may be subject to changes due to extenuating circumstances beyond our control. Nevertheless, our internal control system contains self-monitoring mechanisms, and TSMC takes immediate remedial actions in response to any identified deficiencies.
3. TSMC evaluates the design and operating effectiveness of its internal control system based on the criteria provided in the Regulations Governing the Establishment of Internal Control Systems by Public Companies (herein below, the “Regulations”). The criteria adopted by the Regulations identify five key components of managerial internal control: (1) control environment, (2) risk assessment, (3) control activities, (4) information and communication, and (5) monitoring activities.
4. TSMC has evaluated the design and operating effectiveness of its internal control system according to the aforesaid Regulations.
5. Based on the findings of such evaluation, TSMC believes that, on December 31, 2018, it has maintained, in all material respects, an effective internal control system (that includes the supervision and management of our subsidiaries), to provide reasonable assurance over our operational effectiveness and efficiency, reliability, timeliness, transparency of reporting, and compliance with applicable rulings, laws and regulations.
6. This Statement is an integral part of TSMC’s annual report and prospectus, and will be made public. Any falsehood, concealment, or other illegality in the content made public will entail legal liability under Articles 20, 32, 171, and 174 of the Securities and Exchange Law.
7. This Statement was passed by the Board of Directors in their meeting held on February 19, 2019, with none of the eight attending directors expressing dissenting opinions, and the remainder all affirming the content of this Statement.

Taiwan Semiconductor Manufacturing Company Limited



Mark Liu
Chairman



C. C. Wei
Chief Executive Officer

3.7.2 If CPA Was Engaged to Conduct a Special Audit of Internal Control System, Provide Its Audit Report: None.

3.8 Status of Personnel Responsible for the Company’s Financial and Business Operation

3.8.1 Resignation or Dismissal of Chairman, President, and Heads of Accounting, Finance, Internal Audit and R&D during 2018 and as of the Date of this Annual Report:

As of 02/28/2019

Title Name	On-board Date (Note 1)	Date of Resignation or Dismissal	Summary of Resignation or Dismissal
Chairman Morris Chang	12/10/1986	06/05/2018	After having led the Company for over 31 years, TSMC’s Founder, Dr. Morris Chang, retired from the Company after the Annual Shareholders’ Meeting on June 5, 2018. At the meeting, TSMC shareholders elected a new Board of Directors, which then convened to elect Dr. Mark Liu as Chairman and Dr. C.C. Wei as Chief Executive Officer (CEO) and Vice Chairman, completing the transition of responsibilities.
President and Co-Chief Executive Officer Mark Liu	11/12/2013	06/05/2018	
President and Co-Chief Executive Officer C.C. Wei	11/12/2013	06/05/2018	

Note: On-board date means the official date of presiding the position.

3.8.2 Certification of Employees Whose Jobs are Related to the Release of the Company’s Financial Information

Certification	Number of Employees	
	Internal Audit	Finance
Certified Public Accountants (CPA)	4	35
US Certified Public Accountants (US CPA)	4	16
The Chartered Institute of Management Accountants (CIMA)	-	1
Certified Internal Auditor (CIA)	14	6
Chartered Financial Analyst (CFA)	-	4
Certified Management Accountant (CMA)	-	1
Financial Risk Manager (FRM)	-	2
Certification in Control Self-Assessment (CCSA)	3	-
Certification in Risk Management Assurance (CRMA)	5	-
Certified Information Systems Auditor (CISA)	5	-
Chief Fraud Examiner (CFE)	2	-
BS7799/ISO 27001 Lead Auditor	2	-

3.9 Information Regarding TSMC’s Independent Auditor

3.9.1 Audit Fees

The Audit Committee approves all fees payable to TSMC’s independent auditor and recommends the same to the Board of Directors for further approval. The Board of Directors has authorized the Audit Committee to approve any increase not exceeding 10% of the approved fees.

Unit: NT\$ thousands

Accounting Firm	Name of CPA	Audit Fee	Non-audit Fee					CPA’s Audit Period	Remark
			System Design	Company Registration	Human Resource	Others	Subtotal		
Deloitte & Touche	Mei-Yen Chiang, Yu-Feng Huang, and others	55,323	-	-	-	-	-	01/01/2018 - 12/31/2018	Note

Note : Article 10.5.1 of Regulation Governing Information to be published in Annual Report of Public Companies was not applicable to TSMC.

3.9.2 CPA’s Information

(1) Former CPAs

Date of Change	Approved by Board of Directors on November 14, 2017		
Reasons and Explanation of Changes	In compliance with regulatory requirements on rotation, the engagement partner Yih-Hsin Kao was replaced by Mei-Yen Chiang starting from 2018. The co-signing partner remains to be Yu-Feng Huang.		
State whether the Appointment is Terminated or Rejected by the Consignor or CPAs	Client	CPA	Consignor
	Status		
	Appointment terminated automatically	Not available	Not available
	Appointment rejected (discontinued)	Not available	Not available
The Opinions other than Unmodified Opinion Issued in the Last Two Years and the Reasons for the Said Opinions (Note)	None		
Is there any disagreement in opinion with the issuer	Yes		Accounting principle or practice
			Disclosure of financial statements
			Auditing scope or procedures
			Others
	No	V	
	Explanation		
Supplementary Disclosure (Disclosures Specified in Article 10.6.1.4~7 of the Standards)	None		

Note: Starting in 2016, the new auditing standard of the Republic of China requires “An Unqualified Opinion” be replaced by “An Unmodified Opinion”.

(2) Successor CPAs

Accounting Firm	Deloitte & Touche
CPA	Mei-Yen Chiang and Yu-Feng Huang
Date of Engagement	Approved by Board of Directors on November 14, 2017
Prior to the Formal Engagement, Any Inquiry or Consultation on the Accounting Treatment or Accounting Principles for Specific Transactions, and the Type of Audit Opinion that Might be Rendered on the Financial Report	None
Written Opinions from the Successor CPAs that are Different from the Former CPA's Opinions	None

(3) The Reply of Former CPAs on Article 10.6.1 and Article 10.6.2.3 of the Standards: None.

3.9.3 TSMC’s Chairman, Directors, Chief Executive Officer, Chief Financial Officer, and Managers in Charge of Its Finance and Accounting Operations Did Not Hold Any Positions within TSMC’s Independent Audit Firm or Its Affiliates in the Most Recent Year.

3.9.4 Evaluation of the External Auditor’s Independence

The Audit Committee regularly monitors the independence of TSMC’s external auditor by conducting the following evaluation and reports the same to the Board of Directors:

1. The auditor’s independence declaration
2. The Audit Committee pre-approves all audit and non-audit services conducted by the auditor to ensure that the non-audit services do not influence the results of the audit
3. Ensure the audit partner rotates every five years
4. Annually evaluate the independence of the external auditor based on the results of the auditor survey

3.10 Material Information Management Procedure

TSMC has established relevant procedures for managing and disclosing material information. The responsible departments regularly remind all officers and employees about the need to comply with these procedures and other applicable regulations when they become aware of any potential material information and the possible need to publicly disclose such information. To ensure that our employees, managers and board directors are aware of and comply with these relevant regulations, TSMC has also established our “Insider Trading Policy”. To reduce the risk of insider trading, on-line training programs and live seminars are conducted periodically. In addition, employees can familiarize themselves with relevant internal policies and training articles by easily accessing TSMC’s Legal Organization intranet website.



Capital and Shares

4.1 Capital and Shares

4.1.1 Capitalization

Unit: Share/NT\$		As of 02/28/2019						
Month/ Year	Issue Price (Per Share)	Authorized Share Capital		Capital Stock		Remark		
		Shares	Amount	Shares	Amount	Sources of Capital	Capital Increase by Assets Other than Cash	Date of Approval & Approval Document No.
07/2015	10	28,050,000,000	280,500,000,000	25,930,380,458	259,303,804,580	Exercise of Employee Stock Options: NT\$7,180,220	None	07/13/2015 Zhu Shang Tzu No. 1040020526

4.1.2 Capital and Shares

Unit: Share					As of 02/28/2019
Type of Stock	Authorized Share Capital				Total
	Issued Shares			Unissued Shares	
	Listed	Non-listed	Total		
Common Stock	25,930,380,458	-	25,930,380,458	2,119,619,542	28,050,000,000

Shelf Registration: None.

4.1.3 Composition of Shareholders

Common Share		As of 07/01/2018 (last record date)				
Type of Shareholders	Government Agencies	Financial Institutions	Other Juridical Persons	Foreign Institutions and Natural Persons	Domestic Natural Persons	Total
Number of Shareholders	8	166	1,317	4,433	353,109	359,033
Shareholding	1,653,713,591	994,136,671	1,166,393,138	20,030,594,823	2,085,542,235	25,930,380,458
Holding Percentage	6.38%	3.83%	4.50%	77.25%	8.04%	100.00%

Distribution Profile of Share Ownership

Common Share		As of 07/01/2018 (last record date)	
Shareholder Ownership (Unit: Share)	Number of Shareholders	Ownership	Ownership Percentage
1-999	145,159	31,348,831	0.12%
1,000-5,000	158,212	319,546,061	1.23%
5,001-10,000	25,270	183,241,073	0.71%
10,001-15,000	9,414	115,145,590	0.44%
15,001-20,000	4,530	79,962,808	0.31%
20,001-30,000	4,761	116,345,899	0.45%
30,001-40,000	2,294	79,637,876	0.31%
40,001-50,000	1,425	64,240,732	0.25%
50,001-100,000	2,847	199,148,582	0.77%
100,001-200,000	1,674	234,056,220	0.90%
200,001-400,000	1,056	296,673,341	1.14%
400,001-600,000	467	228,213,351	0.88%
600,001-800,000	284	197,492,674	0.76%
800,001-1,000,000	202	181,809,127	0.70%
Over 1,000,001	1,438	23,603,518,293	91.03%
Total	359,033	25,930,380,458	100.00%

Preferred Shares: None.

4.1.4 Major Shareholders

Common Share		As of 07/01/2018 (last record date)	
Shareholders	Total Shares Owned	Ownership Percentage	
ADR-Taiwan Semiconductor Manufacturing Company, Ltd.	5,340,787,298	20.60%	
National Development Fund, Executive Yuan	1,653,709,980	6.38%	
Government of Singapore	691,147,172	2.67%	
JPMorgan Chase Bank N.A. Taipei Branch in Custody for EuroPacific Growth Fund	362,293,649	1.40%	
Norges Bank	337,945,515	1.30%	
JPMorgan Chase Bank N.A. Taipei Branch in Custody for Vanguard Total International Stock Index Fund, a series of Vanguard Star Funds	327,124,263	1.26%	
Cathay Life Insurance Co., Ltd.	299,802,235	1.16%	
JPMorgan Chase Bank N.A. Taipei Branch in Custody for Oppenheimer Developing Markets Funds, managed by Oppenheimer Funds, Inc.	281,307,429	1.08%	
Vanguard Emerging Markets Stock Index Fund, a series of Vanguard International Equity Index Funds	224,489,845	0.87%	
New Labor Pension Fund	221,349,500	0.85%	

4.1.5 Net Change in Shareholding by Directors, Management and Shareholders with 10% Shareholdings or More

Title Name	2018		01/01/2019 - 02/28/2019	
	Net Change in Shareholding	Net Change in Shares Pledged	Net Change in Shareholding	Net Change in Shares Pledged
Founder and Former Chairman Morris Chang (Note 1)	-	-	-	-
Chairman Mark Liu	-	-	-	-
Chief Executive Officer & Vice Chairman C.C. Wei	-	-	-	-
Director F.C. Tseng	-	-	-	-
Director National Development Fund, Executive Yuan Representative: Mei-ling Chen	-	-	-	-
	-	-	-	-
Independent Director Sir Peter L. Bonfield	-	-	-	-
Independent Director Stan Shih	-	-	-	-
Independent Director Thomas J. Engibous (Note 1)	-	-	-	-
Independent Director Kok-Choo Chen	-	-	-	-
Independent Director Michael R. Splinter	-	-	-	-
Senior Vice President and Chief Information Officer Stephen T. Tso (Note 2)	(30,000)	-	-	-
Senior Vice President, Chief Financial Officer and Spokesperson Lora Ho	30,000	(200,000)	-	-
Senior Vice President Wei-Jen Lo	-	-	-	-
Senior Vice President Rick Cassidy	-	-	-	-
Senior Vice President Y.P. Chin	(1,000)	-	-	-
Senior Vice President Y.J. Mii	-	-	-	-
Senior Vice President J.K. Lin	-	-	-	-
Senior Vice President J.K. Wang	-	-	-	-
Vice President M.C. Tzeng (Note 2)	-	-	-	-
Vice President and Chief Technology Officer Jack Sun (Note 2)	(3,000)	-	-	-

(Continued)

Title Name	2018		01/01/2019 - 02/28/2019	
	Net Change in Shareholding	Net Change in Shares Pledged	Net Change in Shareholding	Net Change in Shares Pledged
Vice President N.S. Tsai	(63,000)	-	-	-
Vice President Irene Sun	-	-	-	-
Vice President Cliff Hou	-	-	-	-
Vice President Been-Jon Woo (Note 2)	15,000	-	-	-
Vice President and General Counsel Sylvia Fang	-	(250,000)	-	210,000
Vice President Connie Ma	37,000	-	-	-
Vice President Y.L. Wang	-	-	-	-
Vice President Doug Yu	-	-	-	-
Vice President and TSMC Fellow Alexander Kalnitsky	-	-	-	-
Vice President Kevin Zhang	-	-	-	-
Vice President and TSMC Fellow T.S. Chang (Note 3)	-	-	-	-
Vice President Michael Wu (Note 3)	10,000	-	-	-
Vice President Min Cao (Note 3)	10,000	-	-	-
Vice President H.-S. Philip Wong (Note 4)	-	-	-	-
Vice President Marvin Liao (Note 5)	-	-	-	-
Vice President Y.H. Liaw (Note 6)	-	-	-	-

Note 1: Founder and former Chairman Dr. Morris Chang retired after the Annual Shareholders' Meeting on June 5, 2018. Mr. Thomas J. Engibous resigned as an Independent Director due to health reasons, effective January 1, 2019.

Note 2: Senior Vice President and Chief Information Officer Dr. Stephen T. Tso retired, effective March 1, 2018. Vice President and Chief Technology Officer Dr. Jack Sun retired, effective August 1, 2018. Vice President M.C. Tzeng retired, effective November 1, 2018. Vice President Dr. Been-Jon Woo retired, effective January 1, 2019. Their shareholdings were not disclosed after that date.

Note 3: Dr. T.S. Chang, Dr. Michael Wu and Dr. Min Cao were promoted to Vice President, effective February 13, 2018. Their shareholdings were disclosed starting from that date.

Note 4: Dr. H.-S. Philip Wong was promoted to Vice President, effective August 14, 2018. His shareholding was disclosed starting from that date.

Note 5: Dr. Marvin Liao was promoted to Vice President, effective November 13, 2018. His shareholding was disclosed starting from that date.

Note 6: Mr. Y.H. Liaw was promoted to Vice President, effective February 19, 2019. His shareholding was disclosed starting from that date.

4.1.6 Stock Trade with Related Party: None.

4.1.7 Stock Pledge with Related Party: None.

4.1.8 Related Party Relationship among TSMC’s 10 Largest Shareholders

Common Share

As of 07/01/2018 (last record date)

Name	Current Shareholding		Spouse and Minor Shareholding		TSMC Shareholding by Nominee Arrangement		Name and Relationship between TSMC’s Shareholders	
	Shares	%	Shares	%	Shares	%	Name	Relationship
ADR-Taiwan Semiconductor Manufacturing Company, Ltd.	5,340,787,298	20.60%	N/A	N/A	N/A	N/A	None	None
National Development Fund, Executive Yuan Representative: Mei-ling Chen	1,653,709,980	6.38%	N/A	N/A	N/A	N/A	None	None
	-	-	-	-	-	-	None	None
Government of Singapore	691,147,172	2.67%	N/A	N/A	N/A	N/A	None	None
JPMorgan Chase Bank N.A. Taipei Branch in Custody for EuroPacific Growth Fund	362,293,649	1.40%	N/A	N/A	N/A	N/A	None	None
Norges Bank	337,945,515	1.30%	N/A	N/A	N/A	N/A	None	None
JPMorgan Chase Bank N.A. Taipei Branch in Custody for Vanguard Total International Stock Index Fund, a series of Vanguard Star Funds	327,124,263	1.26%	N/A	N/A	N/A	N/A	None	None
Cathay Life Insurance Co., Ltd. Chairman: Tiao-kuei Huang	299,802,235	1.16%	N/A	N/A	N/A	N/A	None	None
	Data Not Available							
JPMorgan Chase Bank N.A. Taipei Branch in Custody for Oppenheimer Developing Markets Funds, managed by Oppenheimer Funds, Inc.	281,307,429	1.08%	N/A	N/A	N/A	N/A	None	None
Vanguard Emerging Markets Stock Index Fund, a series of Vanguard International Equity Index Funds	224,489,845	0.87%	N/A	N/A	N/A	N/A	None	None
New Labor Pension Fund	221,349,500	0.85%	N/A	N/A	N/A	N/A	None	None

4.1.9 Long-term Investment Ownership

As of 12/31/2018

Long-term Investment	Ownership by TSMC (1)		Ownership by Directors, Managers and Directly/Indirectly Owned Subsidiaries (2)		Total Ownership (1) + (2)	
	Shares	%	Shares	%	Shares	%
Equity Method:						
TSMC Partners, Ltd.	988,268,244	100%	-	-	988,268,244	100%
TSMC Global Ltd.	11,284	100%	-	-	11,284	100%
TSMC North America	11,000,000	100%	-	-	11,000,000	100%
TSMC Europe B.V.	200	100%	-	-	200	100%
TSMC Japan Limited	6,000	100%	-	-	6,000	100%
TSMC Korea Limited	80,000	100%	-	-	80,000	100%
TSMC China Company Limited	Not Applicable (Note 1)	100%	Not Applicable (Note 1)	-	Not Applicable (Note 1)	100%
TSMC Nanjing Company Limited	Not Applicable (Note 1)	100%	Not Applicable (Note 1)	-	Not Applicable (Note 1)	100%
TSMC Solar Europe GmbH (Note 2)	800	100%	-	-	800	100%
VisEra Technologies Company Ltd.	253,120,000	86.94%	-	-	253,120,000	86.94%
Systems on Silicon Manufacturing Co. Pte. Ltd.	313,603	38.79%	-	-	313,603	38.79%
Vanguard International Semiconductor Corp.	464,223,493	28.32%	275,614,355	16.82% (Note 3)	739,837,848	45.14%
Xintec Inc.	111,281,925	40.95%	-	-	111,281,925	40.95%
Global UniChip Corporation	46,687,859	34.84%	-	-	46,687,859	34.84%
VentureTech Alliance Fund II, L.P.	Not Applicable (Note 1)	98.00%	Not Applicable (Note 1)	-	Not Applicable (Note 1)	98.00%
VentureTech Alliance Fund III, L.P.	Not Applicable (Note 1)	98.00%	Not Applicable (Note 1)	-	Not Applicable (Note 1)	98.00%

Note 1: Not applicable. These firms do not issue shares. TSMC’s investment is measured as a percentage of ownership.

Note 2: TSMC Solar Europe GmbH is under liquidation procedures.

Note 3: TSMC’s Director, National Development Fund of Executive Yuan, holds 16.72% while other Directors and Management hold 0.10%.

4.1.10 Share Information

TSMC’s earnings per share in 2018 increased 2.3% from 2017 to NT\$13.54 per share. The following table details TSMC’s market price, net worth, earnings, and dividends per common share, as well as other data regarding return on investment.

Market Price, Net Worth, Earnings, and Dividends Per Common Share

Unit: NT\$, except for weighted average shares and return on investment ratios

Item	2017	2018	01/01/2019 - 02/28/2019
Market Price Per Share (Note 1)			
Highest Market Price	244.00	266.00	239.50
Lowest Market Price	179.50	212.00	208.00
Average Market Price	210.09	237.45	224.25
Net Worth Per Share			
Before Distribution	58.70	64.67	-
After Distribution	50.70	56.67 (Note 5)	-
Earnings Per Share			
Weighted Average Shares (thousand shares)	25,930,380	25,930,380	-
Diluted Earnings Per Share	13.23	13.54	-
Dividends Per Share			
Cash Dividends	8.00	8.00 (Note 5)	-
Accumulated Undistributed Dividend	-	-	-
Return on Investment			
Price/Earnings Ratio (Note 2)	15.88	17.54	-
Price/Dividend Ratio (Note 3)	26.26	29.68 (Note 5)	-
Cash Dividend Yield (Note 4)	3.8%	3.4% (Note 5)	-

Note 1: Referred to TWSE website
Note 2: Price/Earnings Ratio = Average Market Price/ Diluted Earnings Per Share
Note 3: Price/Dividend Ratio = Average Market Price/Cash Dividends Per Share
Note 4: Cash Dividend Yield = Cash Dividends Per Share/Average Market Price
Note 5: Pending shareholders' approval

4.1.11 Dividend Policy and Distribution of Earnings

TSMC does not pay dividends when there are no profits or retained earnings. TSMC has distributed cash dividends every year to its shareholders since 2004. Payment of dividends (including in cash and in stock) in respect of the prior year is made following approval by the annual general meeting of shareholders. The R.O.C. Company Act, amended in August 2018, allows a company, as authorized by its Articles of Incorporation, to distribute dividends on a quarterly basis or a semi-annual basis and to have its board of directors to approve the dividends in cash. On February 19, 2019, TSMC’s board of directors adopted a proposal recommending distribution of a 2018 cash dividend of NT\$8 per common share and resolved to submit the proposal for approval by the annual general meeting of shareholders to be held on June 5, 2019 as shown in the table below. TSMC’s board of directors also resolved to submit for approval at the annual general meeting of shareholders the proposed amendments to TSMC’s Articles of Incorporation to authorize the Company’s board of directors to approve cash dividends after the close of each quarter. Subject to the shareholders’ approval of such amendments, TSMC’s board of directors will approve each quarter’s dividend in the following quarter’s board meeting, after which the dividend will be distributed within six months. TSMC’s board of directors plans to approve a cash dividend of NT\$2 per common share for the first quarter of 2019 in the second quarter of 2019, which will be paid in the fourth quarter of 2019. Therefore, all shareholders of TSMC are expected to receive a cash dividend of NT\$10 per share in total in 2019. In the future, TSMC intends to continue its stable dividend policy and return about 70% of free cash flow to shareholders every year. As the Company’s business continues to grow and generates greater amounts of free cash flow, it expects to maintain a sustainable quarterly cash dividend, and to distribute the cash dividend each year at a level not lower than the year before.

Proposal to Distribute 2018 Earnings

Unit: NT\$

Cash Dividends Paid to Common Shareholders (NT\$[8] per share)	207,443,043,664

4.1.12 Compensation to Directors and Profit Sharing Bonus to Employees

Based on TSMC’s Articles of Incorporation, before paying dividends or bonuses to shareholders, TSMC shall set aside not more than 0.3% of its annual profit to directors as compensation and not less than 1% to employees as profit sharing bonus.

As resolved by TSMC’s Board of Directors on February 19, 2019, a profit sharing bonus to employees was expensed based on a certain percentage of 2018 profit; compensation to directors was expensed based on the estimated amount of payment. If the actual amounts subsequently paid differ from the above estimated amounts, the differences will be recorded in the year paid as a change in accounting estimate.

2018 Directors’ Compensation and Employees’ Profit Sharing Bonus

	Board Resolution (02/19/2019)
	Amount (NT\$)
Directors’ Compensation (Cash)	349,271,420
Employee’s Profit Sharing Bonus (Cash)	23,570,040,330
Total	23,919,311,750

Note: NT\$23,570,040,330 employees’ cash bonus has already been distributed following each quarter of 2018. The above employees’ profit sharing bonus will be distributed in July, 2019.

2017 Directors’ Compensation and Employees’ Profit Sharing Bonus

	Board Resolution (02/13/2018)	Actual Result (Note)
	Amount (NT\$)	Amount (NT\$)
Directors’ Compensation (Cash)	368,919,380	368,919,380
Employees’ Profit Sharing Bonus (Cash)	23,019,082,263	23,019,082,263
Total	23,388,001,643	23,388,001,643

Note: The above Directors’ Compensation and Employees’ Profit Sharing Bonus were expensed under the Company’s 2017 statement of comprehensive income and the same amounts were approved by the Board of Directors at its meeting on February 13, 2018.

4.1.13 Impact to 2019 Business Performance and EPS Resulting from Stock Dividend Distribution: Not applicable.

4.1.14 Buyback of Common Stock: None.

4.2 Issuance of Corporate Bonds

4.2.1 Corporate Bonds

NTD Corporate Bonds

As of 02/28/2019

Issuance		Domestic Unsecured Bond (101-1)	Domestic Unsecured Bond (101-2)	Domestic Unsecured Bond (101-3)	Domestic Unsecured Bond (101-4)	Domestic Unsecured Bond (102-1)	Domestic Unsecured Bond (102-2)	Domestic Unsecured Bond (102-3)	Domestic Unsecured Bond (102-4)
Issuing Date		08/02/2012	09/26/2012	10/09/2012	01/04/2013	02/06/2013	07/16/2013	08/09/2013	09/25/2013
Denomination		NT\$10,000,000	NT\$10,000,000	NT\$10,000,000	NT\$10,000,000	NT\$10,000,000	NT\$10,000,000	NT\$10,000,000	NT\$10,000,000
Offering Price		Par	Par	Par	Par	Par	Par	Par	Par
Total Amount		NT\$18,900,000,000	NT\$21,700,000,000	NT\$4,400,000,000	NT\$23,600,000,000	NT\$21,400,000,000	NT\$13,700,000,000	NT\$12,500,000,000	NT\$15,000,000,000
Coupon		Tranche A: 1.28% p.a. Tranche B: 1.40% p.a.	Tranche A: 1.28% p.a. Tranche B: 1.39% p.a.	1.53% p.a.	Tranche A: 1.23% p.a. Tranche B: 1.35% p.a. Tranche C: 1.49% p.a.	Tranche A: 1.23% p.a. Tranche B: 1.38% p.a. Tranche C: 1.50% p.a.	Tranche A: 1.50% p.a. Tranche B: 1.70% p.a.	Tranche A: 1.34% p.a. Tranche B: 1.52% p.a.	Tranche A: 1.35% p.a. Tranche B: 1.45% p.a. Tranche C: 1.60% p.a. Tranche D: 1.85% p.a. Tranche E: 2.05% p.a. Tranche F: 2.10% p.a.
Tenor and Maturity Date		Tranche A: 5 years Maturity: 08/02/2017 Tranche B: 7 years Maturity: 08/02/2019	Tranche A: 5 years Maturity: 09/26/2017 Tranche B: 7 years Maturity: 09/26/2019	Tenor: 10 years Maturity: 10/09/2022	Tranche A: 5 years Maturity: 01/04/2018 Tranche B: 7 years Maturity: 01/04/2020 Tranche C: 10 years Maturity: 01/04/2023	Tranche A: 5 years Maturity: 02/06/2018 Tranche B: 7 years Maturity: 02/06/2020 Tranche C: 10 years Maturity: 02/06/2023	Tranche A: 7 years Maturity: 07/16/2020 Tranche B: 10 years Maturity: 07/16/2023	Tranche A: 4 years Maturity: 08/09/2017 Tranche B: 6 years Maturity: 08/09/2019	Tranche A: 3 years Maturity: 09/25/2016 Tranche B: 4 years Maturity: 09/25/2017 Tranche C: 5.5 years Maturity: 03/25/2019 Tranche D: 7.5 years Maturity: 03/25/2021 Tranche E: 9.5 years Maturity: 03/25/2023 Tranche F: 10 years Maturity: 09/25/2023
Outstanding		NT\$9,000,000,000	NT\$9,000,000,000	NT\$4,400,000,000	NT\$13,000,000,000	NT\$15,200,000,000	NT\$13,700,000,000	NT\$8,500,000,000	NT\$12,000,000,000
Credit Rating		twAAA (Taiwan Ratings Corporation, 07/02/2012)	twAAA (Taiwan Ratings Corporation, 08/23/2012)	twAAA (Taiwan Ratings Corporation, 09/04/2012)	twAAA (Taiwan Ratings Corporation, 11/29/2012)	twAAA (Taiwan Ratings Corporation, 12/18/2012)	twAAA (Taiwan Ratings Corporation, 05/16/2013)	twAAA (Taiwan Ratings Corporation, 07/15/2013)	twAAA (Taiwan Ratings Corporation, 08/06/2013)
Trustee		Mega International Commercial Bank	Taipei Fubon Commercial Bank						
Guarantor		None							
Underwriter		Not Applicable							
Legal Counsel		Modern Law Office							
Auditor		Deloitte & Touche							
Repayment		Bullet							
Redemption or Early Repayment Clause		None							
Covenants		None							
Other Rights of Bondholders	Conversion Right	None							
	Amount of Converted or Exchanged Common Shares, ADRs or Other Securities	Not Applicable							
Dilution Effect and Other Adverse Effects on Existing Shareholders		None							
Custodian		None							

4.2.2 Convertible Bond: None.

4.2.3 Exchangeable Bond: None.

4.2.4 Shelf Registration: None.

4.2.5 Bond with Warrants: None.

4.3 Preferred Shares

4.3.1 Preferred Share: None.

4.3.2 Preferred Share with Warrants: None.

4.4 Issuance of American Depositary Shares

Issuing Date	10/08/1997	11/20/1998	01/12/1999 - 01/14/1999	07/15/1999	08/23/1999 - 09/09/1999	02/22/2000 - 03/08/2000	04/17/2000	06/07/2000 - 06/15/2000	05/14/2001 - 06/11/2001	06/12/2001	11/27/2001	02/07/2002 - 02/08/2002	11/21/2002 - 12/19/2002	07/14/2003 - 07/21/2003	11/14/2003	08/10/2005 - 09/08/2005	05/23/2007
Total Amount (US\$)	594,720,000	184,554,440	35,500,000	296,499,641	158,897,089	379,134,599	224,640,000	1,167,873,850	240,999,660	297,649,640	320,600,000	1,001,650,000	160,097,914	908,514,880	1,077,000,000	1,402,036,500	2,563,200,000
Offering Price Per ADS (US\$)	24.78	15.26	17.75	24.516	28.964	57.79	56.16	35.75	20.63	20.63	16.03	16.75	8.73	10.40	10.77	8.6	10.68
Units Issued	24,000,000	12,094,000	2,000,000	12,094,000	5,486,000	6,560,000	4,000,000	32,667,800	11,682,000	14,428,000	20,000,000	59,800,000	18,348,000	87,357,200	100,000,000	163,027,500	240,000,000
Common Shares Represented	120,000,000	60,470,000	10,000,000	60,470,000	27,430,000	32,800,000	20,000,000	163,339,000	58,410,000	72,140,000	100,000,000	299,000,000	91,740,000	436,786,000	500,000,000	815,137,500	1,200,000,000
Underlying Securities	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders (Pursuant to ADR Conversion Sale Program)	TSMC Common Shares from Selling Shareholders (Pursuant to ADR Conversion Sale Program)	TSMC Common Shares from Selling Shareholders	Cash Offering and TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders (Pursuant to ADR Conversion Sale Program)	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders (Pursuant to ADR Conversion Sale Program)	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders	TSMC Common Shares from Selling Shareholders
Apportionment of Expenses for Issuance and Maintenance	(Note 3)							(Note 4)	(Note 3)								
Issuance and Listing	NYSE																
Rights and Obligations of ADS Holders	Same as those of Common Share Holders																
Trustee	Not Applicable																
Depository Bank	Citibank, N.A. – New York																
Custodian Bank (Note 1)	Citibank, N.A. – Taipei Branch																
ADSs Outstanding (Note 2)	As of February 28, 2019, total number of outstanding ADSs was 1,068,051,367.																
Terms and Conditions in the Deposit Agreement and Custody Agreement	See Deposit Agreement and Custody Agreement for Details																
Closing Price Per ADS (US\$; source: Bloomberg)	2018	High	46.38														
		Low	35.29														
		Average	40.62														
	01/01/2019 - 02/28/2019	High	39.60														
		Low	34.36														
		Average	37.39														

Note 1: Citibank, N.A., Taipei Branch changed its name to “Citibank Taiwan Limited” in 2009.

Note 2: TSMC has in aggregate issued 813,544,500 ADSs since 1997, which, if taking into consideration stock dividends distributed over the period, would amount to 1,147,835,205 ADSs. Stock dividends distributed in 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008 and 2009 were 45%, 23%, 28%, 40%, 10%, 8%, 14.08668%, 4.99971%, 2.99903%, 0.49991%, 0.50417% and 0.49998%, respectively. As of February 28, 2019, total number of outstanding ADSs was 1,068,051,367 after 79,783,838 were redeemed.

Note 3: All fees and expenses such as underwriting fees, legal fees, listing fees and other expenses related to issuance of ADSs were borne by the selling shareholders, while maintenance expenses such as annual listing fees and accountant fees were borne by TSMC.

Note 4: All fees and expenses such as underwriting fees, legal fees, listing fees and other expenses related to issuance of ADSs were borne proportionately by TSMC and the selling shareholders, while maintenance expenses such as annual listing fees and accountant fees were borne by TSMC.

4.5 Status of Employee Stock Option Plan

4.5.1 Issuance of Employee Stock Options: None.

4.5.2 Employee Stock Options Granted to Management Team and to Top 10 Employees: None.

4.6 Status of Employee Restricted Stock

4.6.1 Status of Employee Restricted Stock: None.

4.6.2 Employee Restricted Stock Granted to Management Team and to Top 10 Employees: None.

4.7 Status of New Share Issuance in Connection with Mergers and Acquisitions: None.

4.8 Financing Plans and Implementation: Not applicable.



5 Operational Highlights

5.1 Business Activities

5.1.1 Business Scope

As the founder and leader of the dedicated semiconductor foundry segment, TSMC provides a full range of integrated semiconductor foundry services, including the most advanced process technologies, leading specialty technologies, the most comprehensive design ecosystem support, excellent manufacturing productivity and quality, advanced mask and packaging services, and so on, to meet a growing variety of customer needs. The Company strives to provide the best overall value to its customers and views customer success as TSMC success. As a result, TSMC has won customer trust from around the world and has experienced strong growth and success.

5.1.2 Customer Applications

TSMC manufactured 10,436 different products for 481 customers in 2018. These chips were used across a broad spectrum of electronic applications, including computers and peripherals, information appliances, wired and wireless communication systems, servers and data center, automotive and industrial equipment, consumer electronics such as digital TVs, game consoles, digital cameras, IoT and wearables, and many other devices and applications.

The rapid ongoing evolution of end products prompts customers to pursue differentiation using TSMC’s innovative technologies and services and, at the same time, spurs TSMC’s own development of technology. As always, success depends on leading rather than following industry trends.

5.1.3 Consolidated Shipments and Net Revenue in 2018 and 2017

Unit: Shipments (thousand 12-inch equivalent wafers) / Net Revenue (NT\$ thousands)

		2018		2017	
		Shipments	Net Revenue (Note 3)	Shipments	Net Revenue (Note 3)
Wafer	Domestic (Note 1)	1,575	81,718,513	1,650	89,888,258
	Export	9,177	829,577,851	8,799	785,573,187
Others (Note 2)	Domestic (Note 1)	N/A	8,398,094	N/A	7,900,379
	Export	N/A	111,779,099	N/A	94,085,417
Total	Domestic (Note 1)	1,575	90,116,607	1,650	97,788,637
	Export	9,177	941,356,950	8,799	879,658,604

Note 1: Domestic means sales to Taiwan.
Note 2: Others mainly include revenue associated with packaging and testing services, mask making, design services, and royalties.
Note 3: Commencing in 2018, the Company began to break down the net revenue by product based on a new method which associates most estimated sales returns and allowances with individual sales transactions, as opposed to the previous method which allocated sales returns and allowances based on the aforementioned gross revenue. The Company believes the new method provides a more relevant breakdown than the previous one. On a comparable basis, the classification of 2017 has been revised accordingly.

5.1.4 Production in 2018 and 2017

Unit: Capacity / Output (million 12-inch equivalent wafers) / Amount (NT\$ millions)

Wafers			
Year	Capacity	Output	Amount
2018	12 - 13	10 - 11	478,269
2017	11 - 12	10 - 11	454,603

5.2 Technology Leadership

5.2.1 R&D Organization and Investment

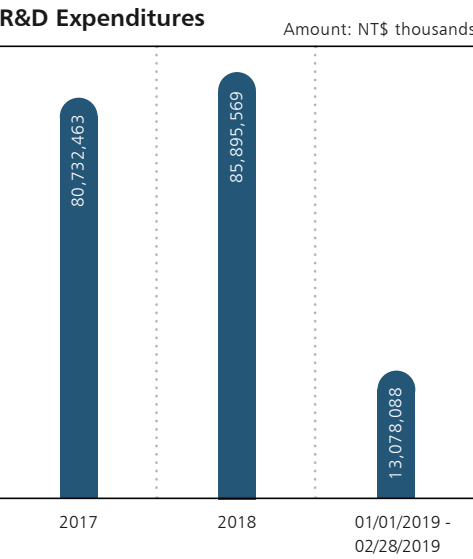
In 2018 TSMC continued to invest in research and development, with total R&D expenditures amounting to 8% of revenue, a level that equals or exceeds the R&D investment of many other leading high-tech companies.

Despite the increasingly complex and difficult challenge to continue extending Moore’s Law, which calls for the doubling of semiconductor computing power every two years, TSMC has focused its R&D efforts on enabling the Company to continually offer its customers first-to-market, leading-edge technologies and design solutions that contribute to their product success. In 2018, following the volume ramp-up of the industry leading 7nm technology, the R&D organization completed the transfer to manufacturing of the 7nm+ technology, an enhanced version of 7nm. At the same time, the R&D organization continues to fuel the pipeline of technological innovation needed to maintain industry leadership. TSMC’s 5nm technology, the fifth generation of technology platform to make use of 3D FinFET transistors, is on track for risk production in 2019. TSMC’s 3nm technology has entered full development stage and the definition and intensive early development efforts have been progressing for nodes beyond 3nm.

In addition to CMOS logic, TSMC conducts R&D on a wide range of other semiconductor technologies that provide the functionality required by customers for mobile SoC and other applications. Highlights in 2018 include: high-volume production of Gen-3 Integrated Fan-Out Package on Package (InFO-PoP) for mobile application processor packaging; successful qualification of Gen-4 InFO-PoP advanced packaging technology for mobile applications and Integrated Fan-Out on Substrate (InFO-oS) for HPC applications; development of industry’s unique 90nm BCD (Bipolar-CMOS-DMOS) technology offering leading-edge 5-16V power devices and dense logic integration with competitive cost, as the next generation mobile Power Management IC (PMIC) solution; stable yield and reliability demonstration of 28nm node eFlash for high performance mobile computing and high performance low-leakage platforms with expected technical qualification for automobile electronics and micro controller units (MCU) in 2019; mass production launch of new generation CMOS image sensors of sub-micron pixel for mobile applications and development of Ge-on-Si sensor for three dimensional range sensing applications with superior performance.

In 2018, TSMC maintained strong partnerships with world-class research institutions, including SRC in the U.S. and IMEC in Belgium. TSMC also continued to expand research collaboration

with leading universities throughout the world for two grand purposes; the advancement of semiconductor technologies and the incubation of talents for the future.



5.2.2 R&D Accomplishments in 2018

Highlights

• 5nm Technology

Even though the semiconductor industry is approaching the physical limits of silicon, 5nm technology still follows Moore’s Law and delivers substantial density improvement with better performance at same power or lower power consumption at comparable performance. In 2018, TSMC continued full development of 5nm focusing on manufacturing baseline process setup, yield learning, transistor and interconnect R/C performance improvement and reliability evaluation. The SRAM and logic yield results met the required expectations and TSMC is thus now committed to the goal of risk production in 2019.

• 3nm Technology

Development of the 3nm FinFET (Fin field-effect transistor) technology, targeting both mobile applications and high performance computing devices, made good progress in 2018. 3nm FinFET technology is expected to offer excellent improvement in speed, power, density and cost over 5nm FinFET technology.

• Lithography Technology

The main focus for R&D lithography in 2018 was 7nm+ technology transfer, 5nm technology development and preparation for development of 3nm technology and beyond. For 7nm+ development, the technology was smoothly transferred and R&D is working with the fab to clean up any

remaining patterning issues. As for 5nm development, EUV (extreme ultraviolet) lithography showed promising imaging capability with expected good wafer yield. R&D is working on EUV cost reduction, mask defect reduction in scanner, and mask-making capability improvement. In 2019, TSMC will focus intently on improving EUV quality and adopting more EUV layers in 3nm technology and beyond.

In 2018, the EUV program made continuous improvement in light-source power and stability, which has enabled faster learning rates and process development for advanced nodes. Additional progress was made with resist process, pellicle, and related mask blanks, as EUV technology moves closer to full scale R&D and manufacturing readiness.

• Mask Technology

Mask technology is an integral part of advanced lithography. In 2018, R&D successfully implemented EUV mask technology into 7nm+ and 5nm nodes. Solid progress was made on the production yield and the reduction of blank native defects to meet high-volume manufacturing requirements.

Integrated Interconnect and Packaging

Wafer level system integration (WLSI) is built upon TSMC’s wafer processes and capacity core competency to meet customer system-level and packaging needs in performance, power, profile, cycle time and cost. WLSI encompasses several complementary platforms, including TSMC-SoIC™, CoWoS®, InFO and Under-Bump-Metallurgy Free Integration (UFI). Customers can leverage TSMC’s unique wafer-to-package turnkey services for optimal time-to-market of highly competitive products.

• 3D IC and TSMC-SoIC™ (System-on-Integrated Chips)

TSMC-SoIC™ is an innovative frontend wafer-process-based platform that integrates multi-chip, multi-tier, multi-function and mix-and-match technologies to enable high speed, high bandwidth, low power, high pitch density, and minimal footprint and stack-height heterogeneous 3D IC integration. This technology not only helps to sustain Moore’s Law regarding chip partition and on-chip integration, but also enables off-chip heterogeneous system-level scaling. TSMC has worked with customers to develop TSMC-SoIC™ designs for high-performance computing system applications.

• Si Interposer and CoWoS® (Chip on Wafer on Substrate)

TSMC continues to see good growth momentum in CoWoS® demand in HPC and AI applications. CoWoS® is the main platform for heterogeneous integration of advanced node SoC

chip and high bandwidth memory (HBM). TSMC’s leadership in this technology is further strengthened by robust manufacturing yield, growing capabilities on larger interposer and package sizes, as well as feature-rich interposers such as embedded capacitors in the Si interposer.

• Advanced Fan-Out and InFO (Integrated Fan-Out)

In 2018, TSMC continued to lead in high-volume manufacturing of InFO-PoP Gen-3 packaging for mobile applications processors and Integrated Fan-Out on Substrate (InFO-oS) applications. InFO-PoP Gen-4 was also successfully qualified for mobile applications and started developing multi-die integration with fine-pitch die-to-die interconnection and InFO-UHD (ultra-high density) for both mobile and HPC applications. Based on InFO-PoP Gen-4 qualification, it could have smaller package size with finer RDL (redistribution layer) line, BGA (ball grid array) pitch. Gen-4 also enhances thermal performance. The newly developed InFO-PoP could be stacked with various commercial DRAM devices with competitive performance. This InFO-PoP with backside RDL will boost penetration into mobile applications and processor applications with wide coverage from premium to mid-end market and was High-Volume Manufacturing (HVM) ready in 2019. New generation IPD (integrated passive device) technology, which provides high density capacitors and low ESL (effective series inductance) for electrical performance boost, passed qualification on InFO-PoP. Enhanced InFO-PoP will benefit AI and 5G mobile applications. New IPD HVM is scheduled to begin in 2019. To meet the demands of 5G mobile communications, TSMC has developed an advanced InFO antenna in package (InFO-AIP) technology, in which the RF chip and millimeter wave antenna are integrated into an InFO package. InFO-AIP technology provides high performance, low-power, small-size, low-cost solutions for millimeter wave system applications such as 5G mobile, video streaming and virtual reality (VR) wireless communications. This technology can also support the fast-evolving automotive applications in car radar, auto-driving and driving safety.

• Advanced Interconnect

TSMC has made significant progress in chip performance by interconnect time delay reduction. The novel Via processes have demonstrated a 30% reduction in Via resistance with comparable chip reliability and performance. In addition, the novel materials and optimized integration approach have been verified with lower capacitance loading and enhanced device reliability. TSMC customers could enhance their competitiveness by using these prominent advances in interconnect RC (resistance-capacitance) delay.

Advanced Technology Research

Innovation in transistor architectures and materials continues to enable higher performance and reduced power consumption in advanced logic technologies. TSMC is at the forefront of transistor research. At the 2018 International Electron Device Meeting (IEDM). TSMC published the first high performance CMOS Ge gate stack, a record low n-Ge contact resistance, and Ge-channel vertically stacked lateral gate-all-around nanowire transistors. TSMC continues to look for hardware accelerators for AI and HP computing. Also presented at 2018 IEDM: Phase change memory was integrated in 40nm CMOS technology and demonstrated as a key technology candidate for AI applications. TSMC research is well positioned to pave the way for continued density scaling, performance enhancement and power reduction to deliver advanced logic technologies for mobile and high performance computation applications.

Specialty Technologies

TSMC offers a broad mix of technologies to address a wide range of applications:

- **Mixed Signal/Radio Frequency (MS/RF) Technology**

In 2018, in order to facilitate transceiver circuit design for the increasing demand of 5G cutting-edge wireless technologies, TSMC successfully delivered various options in 16nm, 22nm and 28nm devices with a Si-based millimeter wave (mmWave) model to fulfill customers' requirement in cross-functional integrated applications. To achieve better performance in insertion loss and isolation in special process for cellular/Wi-Fi RF switch applications, TSMC reduced the key parameter $R_{on}-C_{off}$ to ~ 78 fs (femtosecond) by providing 40nm process as a lower-cost alternative.

- **Power IC/Bipolar-CMOS-DMOS (BCD) Technology**

TSMC developed unique 90nm BCD technology, offering leading-edge 5-16V power devices and dense logic integration at a competitive cost, as a next generation mobile Power Management IC (PMIC) solution. TSMC continually enriches this platform to cover more PMIC applications with 40nm ultra-low-power compatible 20-24V HV devices with integrated RRAM for the first time to enable low power, high integration in a small footprint for mobile applications.

- **Panel Drivers Technology**

In 2018, TSMC deployed 40nm UHD SRAM, 6-8V and 25-32V high-voltage technologies for small panel Super Retina display driver ICs in Display Driver IC (DDIC) and Touch with Display Driver Integration (TDDI). In addition, the Company

also penetrated the markets for OLED (organic light emitting diode), AR/VR and medium panel driver ICs. Dozens of customers and products entered mass production and the yield has been excellent. For next generation products, TSMC has introduced dual platforms in advanced high-voltage technologies, wafer stacking, and panel verification, and plans to begin risk production in the first half of 2019.

- **Micro-electromechanical Systems (MEMS) Technology**

In 2018, TSMC's modular MEMS technology was qualified for mass production of accelerometers and a pilot run of high-resolution pressure sensors. Future plans include the development of next-generation high-sensitivity thin microphone, MEMS Si-pillar TSV (through silicon via) technology and BioMEMS applications.

- **GaN Technology**

The first generation of 650V/100V enhancement high electron mobility transistor (E-HEMT) went into risk production in 2018. The second generation of 650V/110V E-HEMT and RF 100V D-HEMT GaN devices were developed and passed engineering qualification, also in 2018.

- **Complementary Metal-Oxide-Semiconductor (CMOS) Image Sensor Technology**

In 2018, TSMC had several achievements in CMOS image sensor technology including: (1) mass-production of new-generation sensors of sub-micron pixel for mobile application; (2) successful development of Ge-on-Si sensor for 3D range sensing applications with performance superior to Si sensor; (3) successful application of wafer stack technology to prototype Single Photon Avalanche Diode (SPAD) sensor array technology for 3D time-of-flight applications.

- **Embedded Flash/Emerging Memory Technology**

TSMC reached several major milestones in embedded non-volatile memory (NVM) technologies in 2018. At the 40nm node, NOR-based cell technology with Split-Gate cell was successfully mass-produced to support consumer electronics applications such as IoT, smartcards and MCU and was also qualified for automotive electronics applications. At 28nm node, embedded flash development for HP mobile computing and HP low-leakage platforms have demonstrated stable yield and reliability, and technical qualification is expected in 2019 for automobile electronics and micro controller units (MCU). Customers also announced industry's first on-chip flash memory MCU using TSMC's 28nm embedded flash technology for next generation autonomous cars. In 2018 TSMC offered 40nm

RRAM technology to be embedded in NVM technologies as a low-cost solution for the price-sensitive IoT market. Development in 28nm and 22nm embedded resistive memory technology is on track and expected to enter production in 2020. TSMC is also developing 28nm and 22nm embedded MRAM technology as the solution for embedded-flash technology replacement beyond the 40nm Split-Gate cell node. 2019 production of embedded MRAM is expected to serve many emerging applications.

5.2.3 Technology Platform

TSMC provides customers with advanced technology platforms that include the comprehensive design infrastructure required to optimize design productivity and cycle time. These include: design flows for electronic design automation (EDA); silicon-proven libraries and IP building blocks; and simulation and verification design kits, i.e., process design kits (PDKs) and technology files.

For TSMC's latest advanced technologies of 5nm, 7nm, 7nm+, 12nm, 22nm and 3D IC design enablement platform, EDA tools, features and IP solutions are readily available for customers to adopt to meet their product requirements at various design stages. TSMC also extends its IP quality program (TSMC 9000) to allow IP audits to be performed either at TSMC or at TSMC-certified laboratories. To help customers plan new product tape-outs incorporating library/IP from TSMC's Open Innovation Platform® (OIP) ecosystem, the OIP ecosystem features a portal to connect customers to an ecosystem of 39 IP solution providers. Overall, TSMC and its IP partners have accumulated a portfolio of more than 20,000 IP titles, from 0.35 μ m to 5nm with major IP types to meet customer design needs. TSMC and its EDA partners have created numerous deliverables from 0.13 μ m to 5nm that have successfully supported customer tape-outs.

5.2.4 Design Enablement

TSMC's technology platforms provide a solid foundation to facilitate the design process. Customers can design directly using the Company's internally developed IP and tools or use tools available from TSMC's OIP partners.

Tech Files and PDKs

EDA tool certification is an essential element for IP and customer designs to ensure that features meet TSMC process technology requirements, with certification results that can be found on TSMC-Online™. There are corresponding technology files and process development kits (PDKs) available for customers to download and design together with certified EDA tools. TSMC

provides a broad range of PDKs for digital logic, mixed-signal, radio frequency (RF), high-voltage driver, CMOS image sensor (CIS) and embedded flash technologies across a range of technology nodes from 0.5 μ m to 5nm. In addition, the Company provides technology files for design rule checking (DRC), layout verification of schematic (LVS), resistance-capacitance (RC) extraction, automatic place and route, and a layout editor to ensure process technology information is accurately represented in electronic design automation (EDA) tools. By 2018, TSMC had provided more than 9,000 technology files and more than 300 PDKs via TSMC-Online™. There are more than 100,000 customer downloads of these files every year.

Library and IP

Silicon intellectual property (IP) is the basic building block of integrated circuit designs. Various IP types are available to support different customer design applications including foundation IP, analog IP, embedded memory IP, interface IP and soft IP. TSMC and its alliance partners offer customers a rich portfolio of reusable IPs, which are essential building blocks for many circuit designs. In 2018, the Company expanded its library and silicon IP portfolio to contain more than 20,000 items, a 25% increase over 2017.

Design Methodology and Flow

Reference flows are built on top of certified EDA (electronic design automation) tools to provide additional design flow methodology innovations that can help boost productivity. In 2018, TSMC addressed critical design challenges associated with the new 5nm and 3D IC technology for digital and SoC applications by announcing the readiness of reference flows through OIP collaboration that feature FinFET-specific design solutions and methodologies for performance, power and area optimization.

5.2.5 Intellectual Property

A strong portfolio of intellectual property rights strengthens TSMC's technology leadership and protects our advanced and leading-edge technologies. As of end of 2018, TSMC has accumulated near 50,000 patent applications, and over 34,000 patent grants worldwide. In 2018, TSMC has obtained near 2,500 U.S. patents to rank #6 among U.S. patent assignees, making the ranking of top 10 U.S. patent assignees for the third consecutive year. Additionally, TSMC actively develops worldwide patent strategy, ranking #1 among patent applicants in Taiwan, and obtaining over 1,000 patents in Taiwan and China. In terms of patent quality, the average allowance rate of TSMC's U.S. applications is 98% and ranks #1 among top 10 U.S. patent

assignees. Going forward, TSMC will continue to implement a unified strategic plan for intellectual capital management, combining with strategic considerations and close alignment with the business objectives, to drive the timely creation, management and use of intellectual property.

TSMC has established a process to generate company value from intellectual property by aligning intellectual property strategy with R&D, business operation objectives, marketing, and corporate development strategies. Intellectual property rights protect the company’s freedom to operate, enhance competitive position, and provide leverage to participate in many profit-generating activities.

TSMC has worked continuously to improve the quality of intellectual property portfolio and to reduce the maintenance costs. TSMC will continue to invest in intellectual property portfolio and intellectual property management system to ensure the company’s technology leadership and receive maximum business value from intellectual property rights.

5.2.6 TSMC University Collaboration Programs

In recent years TSMC has significantly expanded its collaborations with prestigious universities in Taiwan. The mission of these joint research is twofold: to incubate high-quality graduate students for semiconductor industry, and to inspire university professors to conduct frontier semiconductor science and technologies research, including but not limited to novel device, process and materials technology, semiconductor manufacturing and engineering, and specialty technologies for electronic applications. Back in 2013, TSMC established research centers at four top universities in Taiwan, namely National Chiao Tung University, National Taiwan University, National Cheng Kung University and National Tsing Hua University. In 2018, 371 high-caliber students with backgrounds in the disciplines of electronics, physics, materials, chemistry, chemical engineering and mechanical engineering have joined these four research centers. In 2015, TSMC furthered its collaboration with the International College of Semiconductor Technology (ICST), at National Chiao Tung University. With TSMC’s support to this international program, a few renowned adjunct professors and a good number of international Ph.D. students have undertaken exploratory research at ICST.

In addition, TSMC also conducts strategic research projects at top overseas universities, such as Stanford, MIT, UC Berkeley and so on. The focus is on disruptive capabilities in transistors, interconnect, patterning, modeling and special technologies.

TSMC University Shuttle Program

The TSMC University Shuttle Program was established to provide professors at leading research universities worldwide with access to the advanced silicon process technologies needed to research and develop innovative circuit design concepts. This program links motivated professors and graduate students with enthusiastic managers at TSMC in order to promote excellence in the development of advanced silicon design technologies and to nurture new generations of engineering talent in the semiconductor field. The program provides access to TSMC silicon process technologies for digital and analog/mixed-signal circuits, RF designs and micro-electromechanical system designs. Participants include major university research groups worldwide. TSMC and the University Shuttle Program participants achieve “win-win” collaboration through the program, which allows graduate students to implement exciting designs and achieve silicon proof points for innovations in various end-applications.

5.2.7 Future R&D Plans

To maintain and strengthen TSMC’s technology leadership, the Company plans to continue investing heavily in R&D. For advanced CMOS logic, the Company’s 5nm and 3nm CMOS nodes continue progressing in the pipeline. In addition, the Company’s reinforced exploratory R&D work is focused on beyond-3nm node; in areas such as 3D transistors, new memory, and low-R interconnect, on track to establish a solid foundation to feed into technology platforms. For 3D IC advanced packaging, innovations for energy-efficient sub-system integration and scaling provide further augmentation to CMOS logic applications. For specialty technologies, the Company has intensified its focus on new specialty technologies such as RF and 3D intelligent sensors targeting 5G and smart IoT applications. The Corporate Research function established in 2017 continues to focus on novel materials, process, devices, nanowires, memories, etc. for the long-term, beyond 8 to 10 years. The Company also continues to collaborate with external research bodies from academia to industry consortia alike with the goal of extending Moore’s Law and paving the road to future cost-effective technologies and manufacturing solutions for its customers.

With a highly competent and dedicated R&D team and its unwavering commitment to innovation, TSMC is confident in its ability to deliver the best and most cost-effective SoC technologies to its customers and to drive future business growth and profitability for years to come.

Summary of TSMC’s Major Future R&D Projects

Project Name	Description	Risk Production (Estimated Target Schedule)
5nm logic technology platform and applications	5 th generation FinFET CMOS technology platform for SoC	2019
Beyond-5nm logic technology platform and applications	6 th generation FinFET CMOS technology platform for SoC	2021
3D IC	Cost-effective solution with better form factor and performance for System-in-Package (SiP)	2018 - 2020
Next-generation lithography	EUV lithography and related patterning technology to extend Moore’s Law	2018 - 2020
Long-term research	Specialty SoC technology (including new NVM, MEMS, RF, analog) and transistors for 8 - 10 year out horizon	2018 - 2025
The projects above account for roughly 70% of the total R&D budget for 2019, estimated to be around 9% of 2019 revenue.		

5.3 Manufacturing Excellence

5.3.1 GIGAFAB® Facilities

Maintaining dependable capacity is a key part of TSMC’s manufacturing strategy. The Company currently operates three 12-inch GIGAFAB® facilities – Fabs 12, 14 and 15. The combined capacity of the three facilities exceeded 8 million 12-inch wafers in 2018. Production within these three facilities supports 0.13μm, 90nm, 65nm, 40nm, 28nm, 20nm, 16nm, 10nm, and 7nm process technologies, including each technology’s sub-nodes. An additional portion of the capacity is reserved for R&D work on leading-edge manufacturing technologies, which currently supports the technology development of the 5nm, 3nm node and beyond.

The three GIGAFAB® facilities are coordinated by the centralized fab manufacturing management system known as super manufacturing platform (SMP) to provide customers with greater benefits in the form of more consistent quality and reliability, improved flexibility to cope with demand fluctuations, faster yield learning and time-to-volume, and lower-cost product requalification.

5.3.2 Engineering Performance Optimization

As advanced technology continues to evolve and the geometry keeps shrinking, the need for tighter process control and quality requirement has become extremely challenging for manufacturing. TSMC’s unique manufacturing infrastructure is tailored to handle a diversified product portfolio, which uses strict process control to attain tightened specs and meet higher product quality, performance, and reliability requirements.

To achieve overall optimization of quality, yield, process and equipment, the process control and analysis systems have been integrated with many intelligent functions to perform self-diagnosis, self-learning and self-reaction. These, in turn, have demonstrated remarkable results in yield enhancement, quality assurance, workflow improvement, fault detection, cost reduction and shortening of the R&D cycle.

TSMC has developed systems for precise fault detection and classification, intelligent advanced equipment control and intelligent advanced process control to monitor the manufacturing process in a timely manner and adjust conditions precisely. To achieve quality-first and ensure highly efficient and effective production, the Company has created precision equipment matching and yield mining to minimize process variation and potential defect and excursion.

To meet the stricter quality requirements of mobile, high performance computing, automotive and the Internet of Things, TSMC has further developed Big Data, Machine Learning, and Artificial Intelligence architecture, which identify critical variables to strengthen process control, optimize quality, and improve yield management and operating efficiency simultaneously.

5.3.3 Agile and Intelligent Operations

The Company’s sophisticated, agile operation system continues to drive manufacturing excellence by integrating demand and capacity modeling, lean Work in Process (WIP) line management, lot dispatching and scheduling, and equipment quality performance to provide fast ramp-up, short cycle time, stable manufacturing, on-time delivery, and total quality satisfaction. The system also provides great flexibility to quickly support customers’ urgent pull-in requests when needed.

TSMC has also introduced new applications such as IoT, intelligent mobile devices and mobile robots to consolidate data collection, yield traceability, workflow efficiency, and material transportation to continuously enhance fab operation efficiency.

Committed to manufacturing excellence, TSMC has integrated expert systems, advanced algorithms, artificial intelligence and machine learning technology to build up an advanced manufacturing environment. Advanced manufacturing technologies are widely applied in scheduling and dispatching, people productivity, equipment productivity, process and equipment control, quality defense, and robotic control in order to optimize quality, productivity, efficiency, and flexibility while maximizing cost effectiveness and accelerating overall innovation.

5.3.4 Raw Materials and Supply Chain Management

In 2018, TSMC continued to review and resolve supply issues, quality issues and potential supply chain risks through the collaboration of teams formed by operations, quality control and business organizations. TSMC also worked with suppliers to further advance material and process innovation, improve quality and create recycling savings with benefits from win-win solutions.

Raw Materials Supply

Major Materials	Major Suppliers	Market Status	Procurement Strategy
Raw Wafers	FST GlobalWafers SEH Siltronic SUMCO	These 5 suppliers together provide over 90% of the world's raw wafer supply. Each supplier has multiple manufacturing sites in order to meet customer demand, including plants in North America, Asia, and Europe.	• TSMC's suppliers of silicon wafers are required to pass stringent quality certification procedures. • TSMC procures wafers from multiple sources to ensure adequate supplies for volume manufacturing and to appropriately manage supply risk. • Raw wafer quality enhancement programs are in place to support TSMC's technology advancement. • TSMC regularly reviews the quality, delivery, cost, sustainability and service performance of its wafer suppliers. The results of these reviews are incorporated into subsequent purchasing decisions. • A periodic audit of each wafer supplier's quality assurance system ensures that TSMC can maintain the highest quality in its own products. • TSMC takes various approaches with suppliers to better manage the cost and supply.
Chemicals	Air Liquide BASF Entegris Fujifilm Electronic Materials Kanto PPC Kuang Ming Merck RASA Shiny Tokuyama Versum Wah Lee	These 12 companies are the major worldwide suppliers of chemicals.	• Most suppliers have relocated some of their operations closer to TSMC's major manufacturing facilities, thereby significantly improving procurement logistics. • All supplied products are regularly reviewed to ensure that TSMC's specifications are met and product quality is satisfactory. • TSMC encourages and engages with chemical suppliers to implement innovative green solutions for waste reduction
Lithographic Materials	3M Asahi Kasei Dow Chemical Fujifilm Electronic Materials JSR Merck Nissan Shin-Etsu Chemical Sumitomo Chemical T.O.K.	These 10 companies are the major worldwide suppliers of lithographic materials.	• TSMC works closely with suppliers to develop materials that meet all application and cost requirements. • TSMC and suppliers periodically conduct programs to improve their quality, delivery, sustainability and green policy, and to ensure continuous progress of TSMC's supply chain. • Some major suppliers have relocated or plan to replicate their manufacturing sites closer to TSMC's major manufacturing facilities, thereby significantly improving procurement logistics and reducing supply risks.
Gases	Air Liquide Air Products Central Glass Entegris Linde LienHwa Praxair SK Materials Taiwan Material Technology Taiyo Nippon Sanso Versum	These 10 companies are the major worldwide suppliers of specialty gases.	• The majority of these suppliers have facilities in multiple geographic locations, which minimizes supply risk for TSMC. • TSMC conducts periodic audits to ensure that they meet TSMC's standards.
Slurry, Pad, Disk	3M AGC Cabot Microelectronics Dow Chemical Fujibo Fujifilm Electronic Materials Fujimi Kinik Versum	These 9 companies are the major worldwide suppliers of CMP (Chemical Mechanical Polishing) materials.	• TSMC works closely with suppliers to develop materials that meet all application and cost requirements. • TSMC and suppliers periodically conduct programs to improve their quality, delivery, sustainability and green policy, and to ensure continuous progress of TSMC's supply chain. • Most suppliers have relocated or plan to replicate some of their manufacturing sites closer to TSMC's major manufacturing facilities, thereby significantly improving procurement logistics and reducing supply risks.

Suppliers Accounting for at Least 10% of Annual Consolidated Net Procurement

Unit: NT\$ thousands

Supplier	2018			2017		
	Procurement Amount	As % of 2018 Total Net Procurement	Relation to TSMC	Procurement Amount	As % of 2017 Total Net Procurement	Relation to TSMC
Company A	11,047,359	17%	None	8,868,953	17%	None
Company B	10,233,843	16%	None	8,029,455	15%	None
Company C	6,800,865	11%	None	5,579,238	10%	None
VIS	5,142,749	8%	Investee accounted for using equity method	5,755,727	11%	Investee accounted for using equity method
Company D	4,556,717	7%	None	5,156,154	10%	None
Others	25,625,521	41%	-	19,804,126	37%	-
Total Net Procurement	63,407,054	100%	-	53,193,653	100%	-

● **Reason for Increase or Decrease:** Due to market or customer product demand changes, etc.

5.3.5 Quality and Reliability

TSMC's strong industry reputation stems from its commitment to provide customers with the highest-quality wafers and best service for their products. Quality and Reliability (Q&R) services aim to achieve "quality on demand" to fulfill customers' requirements for time-to-market delivery, product reliability, and competitiveness over a broad range of product market segments. An automotive quality improvement program has been implemented to meet customer requirements for low Defect Parts Per Million (DPPM).

Q&R technical services assist customers in the technology development stages and product design stages to design-in superior product reliability. In 2018, Q&R worked with R&D in advanced logic technology, specialty technology and advanced packaging technology development and qualification. Q&R has successfully qualified the leading-edge 7nm+ technology (the third FinFET generation), which includes Extreme Ultraviolet (EUV) process and characterized process window with Fab for mass production in 2019. TSMC has led the industry in 7nm technology qualification. The Company developed a complete model to simulate thermal dissipation effect during FinFET operation, to provide more accurate electromigration (EM) design guideline for customers, to develop statistical electromigration budgeting (SEB) model to calculate effective metal electromigration failure rate on whole chip and implement it into electronic design automation (EDA) tool. Through the 7nm+ development process, TSMC enhanced profound reliability learning with new process steps and new reliability methodologies, which, in turn, provided an important foundation for 5nm technology development and prepared for 5nm risk production to start in 2019.

For specialty technologies, Q&R completed the second generation diffractive optical element (DOE) product qualification and ramped up DOE unit production to support a key customer's new product launch with 3D sensing and facial recognition applications. In high-voltage technologies, 0.13μm Bipolar-CMOS-DMOS (BCD) and 0.18μm, third generation BCD process passed automotive grade qualification. For CoWoS® packaging technologies, Q&R integrated high bandwidth memory (HBM) with advanced silicon technology and completed component level, board level and customer product system level qualifications. It has been in production and over one million units have been shipped to key customers without quality or reliability issues. The technology enables the applications of HPC and AI. In addition, Integrated Fan-Out (InFO) assembly technology for mobile applications moved into the third generation of manufacturing. Over 70 million InFO devices have been shipped without any InFO related quality or reliability issues.

To enhance employee problem-solving capabilities and develop related quality systems and methodologies, Q&R continued to hold several company-wide symposiums and training programs such as Total Quality Excellence (TQE), Design of Experiment (DOE), Statistical Process Control (SPC) and metrology in 2018. This included the promotion and training of deep machine learning, which was successfully applied to automatic classification of wafer defects and advanced spectral analysis to detect differences among processes and equipment so that corrective actions could be triggered. In 2019, Q&R will continue the development of employee capabilities by promoting and using new methodologies to enhance TSMC competitiveness. To improve raw material quality, in 2017 Q&R began

encouraging raw materials suppliers to participate in the National Quality Control Circle Competition, which has achieved good results. In 2018, Q&R-backed raw materials suppliers won one gold, four silver and six bronze medals. In 2019 and beyond, Q&R will continue to urge raw material suppliers to join this quality competition to help them improve quality and further enhance TSMC competitiveness.

In developing leading-edge technologies, one of the most challenging tasks is to establish effective metrology methods to minimize process variations. In 2018, Q&R joined forces with R&D metrology experts to address nanometer and atomic-scale characterization needs with a “hybrid metrology” approach, where multiple techniques, both chemical analysis and physical measurement, are used to provide a full characterization of ever more complex 3D nanometer structures. This hybrid metrology approach is being used to support 5nm technology development and will be extended to assist in 3nm and specialty technology development.

The health and safety of employees have always been a priority at TSMC. Since the end of 2015, Q&R has collaborated with the Environmental Safety and Health (ESH) organization to build capability to detect and analyze carcinogenic, mutagenic and reprotoxic (CMR) substances. Beginning in 2017, raw materials suppliers were required to replace PFOA (Perfluorooctanoic Acid) raw materials with non-PFOA alternatives to comply with green procurement policy.

Q&R is also responsible for leading the Company toward the ultimate goal of zero-defect production through the use of continuous improvement programs. Periodic customer feedback indicates that products shipped from TSMC have consistently met or exceeded their field quality and reliability requirements. In 2018, a third-party audit verified the effectiveness of TSMC quality management systems in compliance with IATF 16949: 2016 and IECQ QC 080000: 2017 certificates requirements. In addition, since 2017 Q&R and Fabs have jointly worked on new enhancements for automotive product quality improvement, including design rule implementation and migration to Automotive Quality System 2.0. This covers Fab in-line and Wafer Acceptance Testing using Cpk (process capability index) tightening and maverick wafers/lots handling. Q&R also provides dedicated resources for field/line return analysis and timely physical failure analysis (PFA) for process improvement to meet automotive customers’ low DPPM requirement.

5.4 Customer Trust

5.4.1 Customers

TSMC’s customers worldwide have a variety of successful product specialties and excellent performance records in various segments of the semiconductor industry. Customers include fabless semiconductor companies, systems companies, and integrated device manufacturers such as Advanced Micro Devices, Inc., Broadcom Limited, Hisilicon Technologies Co. Ltd., Intel Corporation, Marvell Technology Group Ltd., MediaTek Inc., NVIDIA Corporation, NXP Semiconductors N.V., Qualcomm Inc., Sony Corporation, Texas Instruments Inc., and many more.

Customer Service

TSMC believes that providing superior service is critical to enhancing customer satisfaction and relationship, which, in turn, is very important to retaining existing customers, strengthening customer relationships and attracting new customers. With a dedicated customer service team as the main contact for coordination and facilitation, TSMC strives to provide world-class design support, mask making, wafer manufacturing, and backend services to provide customers an optimum experience and, in return, gain customer trust and sustain Company revenues and profitability.

To facilitate customer interaction and information access on a real-time basis, TSMC-Online™ offers a suite of web-based applications that play an active role in design, engineering and logistics collaborations. Customers have 24/7 access to critical information and customized reports. Design collaboration focuses on content availability and accessibility, with close attention paid to complete, accurate and up-to-date information at each stage of the design life cycle. Engineering collaboration includes online access to engineering lots, wafer yields, wafer acceptance test (WAT) analysis, and quality and reliability data. Logistics collaboration provides access to data on any given order status in wafer fabrication, backend process and shipping.

Customer Satisfaction

To measure customer satisfaction and to ensure that customer needs are fully understood, TSMC conducts an annual customer satisfaction survey (ACSS) with most active customers, either by web or interview through an independent consultancy.

Complementary to the survey, quarterly business reviews (QBRs) are also conducted by the customer service team so that customers can give feedback to TSMC on a regular basis. Through surveys, feedback reviews and intensive interaction with customers, TSMC is able to stay in close touch and provide better service and collaboration.

Customer feedback is routinely reviewed, analyzed and then used to develop appropriate improvement plans, all in all becoming an integral part of the customer satisfaction process with a complete closed loop. TSMC uses data derived from the survey as a base to identify future focus areas. TSMC acts on the belief that customer satisfaction leads to healthy relationships, and healthy relationships lead to higher levels of retention and expansion.

Customers that Accounted for at Least 10% of Annual Consolidated Net Revenue

Unit: NT\$ thousands

Customer	2018			2017		
	Net Revenue (Note)	As % of 2018 Total Net Revenue	Relation to TSMC	Net Revenue (Note)	As % of 2017 Total Net Revenue	Relation to TSMC
Customer A	224,690,695	22%	None	220,463,127	23%	None
Others	806,782,862	78%		756,984,114	77%	
Total Net Revenue	1,031,473,557	100%		977,447,241	100%	

Note: Commencing in 2018, the Company began to break down the net revenue by customer based on a new method which associates most estimated sales returns and allowances with individual sales transactions, as opposed to the previous method which allocated sales returns and allowances based on the aforementioned gross revenue. The Company believes the new method provides a more relevant breakdown than the previous one. On a comparable basis, the classification of 2017 has been revised accordingly.

- Reason for Increase or Decrease: No significant change.

5.4.2 Open Innovation Platform® (OIP) Initiative

Innovation has always been an exciting and challenging proposition. Competition among semiconductor companies continues to grow more intense in the face of increasing industry consolidation and the commoditization of technology at more mature, conventional levels. Companies must find ways to keep innovating in order to survive and prosper. One way to accelerate innovation is through active collaboration with external partners. At TSMC this is known as “Open Innovation®.” It is an “outside in” approach to complement traditional “inside out” methods. TSMC has adopted this path to innovate via its Open Innovation Platform® (OIP) initiative, which is a key part of the TSMC Grand Alliance.

TSMC announced the fifth OIP Alliance, the OIP Cloud Alliance, at the 2018 Open Innovation Platform® Ecosystem Forum. Inaugural members Amazon Web Services (AWS), Cadence, Microsoft Azure, and Synopsys worked jointly with TSMC to implement Open Innovation Platform Virtual Design Environment (OIP VDE), which enables semiconductor customers to design securely in the cloud. In TSMC’s enablement of OIP VDE, both digital RTL-to-GDSII and custom schematic-capture-to-GDSII design flows have been validated along with OIP collateral, including process technology files, PDKs, foundation IP and reference flows. To ensure low barriers to entry and high technical support levels, Cadence and Synopsys act as focal points helping customers to set up VDE and providing first-line support.

The OIP initiative is a comprehensive design technology infrastructure that encompasses all critical IC implementation areas to reduce design barriers and improve first-time silicon success. OIP promotes the speedy implementation of innovation amongst the semiconductor design community and its ecosystem partners using TSMC’s IP, design implementation, design for manufacturability (DFM) capabilities, process technology and backend services.

Crucial to OIP are ecosystem interfaces and collaborative components initiated and supported by TSMC that more efficiently empower innovation throughout the supply chain and, in turn, drive the creation and sharing of new revenue and profits. TSMC’s active accuracy assurance (AAA) initiative is key to OIP, providing the accuracy and quality required by the ecosystem interfaces and collaborative components.

TSMC’s Open Innovation® model brings together the creative thinking of customers and partners under the common goal of shortening each of the following: design time, time-to-volume, time-to-market and, ultimately, time-to-revenue. The model features:

- the foundry segment’s earliest and most comprehensive electronic design automation (EDA) certification program, delivering timely design tool enhancement required by new process technologies
- the foundry segment’s largest, most comprehensive and most robust silicon-proven IP (intellectual properties) and library portfolio, and
- comprehensive design ecosystem alliance programs covering market-leading EDA, library, IPs, and design service partners.

TSMC’s OIP alliance consists of 23 EDA partners, four cloud partners, 39 IP partners, 20 design center alliance (DCA) partners, and seven value chain aggregator (VCA) partners. TSMC and its partners work together proactively and engage much earlier and deeper than ever before in order to address mounting design challenges at advanced technology nodes. Through this early and intensive collaboration effort, TSMC’s OIP is able to deliver the needed design infrastructure with timely enhancement of EDA tools, early availability of critical IPs and quality design services when customers need them. Taking full advantage of the process technologies once they reach production-ready maturity is critical to customers’ success.

TSMC’s OIP partner management portal facilitates communication with its ecosystem partners for efficient business productivity. Designed with a highly intuitive interface, this portal can be accessed via a direct link from TSMC-Online™.

In October TSMC held its 2018 Open Innovation Platform® (OIP) Ecosystem Forum in Santa Clara, California and in Nanjing. This annual event demonstrates how TSMC and its ecosystem partners jointly develop design solutions on top of TSMC’s advanced technologies through OIP collaboration. At the forum, TSMC delivered key messages of the new OIP Cloud Alliance and collaborated solution of OIP Virtual Design Environment (OIP VDE) with the goal of further enhancing customer design productivity by leveraging the flexibility and computing power of the Cloud, and presented on EDA and IP readiness of 5nm, 7nm,

7nm+ and their respective power, performance and area (PPA) benefits. TSMC also showed the progress in 22nm technology, in automotive design enablement platforms in 16FFC and 7nm, and in the availability of various 3D IC reference flows covering a wide range of applications. The readiness of design ecosystem solutions will help customers design applications to capture the market opportunities in mobile, high-performance computing, the Internet of Things and automotive. Followed with invited keynote from Microsoft, highlighting the new collaboration with TSMC in Cloud computing to facilitate customer’s adoption of Cloud resources and apply them securely in their semiconductor designs.

5.5 Human Capital

Human capital is TSMC’s most treasured asset. In this regard, the Company’s main role is to provide jobs with challenging, meaningful work in a safe environment with excellent compensation and benefits. TSMC goes beyond this, however, by actively encouraging employees to nurture and enjoy a healthy family life, to develop outside interests, to expand social participation, and, in general, live a happy life.

TSMC participates in the Responsible Business Alliance (RBA) as a full member and abides by local laws. The Company refrains from forcing employees to do unwilling labor service, listens to the employees, keeps communication channels open, respects the right of all workers to form and join trade unions of their own choosing as well as to refrain from such activities as they choose.

5.5.1 TSMC Human Rights Policy

TSMC abides local laws and regulations in all countries and regions where we operate, and upholds the human rights of workers, including regular, contract and temporary employees, and interns. We treat all workers with dignity and respect as understood by the international human rights standards such as *The International Bill of Human Rights*, *The International Labour Organization’s Declaration on Fundamental Principles and Rights at Work*, and *Ten Principles of the United Nations Global Compact*. We also align our actions with the *Responsible Business Alliance Code of Conduct*. And *TSMC’s Supplier Code of Conduct* requires our suppliers to follow the same standards.

5.5.2 Workforce Structure

At the end of 2018, TSMC had 48,752 employees worldwide, including 5,294 managers, 22,285 professionals, 4,109 assistants, and 17,064 technicians. The following table summarizes TSMC’s workforce as of the end of February, 2019:

		12/31/2017	12/31/2018	02/28/2019
Job	Managers	5,107	5,294	5,344
	Professionals	21,895	22,285	22,479
	Assistant Engineer/Clerical	4,082	4,109	4,119
	Technician	17,518	17,064	16,977
Total		48,602	48,752	48,919
Gender	Male (%)	60.7%	61.3%	61.5%
	Female (%)	39.3%	38.7%	38.5%
Education	Ph.D.	4.6%	4.7%	4.7%
	Master's	41.5%	42.6%	43.0%
	Bachelor's	26.3%	25.9%	25.7%
	Other Higher Education	11.4%	11.1%	11.0%
	High School	16.2%	15.7%	15.6%
Average Years of Age		35.7	36.4	36.5
Average Years of Service		8.4	9.1	9.2

5.5.3 Recruitment

The key elements of TSMC’s success and growth depend on our employees, who share common vision and values. In order to strengthen growth momentum, the Company is dedicated to recruiting top-notch professionals for all positions available. TSMC is an equal opportunity employer and operates on the principles of open and fair recruitment. The hiring principles are integrity and ability, and the Company evaluates all candidates according to their qualifications as related to the requirement of each position without regard to race, gender, age, religion, nationality or political affiliation.

To enable TSMC’s continuous growth, the Company recruited more than 2,300 employees in 2018, including over 2,000 managers and professionals, as well as over 300 assistants and technicians.

5.5.4 People Development

Employee development, an integral and critical factor for the growth of any company, should be goal oriented, disciplined and planned. TSMC is committed to expanding and fulfilling employee potential by providing meaningful work in a global workplace. TSMC is also committed to cultivating a consistent and diverse learning environment. To this end, the Company has initiated the “TSMC Employee Training and Education Procedure” to ensure the Company’s and the individuals’ development objectives can be achieved through the integration of internal and external training resources with internal rotation opportunities.

To help employees reach their potential, TSMC dedicates to do the on-the-job training and systematic job rotation; more than that, TSMC provides various learning resources and channels to encourage employees to do self-learning to further uplift their performance and potential. TSMC integrates internal and external resources and designs diversified development programs based on business objectives, the nature of the individual’s job, work performance and career development path. The Company provides employees a diverse network of learning resources, including on-the-job training, classroom training, e-learning, coaching, mentoring and job rotation; it also creates an educational atmosphere through learning activities in response to organization development requirements and employee capability enhancement goals.

The Company provides employees with a wide range of onsite general, professional and managerial training programs. In addition to engaging external experts as trainers, hundreds of TSMC employees are trained to be qualified instructors to deliver their valuable knowhow in internal training courses.

TSMC’s training programs include:

- New employee – for basic training and job orientation. In addition, the newcomers’ managers and the Company’s well-established buddy system are in place to support new hires in their assimilation process regarding both corporate culture and work requirements.
- General – refers to training required by government regulations and/or Company policies, as well as training on general subjects for all employees or employees in various job functions. Topics include industry-specific safety, workplace health and safety, quality, fab emergency response and personal effectiveness management.

- Professional/functional – technical and professional training required by different functions within the Company. TSMC offers training courses on equipment engineering, process engineering, accounting, information technology, and so forth.
- Management – management development programs tailored to the needs of managers at all levels based on their managerial capabilities and responsibilities, including new, experienced, and senior managers; optional courses are also available.
- Direct labor – training for production-line employees to acquire the knowledge, skills and approaches they need to perform their jobs well and to pass certification for operating equipment. Includes direct labor skill training, technician “Train the Trainer” training, and manufacturing leadership training.
- Customized – programs tailored to the needs of the organization and/or the employee’s development plan.

In 2018, TSMC conducted 989 internal training sessions and provided nearly 530,000 hours of training and a total of more than 540,000 attendees participated. On average, each employee attended over 11 hours of training and TSMC spent over NT\$82 million on the learning and development for employees.

Apart from internal training resources, our employees are also subsidized when pursuing external short-term courses, for-credit classes and degrees.

5.5.5 Compensation

Employment at TSMC entitles employees to a comprehensive compensation and benefits program above the industry average. TSMC provides a diversified compensation program that is competitive externally, fair internally, and adapted locally. TSMC adheres to the philosophy of sharing wealth with employees in order to attract, retain, develop, motivate and reward talented employees. With sound business results over the past 30 years, the actual total compensation received by employees has been above the industry’s average.

TSMC’s compensation program includes a monthly salary, employee cash bonuses based on quarterly business results, and an employee profit sharing bonus based on annual profits.

The purpose of the employee cash bonus and profit sharing bonus programs is to reward employee contributions appropriately, to encourage employees to work consistently

toward ensuring the success of TSMC, and to align employees’ interests with those of TSMC’s shareholders so as to achieve wins for the Company, shareholders and employees. The Company determines the amount of the cash bonus and profit sharing bonus based on operating results and industry practice in the Republic of China. The amount and distribution of the employee bonuses are recommended by the Compensation Committee to the Board of Directors for approval. Individual rewards are based on each employee’s job responsibility, contribution and performance.

The same philosophy applies to TSMC’s compensation programs in overseas subsidiaries. In addition to providing employees of TSMC’s overseas subsidiaries with a locally competitive base salary, the Company grants annual bonuses as a part of total compensation. The annual bonuses are granted in line with local regulations, market practices, and the overall operating performance of each subsidiary, to encourage employee commitment and development with the Company.

5.5.6 Employee Engagement

The Company encourages employees to maintain a healthy and well-balanced life while pursuing their goals effectively. TSMC continuously facilitates employee communication and provides employee caring, benefit, rewards and recognition programs.

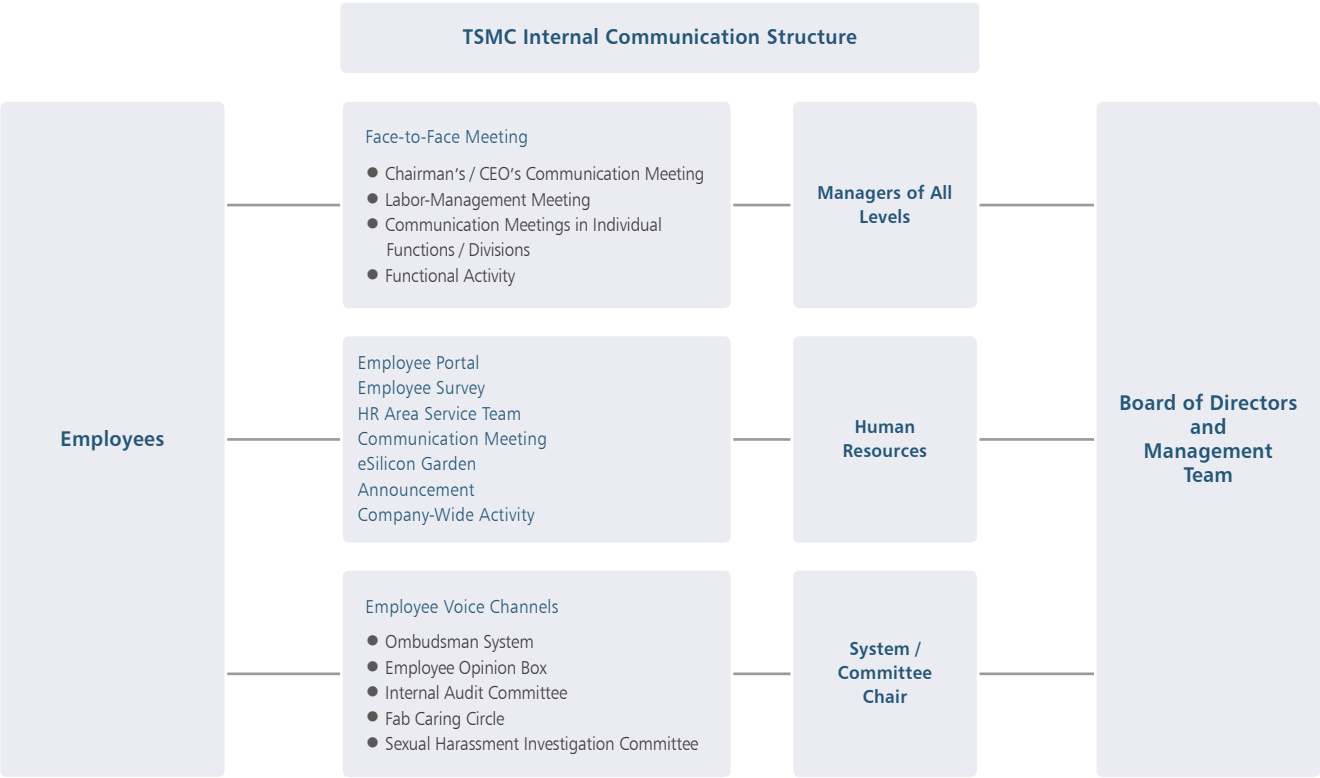
Employee Communication

TSMC values two-way communication and is committed to keeping communication channels open and transparent for management, subordinates and peers. We devoted to ensure that employees are able to openly communicate and share ideas and concerns with management regarding working conditions and management practices without fear of discrimination, reprisal, intimidation or harassment.

TSMC makes continuous efforts listen to the voice of employees and to facilitate mutual and timely employee communication, based on multiple channels and platforms, which in turn fosters harmonious labor relations and creates a win-win situation for the Company and employees.

- A host of two-way communication channels, including:
- Communication meetings for various levels of managers and employees, for example, Chairman’s/ CEO’s communication meeting, and communication meetings in individual functions/ divisions.

- The Company holds quarterly labor-management meetings to provide business updates, and invite employees to discuss labor conditions, and employee welfare activities.
- Unperiodical employee satisfaction surveys to selected employees, with follow-up actions based on the survey findings.
- Core value surveys, held biennially, to understand the Company’s implementation of core values and employees’ commitment and engagement.
- The employee portal, *myTSMC*, an internal website featuring the Founder’s, Chairman’s, and CEO’s talks, corporate messages, executive interviews, and other activities of interest to employees.
- *eSilicon Garden*, a website hosting TSMC’s internal electronic publications providing real-time updates on major activities of the Company, as well as inspirational content featuring outstanding teams and individuals.
- Two reporting channels for complaints regarding management, financial, auditing, ethics and business conduct issues:
 - The whistleblower reporting system administered by the audit committee
 - The ombudsman system administered by senior manager appointed by the CEO
- The employee opinion box, which provides an opportunity for employees to submit suggestions or opinions regarding their work and the overall work environment.
- The Fab Caring Circle in each fab addresses the issues related to employees’ work and personal life; the system is dedicated mainly to the Company’s direct labor workers.
- Sexual harassment investigation committee: This channel is dedicated to ensuring a work environment free from the threat of sexual harassment; the committee consists of three directors, one from human resources, one from legal affairs, and the third from other organizations.



TSMC has many internal communication channels, a major reason why the relationship between management and employees has been quite harmonious. The Company respects the right of all workers to form and join trade unions of their own choosing as well as the right to refrain from such activities. No employees have pursued this avenue or issued a request to form a union so far.

In 2018 and in 2019 as of the date of this annual report, there have been no losses resulting from labor disputes.

Employee Benefit Programs

- Convenient onsite services and amenities: cafeterias, laundry services, convenience stores, bakery, juice bar, coffee shop, travel, banking, and commuting assistance are accessible for employees in the fabs.
- Comprehensive health management services, including programs for weight control, in-fab clinic and dentist services, smoking cessation, massage service, cancer screening, and blood donation, as well as mental and health seminars to raise personal health awareness. Other health management programs include post health-exam follow-up activities, prevention of cerebrovascular disease, ergonomic hazards management, and maternal care and protection. Employee assistance programs include five free annual counseling hours for mental health and financial/legal issues, with extensions available depending on the individual’s needs.
- Diverse employee welfare programs: including 80 hobby clubs, 70 presentations covering various topics, 14 art events, sports day, and family day. In addition, holiday bonuses, marriage bonuses, condolence allowances and emergency subsidies are also available to address employees’ needs.
- Premium sports centers: a variety of workout facilities available to all employees and their families, as well as exercise sessions conducted by professional instructors to improve employee wellness.
- Flexible preschool service: childcare service, operated to meet employees’ work schedules, is available in four fabs in Hsinchu, Taichung, and Tainan.

Employee Recognition

TSMC sponsors various internal award programs to recognize outstanding achievements by employees, both individual and at a team level. With these award programs, TSMC aims to encourage continued employee development, which, in turn, adds to the Company’s competitive advantage.

The award programs include:

- TSMC Medal of Honor: recognizes those who contribute significantly to the Company’s business performance.
- TSMC Academy: recognizes outstanding scientists and engineers whose individual technical capabilities make significant contributions to the Company.
- TSMC Excellent Labor Award: recognizes technicians and group leaders whose outstanding performances make significant contributions to the Company.
- Total Quality Excellence for each fab: recognizes employees’ continuous efforts in creating value for the Company.
- Service Award: TSMC’s recognition and appreciation of senior employees and their long-term commitment and dedication to the Company.
- Excellent Instructor Award: praises the outstanding performance and contribution of the Company’s internal instructors in training courses for employees.
- Function-wide awards dedicated to innovation, such as the Idea Forum and TQE awards, which recognize employees’ initiative and continuous implementation of innovative practices.

Apart from corporate-wide awards, TSMC encourages employees to participate in external talent activities and competitions. In 2018, distinguished TSMC employees continued to be recognized through a host of national awards, including the National Model Labor Award, the Outstanding Young Engineer Award, and the National Manager Excellence Award.

5.5.7 Retention

Overall employee satisfaction with the Company’s efforts is reflected in the 2018 TSMC core values survey which is taken biennially. According to this survey, 98% of participants agreed that they are willing to commit fully in their work to make TSMC an even more successful company; while 96% concurred with the statement that they are willing to contribute their talents to TSMC and grow together with the Company for the next five years.

In 2018, the Company recorded a manageable turnover rate of 4.5%. Although a bit lower than a “healthy” outflow often defined as 5% to 10%, the Company is still in continuous growth mode resulting in 2,300 new staff hired in 2018, accounting for 4.8% of all employees and helping the organization stay energized.

5.5.8 Retirement Policy

TSMC’s retirement policy is set according to the labor standard laws and labor pension practices of various respective regions. With the Company’s sound financial system, TSMC ensures employees solid pension contributions and payments, which encourages employees to set long-term career plans and further deepens their commitment to TSMC.

5.6 Material Contracts

Research and Development Funding Agreement (Expired)

Term of Agreement:

10/31/2012 - 12/31/2017

Contracting Party:

ASML Holding N.V. (ASML)

Summary:

TSMC shall provide EUR276 million to ASML’s research and development programs from 2013 to 2017.

Note: TSMC is not currently party to any other material contract, other than contracts entered into in the ordinary course of our business. The Company’s “Significant Contingent Liabilities and Unrecognized Commitments” are disclosed in Annual Report section (II), Financial Statements, page 82.



Financial Highlights and Analysis

6

6.1 Financial Highlights

6.1.1 Condensed Balance Sheet

Condensed Balance Sheet from 2014 to 2018 (Consolidated) (Note 1)

Unit: NT\$ thousands

Item \ Year	2014 (Adjusted)	2015	2016	2017	2018
Current Assets	626,565,639	746,743,991	817,729,126	857,203,110	951,679,721
Long-term Investments (Note 2)	30,056,279	34,993,583	46,153,916	41,569,074	29,304,796
Property, Plant and Equipment	818,198,801	853,470,392	997,777,687	1,062,542,322	1,072,050,279
Intangible Assets	13,531,510	14,065,880	14,614,846	14,175,140	17,002,137
Other Assets (Note 3)	6,696,857	8,244,452	10,179,727	16,371,997	20,091,105
Total Assets	1,495,049,086	1,657,518,298	1,886,455,302	1,991,861,643	2,090,128,038
Current Liabilities					
Before Distribution	201,013,629	212,228,594	318,239,273	358,706,680	340,542,586
After Distribution	317,697,110	367,810,877	499,751,936	566,149,724	(Note 4)
Noncurrent Liabilities	247,707,125	222,655,225	178,164,903	110,395,320	72,089,056
Total Liabilities					
Before Distribution	448,720,754	434,883,819	496,404,176	469,102,000	412,631,642
After Distribution	565,404,235	590,466,102	677,916,839	676,545,044	(Note 4)
Equity Attributable to Shareholders of the Parent					
Capital Stock	259,296,624	259,303,805	259,303,805	259,303,805	259,303,805
Capital Surplus	55,989,922	56,300,215	56,272,304	56,309,536	56,315,932
Retained Earnings					
Before Distribution	705,165,274	894,293,586	1,072,008,169	1,233,362,010	1,376,647,841
After Distribution	588,481,793	738,711,303	890,495,506	1,025,918,966	(Note 4)
Others	25,749,291	11,774,113	1,663,983	(26,917,818)	(15,449,913)
Equity Attributable to Shareholders of the Parent					
Before Distribution	1,046,201,111	1,221,671,719	1,389,248,261	1,522,057,533	1,676,817,665
After Distribution	929,517,630	1,066,089,436	1,207,735,598	1,314,614,489	(Note 4)
Noncontrolling Interests	127,221	962,760	802,865	702,110	678,731
Total Equity					
Before Distribution	1,046,328,332	1,222,634,479	1,390,051,126	1,522,759,643	1,677,496,396
After Distribution	929,644,851	1,067,052,196	1,208,538,463	1,315,316,599	(Note 4)

Note 1: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version. The financial statements of 2014 were adjusted to retrospectively apply newly effected GAAP. Adjustments included a decrease of NT\$84,759 thousand in total assets, a decrease of NT\$737,344 thousand in total liabilities before distribution and an increase of NT\$652,585 thousand in total equity before distribution.

Note 2: Long-term investments as of December 31, 2014, 2015, 2016 and 2017 include noncurrent available-for-sale financial assets, held-to-maturity financial assets, financial assets carried at cost and investments accounted for using equity method. Starting from 2018, upon initial application of IFRS 9 "Financial Instruments", the category includes noncurrent financial assets at fair value through other comprehensive income, and noncurrent financial assets at amortized cost, and investments accounted for using equity method.

Note 3: Other assets consist of deferred income tax assets, refundable deposits, and other noncurrent assets.

Note 4: Pending shareholders' approval.

Condensed Balance Sheet from 2014 to 2018 (Unconsolidated) (Note 1)

Unit: NT\$ thousands

Year Item	2014 (Adjusted)	2015	2016	2017	2018
Current Assets	370,949,497	426,913,080	443,781,164	436,769,337	469,966,106
Long-term Investments (Note 2)	242,395,596	326,330,737	397,290,976	464,401,415	550,524,494
Property, Plant and Equipment	796,684,361	831,784,912	979,401,337	1,016,355,970	1,025,286,941
Intangible Assets	8,996,810	9,391,418	10,047,991	9,870,127	12,429,930
Other Assets (Note 3)	3,935,389	5,265,368	6,816,676	11,992,542	17,253,537
Total Assets	1,422,961,653	1,599,685,515	1,837,338,144	1,939,389,391	2,075,461,008
Current Liabilities					
Before Distribution	178,261,092	194,299,278	308,177,214	308,383,240	328,060,518
After Distribution	294,944,573	349,881,561	489,689,877	515,826,284	(Note 4)
Noncurrent Liabilities	198,499,450	183,714,518	139,912,669	108,948,618	70,582,825
Total Liabilities					
Before Distribution	376,760,542	378,013,796	448,089,883	417,331,858	398,643,343
After Distribution	493,444,023	533,596,079	629,602,546	624,774,902	(Note 4)
Equity					
Capital Stock	259,296,624	259,303,805	259,303,805	259,303,805	259,303,805
Capital Surplus	55,989,922	56,300,215	56,272,304	56,309,536	56,315,932
Retained Earnings					
Before Distribution	705,165,274	894,293,586	1,072,008,169	1,233,362,010	1,376,647,841
After Distribution	588,481,793	738,711,303	890,495,506	1,025,918,966	(Note 4)
Others	25,749,291	11,774,113	1,663,983	(26,917,818)	(15,449,913)
Total Equity					
Before Distribution	1,046,201,111	1,221,671,719	1,389,248,261	1,522,057,533	1,676,817,665
After Distribution	929,517,630	1,066,089,436	1,207,735,598	1,314,614,489	(Note 4)

Note 1: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version. The financial statements of 2014 were adjusted to retrospectively apply newly effected GAAP. Adjustments included a decrease of NT\$82,771 thousand in total assets, a decrease of NT\$735,381 thousand in total liabilities before distribution and an increase of NT\$652,610 thousand in total equity before distribution.

Note 2: Long-term investments as of December 31, 2014, 2015, 2016 and 2017 include held-to-maturity financial assets, financial assets carried at cost and investments accounted for using equity method. Starting from 2018, upon initial application of IFRS 9 "Financial Instruments", the category includes noncurrent financial assets at fair value through other comprehensive income, and noncurrent financial assets at amortized cost, and investments accounted for using equity method.

Note 3: Other assets consist of deferred income tax assets, refundable deposits, and other noncurrent assets.

Note 4: Pending shareholders' approval.

6.1.2 Condensed Statement of Comprehensive Income

Condensed Statement of Comprehensive Income from 2014 to 2018 (Consolidated) (Note 1)

Unit: NT\$ thousands (Except EPS: NT\$)

Year Item	2014 (Adjusted)	2015	2016	2017	2018
Net Revenue	762,806,465	843,497,368	947,938,344	977,447,241	1,031,473,557
Gross Profit	377,722,016	410,394,893	474,832,098	494,826,402	497,874,253
Income from Operations	295,870,309	320,047,775	377,957,778	385,559,223	383,623,524
Non-operating Income and Expenses	6,208,048	30,381,136	8,001,602	10,573,807	13,886,739
Income before Income Tax	302,078,357	350,428,911	385,959,380	396,133,030	397,510,263
Net Income	263,763,958	306,556,167	334,338,236	343,146,848	351,184,406
Other Comprehensive Income for the Year, Net of Income Tax	11,805,021	(14,714,182)	(11,067,189)	(28,821,631)	9,836,976
Total Comprehensive Income for the Year	275,568,979	291,841,985	323,271,047	314,325,217	361,021,382
Net Income (Loss) Attributable to:					
Shareholders of the Parent	263,881,771	306,573,837	334,247,180	343,111,476	351,130,884
Noncontrolling Interests	(117,813)	(17,670)	91,056	35,372	53,522
Total Comprehensive Income (Loss) Attributable to:					
Shareholders of the Parent	275,670,991	291,867,757	323,186,736	314,294,993	360,965,015
Noncontrolling Interests	(102,012)	(25,772)	84,311	30,224	56,367
Basic/Diluted Earnings Per Share (Note 2)	10.18	11.82	12.89	13.23	13.54

Note 1: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version. The financial statements of 2014 were adjusted to retrospectively apply newly effected GAAP. Adjustments included a decrease of NT\$12,359 thousand in gross profit, a decrease of NT\$19,984 thousand in income from operations, a decrease of NT\$16,911 thousand in net income and a decrease of NT\$46,054 thousand in total comprehensive income for the year.

Note 2: Based on weighted average shares outstanding in each year.

Condensed Statement of Comprehensive Income from 2014 to 2018 (Unconsolidated) (Note 1)

Unit: NT\$ thousands (Except EPS: NT\$)

Year Item	2014 (Adjusted)	2015	2016	2017	2018
Net Revenue	757,152,389	837,046,888	936,387,291	969,136,109	1,023,925,713
Gross Profit	366,899,120	397,708,840	461,808,296	478,937,691	492,955,501
Income from Operations	290,640,302	313,408,698	369,730,533	374,690,117	384,027,838
Non-operating Income and Expenses	10,363,515	36,579,970	15,458,427	18,626,059	12,170,315
Income before Income Tax	301,003,817	349,988,668	385,188,960	393,316,176	396,198,153
Net Income	263,881,771	306,573,837	334,247,180	343,111,476	351,130,884
Other Comprehensive Income for the Year, Net of Income Tax	11,789,220	(14,706,080)	(11,060,444)	(28,816,483)	9,834,131
Total Comprehensive Income for the Year	275,670,991	291,867,757	323,186,736	314,294,993	360,965,015
Basic/Diluted Earnings Per Share (Note 2)	10.18	11.82	12.89	13.23	13.54

Note 1: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version. The financial statements of 2014 were adjusted to retrospectively apply newly effected GAAP. Adjustments included a decrease of NT\$12,583 thousand in gross profit, a decrease of NT\$19,356 thousand in income from operations, a decrease of NT\$17,023 thousand in net income and a decrease of NT\$46,150 thousand in total comprehensive income for the year.

Note 2: Based on weighted average shares outstanding in each year.

6.1.3 Financial Analysis

Financial Analysis from 2014 to 2018 (Consolidated) (Note 1)

		2014 (Adjusted)	2015	2016	2017	2018
Capital Structure Analysis	Debts Ratio (%)	30.01	26.24	26.31	23.55	19.74
	Long-term Fund to Property, Plant and Equipment (%)	158.16	169.34	157.17	153.70	163.20
Liquidity Analysis	Current Ratio (%)	311.70	351.86	256.95	238.97	279.46
	Quick Ratio (%)	278.03	319.58	241.34	217.94	248.76
	Times Interest Earned (Times)	94.34	110.84	117.74	119.95	131.28
Operating Performance Analysis	Average Collection Turnover (Times)	8.12	8.37	8.78	7.74	8.19
	Days Sales Outstanding	44.95	43.61	41.57	47.16	44.57
	Average Inventory Turnover (Times)	7.42	6.49	8.18	7.88	6.02
	Average Inventory Turnover Days	49.19	56.24	44.62	46.32	60.63
	Average Payment Turnover (Times)	19.39	20.10	20.11	16.82	16.56
	Property, Plant and Equipment Turnover (Times)	0.95	1.01	1.02	0.95	0.97
	Total Assets Turnover (Times)	0.55	0.54	0.53	0.50	0.51
Profitability Analysis	Return on Total Assets (%)	19.33	19.62	19.03	17.84	17.34
	Return on Equity Attributable to Shareholders of the Parent (%)	27.86	27.04	25.60	23.57	21.95
	Operating Income to Paid-in Capital Ratio (%)	114.10	123.43	145.76	148.69	147.94
	Pre-tax Income to Paid-in Capital Ratio (%)	116.50	135.14	148.84	152.77	153.30
	Net Margin (%)	34.58	36.34	35.27	35.11	34.05
	Basic Earnings Per Share (NT\$)	10.18	11.82	12.89	13.23	13.54
	Diluted Earnings Per Share (NT\$)	10.18	11.82	12.89	13.23	13.54
Cash Flow	Cash Flow Ratio (%)	209.70	249.67	169.63	163.17	168.54
	Cash Flow Adequacy Ratio (%)	92.15	103.82	108.57	112.41	113.11
	Cash Flow Reinvestment Ratio (%)	13.04	13.76	11.51	11.08	9.06
Leverage	Operating Leverage	2.15	2.26	2.15	2.16	2.28
	Financial Leverage	1.01	1.01	1.01	1.01	1.01
Industry Specific Key Performance Indicator	Billing Utilization Rate (%) (Note 2)	97	93	92	91	87
	Advanced Technologies (28-nanometer and below) Percentage of Wafer Sales (%)	42	48	54	58	63
	Sales Growth (%)	27.77	10.58	12.38	3.11	5.53
	Net Income Growth (%)	40.25	16.18	9.03	2.65	2.34

Analysis of deviation of 2018 vs. 2017 over 20%:
Average inventory turnover (Times) decreased by 24% and average inventory turnover days increased by 31% mainly due to an increase in raw wafers, and a higher level of work-in-process inventories driven by 7nm ramping.

Note 1: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version.
Note 2: Capacity includes wafers committed by Vanguard and SSMC.

* Glossary

1. Capital Structure Analysis
- (1) Debt Ratio = Total Liabilities / Total Assets
- (2) Long-term Fund to Property, Plant and Equipment Ratio = (Shareholders' Equity + Noncurrent Liabilities) / Net Property, Plant and Equipment
2. Liquidity Analysis
- (1) Current Ratio = Current Assets / Current Liabilities
- (2) Quick Ratio = (Current Assets - Inventories - Prepaid Expenses) / Current Liabilities
- (3) Times Interest Earned = Earnings before Interest and Taxes / Interest Expenses
3. Operating Performance Analysis
- (1) Average Collection Turnover = Net Sales / Average Trade Receivables
- (2) Days Sales Outstanding = 365 / Average Collection Turnover
- (3) Average Inventory Turnover = Cost of Sales / Average Inventory
- (4) Average Inventory Turnover Days = 365 / Average Inventory Turnover
- (5) Average Payment Turnover = Cost of Sales / Average Trade Payables
- (6) Property, Plant and Equipment Turnover = Net Sales / Average Net Property, Plant and Equipment
- (7) Total Assets Turnover = Net Sales / Average Total Assets

4. Profitability Analysis
- (1) Return on Total Assets = (Net Income + Interest Expenses * (1 - Effective Tax Rate)) / Average Total Assets
- (2) Return on Equity Attributable to Shareholders of the Parent = Net Income Attributable to Shareholders of the Parent / Average Equity Attributable to Shareholders of the Parent
- (3) Operating Income to Paid-in Capital Ratio = Operating Income / Paid-in Capital
- (4) Pre-tax Income to Paid-in Capital Ratio = Income before Tax / Paid-in Capital
- (5) Net Margin = Net Income / Net Sales
- (6) Earnings Per Share = (Net Income Attributable to Shareholders of the Parent - Preferred Stock Dividend) / Weighted Average Number of Shares Outstanding
5. Cash Flow
- (1) Cash Flow Ratio = Net Cash Provided by Operating Activities / Current Liabilities
- (2) Cash Flow Adequacy Ratio = Five-year Sum of Cash from Operations / Five-year Sum of Capital Expenditures, Inventory Additions, and Cash Dividend
- (3) Cash Flow Reinvestment Ratio = (Cash Provided by Operating Activities - Cash Dividends) / (Gross Property, Plant and Equipment + Long-term Investments + Other Noncurrent Assets + Working Capital)
6. Leverage
- (1) Operating Leverage = (Net Sales - Variable Cost) / Income from Operations
- (2) Financial Leverage = Income from Operations / (Income from Operations - Interest Expenses)

Financial Analysis from 2014 to 2018 (Unconsolidated) (Note)

		2014 (Adjusted)	2015	2016	2017	2018
Capital Structure Analysis	Debt Ratio (%)	26.48	23.63	24.39	21.52	19.21
	Long-term Fund to Property, Plant and Equipment Ratio (%)	156.24	168.96	156.13	160.48	170.43
Liquidity Analysis	Current Ratio (%)	208.09	219.72	144.00	141.63	143.26
	Quick Ratio (%)	171.82	186.00	128.65	118.68	113.07
	Times Interest Earned (Times)	120.82	144.41	146.73	144.04	137.46
Operating Performance Analysis	Average Collection Turnover (Times)	8.29	8.58	8.89	7.86	8.45
	Days Sales Outstanding	44.02	42.54	41.07	46.44	43.21
	Average Inventory Turnover (Times)	7.90	6.87	8.56	8.39	6.31
	Average Inventory Turnover Days	46.18	53.11	42.63	43.49	57.89
	Average Payment Turnover (Times)	18.64	19.73	19.04	16.39	16.22
	Property, Plant and Equipment Turnover (Times)	0.97	1.03	1.03	0.97	1.00
	Total Assets Turnover (Times)	0.58	0.55	0.54	0.51	0.51
Profitability Analysis	Return on Total Assets (%)	20.22	20.42	19.58	18.29	17.62
	Return on Equity (%)	27.86	27.04	25.60	23.57	21.95
	Operating Income to Paid-in Capital Ratio (%)	112.09	120.87	142.59	144.50	148.10
	Pre-tax Income to Paid-in Capital Ratio (%)	116.08	134.97	148.55	151.68	152.79
	Net Margin (%)	34.85	36.63	35.70	35.40	34.29
	Basic Earnings Per Share (NT\$)	10.18	11.82	12.89	13.23	13.54
	Diluted Earnings Per Share (NT\$)	10.18	11.82	12.89	13.23	13.54
Cash Flow	Cash Flow Ratio (%)	230.29	264.94	172.81	184.45	173.17
	Cash Flow Adequacy Ratio (%)	90.72	102.35	107.06	99.42	113.52
	Cash Flow Reinvestment Ratio (%)	13.30	13.85	11.74	10.98	9.23
Leverage	Operating Leverage	2.19	2.31	2.19	2.22	2.28
	Financial Leverage	1.01	1.01	1.01	1.01	1.01

Analysis of deviation of 2018 vs. 2017 over 20%:
Average inventory turnover (Times) decreased by 25% and average inventory turnover days increased by 33% mainly due to an increase in raw wafers, and a higher level of work-in-process inventories driven by 7nm ramping.

Note: The financial statements for 2014-2018 were prepared in accordance with 2013 Taiwan-IFRSs version.

* Glossary

1. Capital Structure Analysis
- (1) Debt Ratio = Total Liabilities / Total Assets
- (2) Long-term Fund to Property, Plant and Equipment Ratio = (Shareholders' Equity + Noncurrent Liabilities) / Net Property, Plant and Equipment
2. Liquidity Analysis
- (1) Current Ratio = Current Assets / Current Liabilities
- (2) Quick Ratio = (Current Assets - Inventories - Prepaid Expenses) / Current Liabilities
- (3) Times Interest Earned = Earnings before Interest and Taxes / Interest Expenses
3. Operating Performance Analysis
- (1) Average Collection Turnover = Net Sales / Average Trade Receivables
- (2) Days Sales Outstanding = 365 / Average Collection Turnover
- (3) Average Inventory Turnover = Cost of Sales / Average Inventory
- (4) Average Inventory Turnover Days = 365 / Average Inventory Turnover
- (5) Average Payment Turnover = Cost of Sales / Average Trade Payables
- (6) Property, Plant and Equipment Turnover = Net Sales / Average Net Property, Plant and Equipment
- (7) Total Assets Turnover = Net Sales / Average Total Assets
4. Profitability Analysis
- (1) Return on Total Assets = (Net Income + Interest Expenses * (1 - Effective Tax Rate)) / Average Total Assets
- (2) Return on Equity = Net Income / Average Shareholders' Equity
- (3) Operating Income to Paid-in Capital Ratio = Operating Income / Paid-in Capital
- (4) Pre-tax Income to Paid-in Capital Ratio = Income before Tax / Paid-in Capital
- (5) Net Margin = Net Income / Net Sales
- (6) Earnings Per Share = (Net Income - Preferred Stock Dividend) / Weighted Average Number of Shares Outstanding
5. Cash Flow
- (1) Cash Flow Ratio = Net Cash Provided by Operating Activities / Current Liabilities
- (2) Cash Flow Adequacy Ratio = Five-year Sum of Cash from Operations / Five-year Sum of Capital Expenditures, Inventory Additions, and Cash Dividend
- (3) Cash Flow Reinvestment Ratio = (Cash Provided by Operating Activities - Cash Dividends) / (Gross Property, Plant and Equipment + Long-term Investments + Other Noncurrent Assets + Working Capital)
6. Leverage
- (1) Operating Leverage = (Net Sales - Variable Cost) / Income from Operations
- (2) Financial Leverage = Income from Operations / (Income from Operations - Interest Expenses)

6.1.4 Auditors’ Opinions from 2014 to 2018

Year	CPA	Audit Opinion
2014	Yih-Hsin Kao, Hung-Wen Huang	An Unqualified Opinion
2015	Yih-Hsin Kao, Hung-Wen Huang	An Unqualified Opinion
2016	Yih-Hsin Kao, Yu-Feng Huang	An Unmodified Opinion (Note)
2017	Yih-Hsin Kao, Yu-Feng Huang	An Unmodified Opinion (Note)
2018	Mei Yen Chiang, Yu-Feng Huang	An Unmodified Opinion (Note)

Note: Starting in 2016, the new auditing standard of the Republic of China requires “An Unqualified Opinion” be replaced by “An Unmodified Opinion”.

Deloitte & Touche
20F, No. 100, Songren Rd., Xinyi Dist., Taipei, Taiwan, R.O.C.
Tel: 886-2-2725-9988

6.1.5 Audit Committee’s Review Report

The Board of Directors has prepared the Company’s 2018 Business Report, Financial Statements, and proposal for allocation of earnings. The CPA firm of Deloitte & Touche was retained to audit TSMC’s Financial Statements and has issued an audit report relating to the Financial Statements. The Business Report, Financial Statements, and earnings allocation proposal have been reviewed and determined to be correct and accurate by the Audit Committee members of Taiwan Semiconductor Manufacturing Company Limited. According to relevant requirements of the Securities and Exchange Act and the Company Law, we hereby submit this report.

Taiwan Semiconductor Manufacturing Company Limited

Chairman of the Audit Committee: Sir Peter L. Bonfield



February 19, 2019

6.1.6 Financial Difficulties

The Company should disclose the financial impact to the Company if the Company and its affiliated companies have incurred any financial or cash flow difficulties in 2018 and as of the date of this Annual Report: None

6.1.7 Consolidated Financial Statements and Independent Auditors’ Report along with Parent Company Only
Financial Statements and Independent Auditors’ Report

Please refer to Annual Report section (II), Financial Statements.

6.2 Financial Status and Operating Results

6.2.1 Financial Status

Consolidated

Unit: NT\$ thousands

Item	2018	2017	Difference	%
Current Assets	951,679,721	857,203,110	94,476,611	11%
Long-term Investments (Note 1)	29,304,796	41,569,074	(12,264,278)	-30%
Property, Plant and Equipment	1,072,050,279	1,062,542,322	9,507,957	1%
Intangible Assets	17,002,137	14,175,140	2,826,997	20%
Other Assets (Note 2)	20,091,105	16,371,997	3,719,108	23%
Total Assets	2,090,128,038	1,991,861,643	98,266,395	5%
Current Liabilities	340,542,586	358,706,680	(18,164,094)	-5%
Noncurrent Liabilities	72,089,056	110,395,320	(38,306,264)	-35%
Total Liabilities	412,631,642	469,102,000	(56,470,358)	-12%
Capital Stock	259,303,805	259,303,805	0	0%
Capital Surplus	56,315,932	56,309,536	6,396	0%
Retained Earnings	1,376,647,841	1,233,362,010	143,285,831	12%
Others	(15,449,913)	(26,917,818)	11,467,905	-43%
Equity Attributable to Shareholders of the Parent	1,676,817,665	1,522,057,533	154,760,132	10%
Total Equity	1,677,496,396	1,522,759,643	154,736,753	10%

Note 1: Long-term investments as of December 31, 2017 include noncurrent available-for-sale financial assets, held-to-maturity financial assets, financial assets carried at cost and investments accounted for using equity method. Starting from 2018, upon initial application of IFRS 9 "Financial Instruments", the category includes noncurrent financial assets at fair value through other comprehensive income, and noncurrent financial assets at amortized cost, and investments accounted for using equity method.

Note 2: Other assets consist of deferred income tax assets, refundable deposits, and other noncurrent assets.

• Analysis of Deviation over 20%

Decrease in long-term investments: The decrease was mainly due to decrease in financial assets at amortized cost.
Increase in other assets: The increase was mainly due to increase in deferred income tax assets and refundable deposits.
Decrease in noncurrent liabilities: The decrease was mainly due to reclassification of bonds payable due in 1 year to current liabilities and decrease in guarantee deposits.
Increase in other equity: The increase was mainly due to increase in currency exchange gain arising from translation of foreign operations in 2018.

• Major Impact on Financial Position

The above deviations had no major impact on TSMC’s financial position.

• Future Plan on Financial Position: Not applicable.

Unconsolidated

Unit: NT\$ thousands

Item	2018	2017	Difference	%
Current Assets	469,966,106	436,769,337	33,196,769	8%
Long-term Investments (Note 1)	550,524,494	464,401,415	86,123,079	19%
Property, Plant and Equipment	1,025,286,941	1,016,355,970	8,930,971	1%
Intangible Assets	12,429,930	9,870,127	2,559,803	26%
Other Assets (Note 2)	17,253,537	11,992,542	5,260,995	44%
Total Assets	2,075,461,008	1,939,389,391	136,071,617	7%
Current Liabilities	328,060,518	308,383,240	19,677,278	6%
Noncurrent Liabilities	70,582,825	108,948,618	(38,365,793)	-35%
Total Liabilities	398,643,343	417,331,858	(18,688,515)	-4%
Capital Stock	259,303,805	259,303,805	0	0%
Capital Surplus	56,315,932	56,309,536	6,396	0%
Retained Earnings	1,376,647,841	1,233,362,010	143,285,831	12%
Others	(15,449,913)	(26,917,818)	11,467,905	-43%
Total Equity	1,676,817,665	1,522,057,533	154,760,132	10%

Note 1: Long-term investments as of December 31, 2017 include held-to-maturity financial assets, financial assets carried at cost and investments accounted for using equity method. Starting from 2018, upon initial application of IFRS 9 "Financial Instruments", the category includes noncurrent financial assets at fair value through other comprehensive income, and noncurrent financial assets at amortized cost, and investments accounted for using equity method.

Note 2: Other assets consist of deferred income tax assets, refundable deposits, and other noncurrent assets.

● Analysis of Deviation over 20%

Increase in intangible assets: The increase was mainly due to increase in software.

Increase in other assets: The increase was mainly due to increase in deferred income tax assets and refundable deposits.

Decrease in noncurrent liabilities: The decrease was mainly due to reclassification of bonds payable due in 1 year to current liabilities and decrease in guarantee deposits.

Increase in other equity: The increase was mainly due to increase in currency exchange gain arising from translation of foreign operations in 2018.

● Major Impact on Financial Position

The above deviations had no major impact on TSMC’s financial position.

● Future Plan on Financial Position: Not applicable.

6.2.2 Financial Performance

Consolidated

Unit: NT\$ thousands

Item	2018	2017	Difference	%
Net Revenue	1,031,473,557	977,447,241	54,026,316	6%
Cost of Revenue	533,487,516	482,616,286	50,871,230	11%
Gross Profit before Unrealized Gross Profit on Sales to Associates	497,986,041	494,830,955	3,155,086	1%
Unrealized Gross Profit on Sales to Associates	(111,788)	(4,553)	(107,235)	2,355%
Gross Profit	497,874,253	494,826,402	3,047,851	1%
Operating Expenses	112,149,280	107,901,668	4,247,612	4%
Other Operating Income and Expenses, Net	(2,101,449)	(1,365,511)	(735,938)	-54%
Income from Operations	383,623,524	385,559,223	(1,935,699)	-1%
Non-operating Income and Expenses	13,886,739	10,573,807	3,312,932	31%
Income before Income Tax	397,510,263	396,133,030	1,377,233	0%
Income Tax Expenses	46,325,857	52,986,182	(6,660,325)	-13%
Net Income	351,184,406	343,146,848	8,037,558	2%
Other Comprehensive Income (Loss), Net of Income Tax	9,836,976	(28,821,631)	38,658,607	NM
Total Comprehensive Income for the Year	361,021,382	314,325,217	46,696,165	15%
Total Net Income Attributable to Shareholders of the Parent	351,130,884	343,111,476	8,019,408	2%
Total Comprehensive Income Attributable to Shareholders of the Parent	360,965,015	314,294,993	46,670,022	15%

● Analysis of Deviation over 20%

Increase in unrealized gross profit on sales to associates: The increase was mainly due to higher sales to investees in the fourth quarter of 2018.

Decrease in other operating income and expenses, net: The decrease was mainly due to impairment losses on property, plant and equipment in 2018.

Increase in non-operating income and expenses: The increase was mainly due to higher interest income in 2018.

Increase in other comprehensive income (loss), net of income tax: The increase was mainly due to increase in currency exchange gain arising from translation of foreign operations in 2018.

● Sales Volume Forecast and Related Information

For additional details, please refer to “1. Letter to Shareholders” on pages 3-7 of this Annual Report.

● Major Impact on Financial Performance

The above deviations had no major impact on TSMC’s financial performance.

● Future Plan on Financial Performance: Not applicable.

Unconsolidated

Unit: NT\$ thousands

Item	2018	2017	Difference	%
Net Revenue	1,023,925,713	969,136,109	54,789,604	6%
Cost of Revenue	530,861,166	490,196,856	40,664,310	8%
Gross Profit before Unrealized Gross Profit on Sales to Subsidiaries and Associates	493,064,547	478,939,253	14,125,294	3%
Unrealized Gross Profit on Sales to Subsidiaries and Associates	(109,046)	(1,562)	(107,484)	6,881%
Gross Profit	492,955,501	478,937,691	14,017,810	3%
Operating Expenses	107,259,429	102,985,909	4,273,520	4%
Other Operating Income and Expenses, Net	(1,668,234)	(1,261,665)	(406,569)	-32%
Income from Operations	384,027,838	374,690,117	9,337,721	2%
Non-operating Income and Expenses	12,170,315	18,626,059	(6,455,744)	-35%
Income before Income Tax	396,198,153	393,316,176	2,881,977	1%
Income Tax Expenses	45,067,269	50,204,700	(5,137,431)	-10%
Net Income	351,130,884	343,111,476	8,019,408	2%
Other Comprehensive Income (Loss), Net of Income Tax	9,834,131	(28,816,483)	38,650,614	NM
Total Comprehensive Income for the Year	360,965,015	314,294,993	46,670,022	15%

● Analysis of Deviation over 20%

Increase in unrealized gross profit on sales to subsidiaries and associates: The increase was mainly due to higher sales to investees in the fourth quarter of 2018.

Decrease in other operating income and expenses, net: The decrease was mainly due to impairment losses on property, plant and equipment in 2018.

Decrease in non-operating income and expenses: The decrease was mainly due to lower share of profits of subsidiaries and associates in 2018.

Increase in other comprehensive income (loss), net of income tax: The increase was mainly due to increase in currency exchange gain arising from translation of foreign operations in 2018.

● Sales Volume Forecast and Related Information

For additional details, please refer to “1. Letter to Shareholders” on pages 3-7 of this Annual Report.

● Major Impact on Financial Performance

The above deviations had no major impact on TSMC’s financial performance.

● Future Plan on Financial Performance: Not applicable.

6.2.3 Cash Flow

Consolidated

Unit: NT\$ thousands

Cash Balance 12/31/2017	Net Cash Provided by Operating Activities in 2018	Net Cash Used in Investing Activities in 2018	Net Cash Used in Financing Activities in 2018	Effect of Exchange Rate Changes on Cash and Cash Equivalents in 2018	Cash Balance 12/31/2018	Remedy for Liquidity Shortfall	
						Investment Plan	Financing Plan
553,391,696	573,954,308	(314,268,908)	(245,124,791)	9,862,296	577,814,601	None	None

● Analysis of Cash Flow

NT\$574.0 billion net cash generated by operating activities: mainly include net income and depreciation and amortization expenses.

NT\$314.3 billion net cash used in investing activities: primarily for capital expenditures and net purchase of marketable financial instruments.

NT\$245.1 billion net cash used in financing activities: primarily for cash dividend payment and repayment of corporate bonds.

● Remedial Actions for Liquidity Shortfall

As a result of positive operating cash flows and cash on-hand, remedial actions are not required.

● Cash Flow Projection for Next Year: Not applicable.

Unconsolidated

Unit: NT\$ thousands

Cash Balance 12/31/2017	Net Cash Provided by Operating Activities in 2018	Net Cash Used in Investing Activities in 2018	Net Cash Used in Financing Activities in 2018	Cash Balance 12/31/2018	Remedy for Liquidity Shortfall	
					Investment Plan	Financing Plan
239,176,841	568,101,343	(296,555,902)	(270,519,757)	240,202,525	None	None

● Analysis of Cash Flow

NT\$568.1 billion net cash generated by operating activities: mainly include net income and depreciation and amortization expenses.

NT\$296.6 billion net cash used in investing activities: primarily for capital expenditures.

NT\$270.5 billion net cash used in financing activities: primarily for cash dividend payment, capital injection in subsidiaries and repayment of corporate bonds.

● Remedial Actions for Liquidity Shortfall

As a result of positive operating cash flows and cash on-hand, remedial actions are not required.

● Cash Flow Projection for Next Year: Not applicable.

6.2.4 Recent Years Major Capital Expenditures and Impact on Financial and Business

Unit: NT\$ thousands

Plan	Actual or Planned Source of Capital	Total Amount for 2018 and 2017	Actual Use of Capital	
			2018	2017
Production Facilities, R&D and Production Equipment	Cash flow generated from operations	639,620,221	312,302,551	327,317,670
Others	Cash flow generated from operations	6,549,848	3,279,330	3,270,518
Total		646,170,069	315,581,881	330,588,188

Based on capital expenditures listed above, TSMC’s annual production capacity increased by approximately 0.9 million 12-inch equivalent wafers in 2018.

6.2.5 Long-term Investment Policy and Results

TSMC’s long-term investments, accounted for under the equity method, were all made for strategic purposes. However, when an investment is no longer of strategic value, it may be considered a financial investment. In 2018, the investment gains from these investments amounted to NT\$3,057,781 thousand on a consolidated basis, increasing from previous year mainly due to demand increase. For future investments, TSMC will continue to focus on strategic purposes through prudent assessments.

6.3 Risk Management

The Board of Directors plays a key role in helping the Company identify and manage economic risks. The Risk Management organization periodically briefs the Audit Committee on the ever-changing risk environment facing TSMC, the focus of the Company’s enterprise risk management, and risk assessment and mitigation efforts. The Audit Committee’s Chairperson also reports on the risk environment and risk mitigation actions to be taken.

TSMC and its subsidiaries are committed to proactively and cost effectively integrating and managing strategic, operational, financial and hazardous risks together with potential consequences to operations and financial results. TSMC operates an enterprise risk management (ERM) program based on both its corporate vision and its long-term, sustainable, responsibility to both industry and society. ERM seeks to provide the appropriate management of risks by TSMC on behalf of all stakeholders. A risk map that considers likelihood and impact severity is used to identify and prioritize corporate risk controls. Various risk treatment strategies are also adopted in response to corporate risks as they are identified.

Scope of Risk Management

Strategic Perspective

- Regulatory change & compliance
- Government policies
- Changes in technology & industry
- Technology development & competition
- Demand & capacity expansion

Operational Perspective

- Sales & purchase concentration
- Information security
- Intellectual property rights
- Recruiting qualified personnel
- Corporate image

Financial Perspective

- Interest rate, foreign exchange, inflation & deflation, taxation
- External financing
- High-risk/high-leveraged investment, financial derivative transactions
- Strategic investments

Hazardous Events

- Earthquakes & natural hazards
- Fire or chemical spills
- Climate change
- Utility supply

Enterprise Risk Management Framework



To mitigate the operational impacts of crisis events, ERM conducts pre-crisis risk assessment and identifies feasible strategies for crisis prevention. Corresponding to different scenarios, response procedures and recovery plans have been compiled. For specific severe crisis events involving multiple TSMC’s manufacturing sites, the cross-functional central crisis command center composed of operations and support functions is responsible for internal coordination to speed up response time and proactively communicate with related stakeholders. To raise risk awareness and strengthen the risk management culture in TSMC, RM (Risk Management) task forces were formed in 2018. Enhanced risk assessment and crisis response exercises were also conducted for critical risk events such as fire, earthquake, IT service disruption, IT security, supply chain disruption and utility supply disruption. In order to continuously mitigate corporate risks, crisis response exercises are used to test the integrity and risk-control effectiveness of ERM.

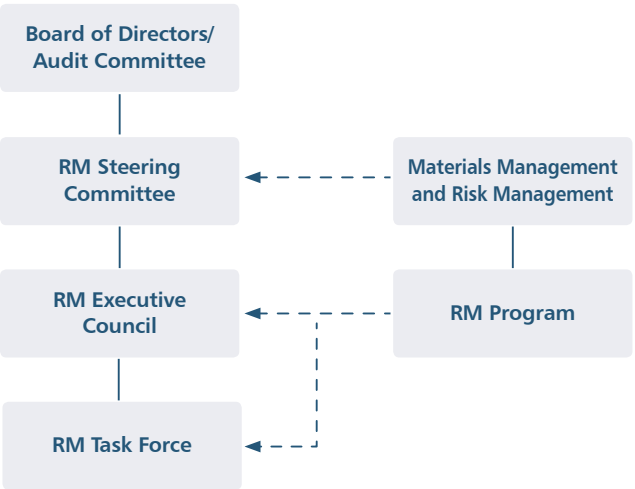
To reduce supply chain disruption risks, TSMC created a task force comprised of members from fab operations, material management, risk management and quality system management to work with suppliers to develop business continuity plans and enhance supply chain resilience to manage their potential risks. Partly as a result of these efforts, there was no interruption in TSMC’s supply chain in 2018.

As production capacity continued to expand with more advanced technology, TSMC initiated and implemented seismic protection engineering design, risk treatment practices and green manufacturing projects in all new fabs.

6.3.1 Risk Management Organization Chart

TSMC’s Risk Management organization annually reports to the Audit Committee on the focus of enterprise risk management, risk assessment and mitigation efforts. The Audit Committee Chairperson also reports to the Board on such discussion and actions.

Organization Functions



RM Steering Committee

- Consists of functional heads (with internal audit head sitting in as an observer)
- Reports to Audit Committee
- Reviews risk control progress
- Identifies and approves prioritization of risk controls

RM Executive Council

- Consists of representatives from each function
- Determines and implements cost-effective risk controls
- Improves transparency and how risks are managed

RM Program

- Pushes RM task forces to enhance effective risk control
- Coordinates and facilitates RM Executive Council on Risk Management activities
- Consolidates ERM reports and updates to the RM Steering Committee

RM Task Force

- Identify potential scenarios and business impact
- Determine risk mitigation actions responding to the scenarios
- Compile crisis management procedures & conduct exercises

6.3.2 Strategic Risks

Risks Associated with Changes in Technology and Industry

• Industry Developments

The electronics industries and semiconductor market are cyclical and subject to significant and often rapid fluctuations in product demand, which could impact TSMC’s semiconductor foundry business. Variations in order levels from customers may result in volatility in the Company’s revenue and earnings.

From time to time, the electronics and semiconductor industries have experienced significant, occasionally prolonged periods of downturns and overcapacity. Because TSMC is, and will continue to be, dependent on the requirements of electronics and semiconductor companies for our services, periods of downturns and overcapacity in the general electronics and semiconductor industries could lead to reduced demand for overall semiconductor foundry services, including TSMC’s services. If TSMC cannot take appropriate actions such as reducing its costs to sufficiently offset declines in demand, the Company’s revenue, margin, and earnings will likely suffer during periods of downturns and overcapacity.

• Changes in Technology

The semiconductor industry and its technologies are constantly changing. TSMC competes by developing process technologies using increasingly advanced nodes and on manufacturing products with more functions. We also compete by developing new derivative technologies. If TSMC does not anticipate these changes in technologies and rapidly develop new and innovative technologies, or the Company’s competitors unforeseeably gain sudden access to additional technologies, TSMC may not be able to provide foundry services on competitive terms. In addition, TSMC’s customers have significantly decreased the time in which their products or services are launched into the market. If TSMC is unable to meet these shorter product time-to-market, it risks losing these customers. These factors have also been intensified by the shift of the global technology market to consumer driven products such as mobile devices, and increasing concentration of customers and competition (all further discussed among these risk factors). Also, the uncertainty and instability inherent in advanced technologies also impose challenges for achieving expected product quality and product yield. If we fail to maintain quality, it may result in loss of revenue and additional cost, as well as loss of business or customer trust. For example, in January 2019, we discovered the yield problems in 12- and 16-nanometer wafers caused by a batch of photoresist, which resulted in delayed delivery of products and are expected to have a negative effect on our gross margin and operating margin. We have strengthened inline wafer inspection and tightened control of incoming

material to deal with the increasing complexity of leading-edge technologies. If TSMC is unable to innovate new technologies that meet the demands of its customers or overcome the above factors, it may become less competitive and its revenue may decline significantly.

Regarding the response measures for the above-mentioned risks, please refer to “2.2.4 TSMC Position, Differentiation and Strategy” on pages 13-15 of this annual report.

Risks Associated with Decrease in Demand and Average Selling Price

A vast majority of the Company’s revenue is derived from customers who use TSMC services in communication products, computing products, consumer electronics products and industrial/standard products. The demand for the Company’s products is significantly affected by the outlook of the major and emerging end markets for its products, such as smartphones, high-performance computing, automotive electronics and the IoT. Any deterioration in or a slowdown in the growth of such end markets resulting in a substantial decrease in the demand for overall global semiconductor foundry services, including TSMC’s products and services, could adversely affect the Company’s revenue. Further, semiconductor manufacturing facilities require substantial investment to construct and are largely fixed-cost assets once they are in operation. Because the Company owns most of its manufacturing capacities, a significant portion of TSMC’s operating costs is fixed. In general, these costs do not decline when customer demand or TSMC’s capacity utilization rates drop, and thus declines in customer demand, among other factors, may significantly decrease TSMC’s margins. Conversely, as product demand rises and factory utilization increases, the fixed costs are spread over increased output, which can improve TSMC’s margins. In addition, the historical and current trend of declining average selling prices (or “ASP”) of end use applications places downward pressure on the prices of the components that go into such applications. If the ASP of end use applications continues decreasing, the pricing pressure on components produced by the Company may lead to a reduction of TSMC’s revenue, margin and earnings.

Risks Associated with Competition

The markets for TSMC’s foundry services are highly competitive. TSMC competes with other foundry service providers, as well as a number of integrated device manufacturers. Some of these companies may have access to more advanced technologies than TSMC. Other companies may have greater financial and other resources than TSMC, such as the possibility of receiving direct or indirect government subsidy, economic stimulus funds, or

other incentives that may be unavailable to TSMC. For example, Chinese companies are expected to be key players for new semiconductor fab development and fab equipment spending through 2020 in part due to various incentives provided by the Chinese government.

Furthermore, the Company’s competitors may, from time to time, also decide to undertake aggressive pricing initiatives in one or several technology nodes. These competitive activities may decrease TSMC’s customer base, or its ASP, or both. If TSMC is unable to compete effectively with these new and aggressive competitors on technology, manufacturing capacity, product quality and customer satisfaction, it risks losing customers to these new contenders.

Risks Associated with Changes in the Government Policies and Regulatory Environment

TSMC management closely monitors all domestic and foreign governmental policies and regulations that might impact TSMC’s business and financial operations. During 2018 and as of the date of this Annual Report, the following changes or developments in governmental policies and regulations may influence the Company’s business operations:

The R.O.C. Company Law was amended on August 1, 2018. The amendments permit a company authorized by its Articles of Incorporation to distribute its earnings on a quarterly or semi-annual basis, and to have its Board of Directors to approve the distribution if the earnings are distributed in cash. TSMC plans to amend its Articles of Incorporation at its June 2019 shareholders’ meeting to authorize TSMC’s Board of Directors to distribute the earnings in cash after the close of each quarter.

With respect to environmental laws, in terms of air pollution protection, the regulations “Collection Rate for Stationary Pollution Source Air Pollutant Emissions Fees” and “Air Pollution Control Act” were amended in July and August 2018, respectively. These amendments impose new items for air pollution control fees and strengthen the surveillance of the stationary pollution sources, both of which may increase the Company’s operating costs, but the impact is not expected to be material. Also, the regulation “Toxic Chemical and High Concern Substances Control Act” was amended in January 2019, to which one of the amendments including establishing a new category of control substances called “Concern Chemical Substances” and their control requirements. The exact effects of which are still uncertain as the relevant sub-regulations have not been finalized yet, but we expect which may increase the Company’s operating costs. In addition, some other environmental laws were proposed to be amended (such as

“Environmental Impact Assessment Act”), the exact effects of which are still uncertain as the amendments have not been finalized yet. However, we expect these amendments may affect our future expansion plans and increase the Company’s operating costs.

It is not expected that other governmental policies or regulatory changes would materially impact TSMC’s operations or financial condition.

6.3.3 Operational Risks

Risks Associated with Capacity Expansion

TSMC performs long-term market demand forecast for its products and services to manage its overall capacity. Because market conditions are dynamic, TSMC’s market demand forecast may change significantly at any time. During periods of decreased demand, certain manufacturing lines or tools in some of the Company’s manufacturing facilities may be suspended or shut down temporarily. However, if subsequent demand increases rapidly in a short period of time, TSMC may not be able to restore the capacity in a timely manner to take advantage of the upturn.

According to the market demand forecast, TSMC has recently been adding capacity in its 300mm wafer fabs to meet market needs for its products and services. Expansion of the Company’s capacity will increase its costs. For example, the Company will need to purchase additional equipment, hire additional personnel and train personnel to operate the new equipment. If TSMC does not increase its net revenue accordingly, its financial performance may be adversely affected by these increased costs.

In order to mitigate the risk associated with capacity expansion, TSMC continuously watches for changes in market conditions and works closely with its customers. When market demand is not as expected, the Company will adjust its capacity plans in a timely manner to reduce the impact on its financial performance.

Risks Associated with Sales Concentration

Over the years, TSMC’s customer profile and the nature of its customers’ businesses have changed dramatically. While it generates revenue from hundreds of customers worldwide, TSMC’s ten largest customers in 2016, 2017, and 2018 accounted for approximately 68%, 66% and 68% of its net revenue in the respective year. The Company’s largest customer in 2016, 2017, and 2018 accounted for 17%, 23% and 22% of its net revenue in the respective year. Our second largest customer in 2016 accounted for 11% of our net revenue. In 2017 and 2018, our second largest customer accounted for less than 10% of our net revenue.

A more concentrated customer base will subject our revenue to seasonal demand fluctuations from our large customers, and cause different seasonal patterns of our business. This customer concentration results in part from the changing dynamics of the electronics industry with the structural shift to mobile devices and applications and software that provide the content for such devices. There are only a limited number of customers who are successfully exploiting this new business model paradigm.

Also, in order to respond to the new business model paradigm, TSMC has seen the changes of nature in its customers’ business models. For example, there is a growing trend toward the system companies developing their own designs and working directly with semiconductor foundries which makes their products and services more marketable in a changing consumer market. Also, since the global semiconductor industry is becoming increasingly competitive, some of TSMC’s customers have engaged in industry consolidations in order to remain competitive. Such consolidations have taken the form of mergers and acquisitions. If more of TSMC’s major customers consolidate, this will further decrease the overall number of its customer pool. The loss of, or significant curtailment of purchases by, one or more of the Company’s top customers, including curtailments due to increased competitive pressures, industry consolidation, a change in their designs, or change in their manufacturing sourcing policies or practices of these customers, or the timing of customer or distributor inventory adjustments, or change in its major customers’ business models may adversely affect TSMC’s results of operations and financial condition.

Risks Associated with Purchase Concentration

• Raw Materials

TSMC’s production operations require that it obtains adequate supplies of raw materials, such as silicon wafers, gases, chemicals, and photoresist, on a timely basis and at commercially reasonable prices. In the past, shortages in the supply of some materials, whether by specific vendors or by the semiconductor industry generally, have resulted in occasional industry-wide price adjustments and delivery delays. For example, the increase in silicon wafer prices due to increased demand for such wafers across the industry had a negative impact on TSMC’s gross margin in 2018. Moreover, major natural disasters, political or economic turmoil occurring within the country of origin of such raw materials, may also significantly disrupt the availability of such raw materials or increase their prices. Also, since TSMC procures some of its raw materials from sole-sourced suppliers, there is a risk that TSMC’s need for such raw materials may not be met or that back-up supplies may not be readily available. In addition, recent trade tensions

could result in increased prices or even unavailability of raw materials due to tariffs, sanctions or other non-tariff barriers. TSMC’s revenue and earnings could decline if the Company is unable to obtain adequate supplies of the necessary raw materials in a timely manner or if there are significant increases in the costs of raw materials. To reduce the supply chain risk and to manage the cost effectively, TSMC is committing resources toward developing new supply sources. In addition, the Company continually encourages its suppliers to reduce their supply chain risk by decentralizing production plants and to improve their cost competitiveness by moving their production facilities to Taiwan from higher-cost areas.

In the meantime, given that qualified backup suppliers are harder to obtain, TSMC is engaging early and extensively with primary suppliers on managing quality and capacity issues in order to be prepared for any unexpected need to ramp up production, which could leave the Company with insufficient time to re-tune its production process. For leading technology nodes, TSMC uses world-class processes at world-class facilities but also requires world-class material quality. To streamline supply chain risk management, the Company intensifies supplier site audits and meetings to extend supply chain best practices to its upstream suppliers. In addition, in response to the rapid increase or decrease in production capacity of new products, TSMC has continued to improve its inventory monitoring system to achieve more accurate demand forecasts to ensure that the supply chain maintains sufficient stock levels. The Company has established a supply chain risk assessment to ensure critical suppliers meet standards in labor, ethics, ESH (environmental, safety and health) and BCP (business continuity plan). To ultimately empower these suppliers to take responsibility for their supply chain, onsite audits are conducted regularly. Any regulatory violations or any adverse environmental impact event, as well as a failure to meet TSMC’s expectations in sustainability requirements, may result in business reduction or termination.

• **Equipment**

The Company’s operations and ongoing expansion plans depend on its ability to obtain an appropriate amount of equipment and related services from a limited number of suppliers in a market that is characterized from time to time by limited supply and long delivery cycles. During such times, supplier-specific or industry-wide lead times for delivery can be as long as six months or more. To better manage its supply chain, the Company has

implemented various business models and risk management contingencies with suppliers to shorten the procurement lead time. Further, the growing complexities especially in advanced lithographic technologies may delay the timely availability of the equipment and parts needed to exploit time-sensitive business opportunities and also increase the market price for such equipment and parts. If TSMC is unable to obtain equipment in a timely manner to fulfill its customers’ demands on technology and production capacity, or at a reasonable cost, its financial condition and results of operations could be negatively impacted.

Risks Associated with IT Security

TSMC has adopted an IT security policy to establish and maintain a secure environment for TSMC’s information and systems. In addition, the Company has established an ISO 27001 information security management system (ISMS) with a formal information risk assessment and management process. Even though TSMC has established these policies, procedures, and many other security measures, it cannot guarantee that the Company’s computing systems, which control or maintain vital corporate functions such as its manufacturing operations and enterprise accounting, would be completely immune to crippling cyber attacks by any third party to gain unauthorized access to its internal network systems, to sabotage its operations and goodwill or otherwise. In the event of a serious cyber attack, TSMC’s systems may lose important corporate data or its production lines may be shut down pending the resolution of such attack. While TSMC seeks to continuously review and assess its cybersecurity policies and procedures to ensure their adequacy and effectiveness, it cannot guarantee that the Company will not be susceptible to new and emerging risks and attacks in the evolving landscape of cybersecurity threats. These cyber attacks may also attempt to steal TSMC’s trade secrets and other sensitive information, such as proprietary information of the Company’s customers and other stakeholders and personal information of the Company’s employees.

Malicious hackers may also try to introduce computer viruses, corrupted software or ransomware into the Company’s network systems to disrupt its operations, blackmail it to regain control of its computing systems or spy on the Company for sensitive information. These attacks may result in TSMC having to pay damages for its delayed or disrupted orders or incur significant expenses in implementing remedial and improvement measures to enhance the Company’s cybersecurity network, and may also expose TSMC to significant legal liabilities arising from or related to legal proceedings or regulatory investigations associated

with, among other things, leakage of employee, customer or third party information which TSMC has an obligation to keep confidential.

TSMC may also be attacked by malicious software contained in the equipment it purchases and installs. In August 2018, TSMC experienced a computer virus outbreak, which caused the malfunction of a number of the Company’s computer systems and fab tools in Taiwan and interrupted the operations of certain equipment. The virus incident was due to a misoperation by the Company’s staff when installing a new equipment that contained malicious software unknown to the Company. Also, the Company’s firewall controls did not effectively prevent the software from propagating. While neither data integrity nor confidential information were compromised, the incident caused shipment delays and a loss of NT\$2,596 million (US\$85 million) classified as the cost of revenue in the third quarter of 2018. Remedial actions have since been taken, such as implementation of an automated system to prevent unprotected tool installation, and strengthening of firewall and network control to prevent computer viruses from spreading among tools and fabs, and enhancements to further improve the Company’s protection against malicious software are ongoing. TSMC has additionally budgeted an adequate amount for IT security solution enhancement. However, there can be no assurance that the Company is no longer subject to malicious software attacks.

In addition, the Company employs certain third party service providers for TSMC and its affiliates worldwide with whom the Company needs to share highly sensitive and confidential information to enable them to provide the relevant services. Despite that TSMC requires the third party service providers to comply with the confidentiality and/or Internet security requirements in its service agreements with them, there is no assurance that each of them will strictly fulfill such obligations, or at all. The on-site network systems of and the off-site cloud computing networks such as servers maintained by such service providers and/or its contractors are also subject to risks associated with cyber attacks. If TSMC or its service providers are not able to timely resolve the respective technical difficulties caused by such cyber attacks, or ensure the integrity and availability of its data (and data belonging to its customers and other third parties) or control of its or its service providers’ computing systems, the Company’s commitments to its customers and other stakeholders may be materially impaired and its results of operations, financial condition, prospects and reputation may also be materially and adversely affected as a result.

Risks Associated with Intellectual Property Rights

The Company’s ability to compete successfully and to achieve future growth depends in part on the continued strength of its intellectual property portfolio. While we actively enforce and protect our intellectual property rights, there can be no assurance that its efforts will be adequate to prevent the misappropriation or improper use of its proprietary technologies, software, trade secrets or know-how. Also, the Company cannot assure you that, as its business or business models expand into new areas, it will be able to develop independently the technologies, patents, software, trade secrets or know-how necessary to conduct its business or that it can do so without unknowingly infringing the intellectual property rights of others. As a result, TSMC may have to rely on, to a certain degree, licensed technologies and patent licenses from others. To the extent that the Company relies on licenses from others, there can be no assurance that it will be able to obtain any or all of the necessary licenses in the future on terms it considers reasonable or at all. The lack of necessary licenses could expose TSMC to claims for damages and/or injunctions from third parties, as well as claims for indemnification by its customers in instances where it has contractually agreed to indemnify its customers against damages resulting from infringement claims.

TSMC has received, from time-to-time, communications from third parties asserting that TSMC’s technologies, manufacturing processes, or the design IPs of the semiconductors made by TSMC or the use of those semiconductors by its customers may infringe their patents or other intellectual property rights. Because of the nature of the industry, the Company may continue to receive such communications in the future. These assertions have at times resulted in litigation. Recently, there has been a notable increase within the industry in the number of assertions made and lawsuits initiated by certain litigious, non-practicing entities and these litigious, non-practicing entities are also becoming more aggressive in their monetary demands and requests for court-issued injunctions. Such lawsuits or assertions may increase TSMC’s cost of doing business and may potentially be extremely disruptive if these non-practicing entities succeed in blocking the trade of products and services offered by TSMC. Also, as the Company expended its manufacturing operations into certain non-R.O.C jurisdictions, it has faced increasing challenges to manage risks of intellectual property misappropriation. Despite our efforts to adopt robust measures to mitigate the risk of intellectual property misappropriation in such new jurisdictions, we cannot guarantee that the protection measures we adopted will be sufficient to prevent us from potential infringements by others, or at all.

If TSMC fails to obtain or maintain certain technologies or intellectual property licenses or fails to prevent our intellectual property from being misappropriated and, if litigation relating to alleged intellectual property matters occurs, it could: (1) prevent the Company from manufacturing particular products or selling particular services or applying particular technologies; and (2) reduce our ability to compete effectively against entities benefiting from our misappropriated intellectual property, which could reduce its opportunities to generate revenue.

TSMC has taken related measures to minimize potential loss of shareholder value arising from intellectual property claims and litigation filed against the Company. These measures include: strategically obtaining licenses from certain semiconductor and other technology companies as needed; timely securing intellectual property rights for defensive and/or offensive protection of TSMC technology and business; and aggressively defending against baseless litigation.

Risks Associated with Litigious and Non-litigious Matters

As is the case with many companies in the semiconductor industry, TSMC has received from time-to-time communications from third parties asserting that its technologies, its manufacturing processes, or the design of the semiconductors made by TSMC or the use of those semiconductors by its customers may infringe upon their patents or other intellectual property rights. These assertions have at times resulted in litigation by or against the Company and settlement payments by the Company. Irrespective of the validity of these claims, TSMC could incur significant costs in the defense thereof or could suffer adverse effects on its operations. TSMC is also subject to antitrust compliance requirements and scrutiny by governmental regulators in multiple jurisdictions. Any adverse results of such proceeding or other similar proceedings that may arise in those jurisdictions could harm TSMC’s business and distract its management, and thereby have a material adverse effect on its results of operations or prospects, and subject TSMC to potential significant legal liability.

Currently, TSMC’s material legal proceedings are as follows:

In May 2017, Uri Cohen filed a complaint in the U.S. District Court for the Eastern District of Texas alleging that TSMC, TSMC North America and other companies infringe four U.S. patents. Cohen’s case was transferred to and consolidated with the responsive declaratory judgment case for non-infringement of Cohen’s asserted patents filed by TSMC and TSMC North

America in the U.S. District Court for the Northern District of California. In July 2018, all pending litigations between the parties in the U.S. District Court for the Northern District of California were dismissed.

On September 28, 2017, TSMC was contacted by the European Commission, which has asked us for information and documents concerning alleged anti-competitive practices in relation to semiconductor sales. We are cooperating with the European Commission to provide the requested information and documents. In light of the fact that this proceeding is still in its preliminary stage, it is premature to predict how the case will proceed, the outcome of the proceeding or its impact.

Other than the matters described above, as of the date of this Annual Report, TSMC is not currently a party to any other material legal proceedings.

Risks Associated with Mergers and Acquisitions

During 2018 and in 2019 as of the date of this annual report, there were no such risks for TSMC.

Risks Associated with Recruiting Quality Personnel

The Company relies on the continued services and contributions of its executive officers, skilled technical and other personnel. The Company’s business could suffer if it loses, for whatever reasons, the services and contributions of some of these personnel and it cannot adequately replace them. The Company may be required to increase or reduce the number of employees in connection with any business expansion or contraction, in accordance with market demand for its products and services. Since there is intense competition for the recruitment of these personnel, the Company cannot ensure that it will be able to fulfill its personnel requirements in a timely manner.

Future R&D Plans and Expected R&D Spending

For additional details, see “5.2.7 Future R&D Plans” on page 76 of this annual report.

Changes in Corporate Reputation and Impact on Company’s Crisis Management

TSMC has established an excellent corporate reputation around the world based on its core values of integrity, commitment, innovation and customer trust, as well as its outstanding operations, rigorous corporate governance, and dedication to social responsibility by serving as a good corporate citizen and continuing to pursue innovation in the economic, environmental and social dimensions of CSR.

In 2018, TSMC was honored with awards and recognition for achievements in operations, corporate governance, patents, innovation, profit growth, investor relations, environmental protection, corporate sustainability and other fields. These included: the Taiwan Institute for Sustainable Energy 2018 Taiwan Corporate Sustainability Awards No.1 for Domestic Corporates and Platinum Medal For Sustainability Report; ranked top 5% in the Taiwan Stock Exchange Corporate Governance Evaluation; member of the *Fortune Magazine* 2018 Global 500; the R.O.C. Ministry of Economic Affairs Industrial Development Bureau “Green Factory Label”; the R.O.C. Environmental Protection Administration “Enterprise Green Procurement Award”; and ranked No. 1 in profit for the China Credit Information Services’ ranking of large Taiwan companies. In addition, TSMC was selected as a component of the Dow Jones Sustainability Indices for the 18th consecutive year, further strengthening the Company’s reputation and corporate culture.

TSMC’s vision for corporate social responsibility is to “uplift society.” The Company maintains a Corporate Social Responsibility Committee, which serves as the Company’s highest-level CSR organization and acts as a decision-making center and communications platform for CSR. Committee members represent departments including Legal, Customer Service, Materials Management, Quality and Reliability, Research and Development, Risk Management, Finance, Investor Relations, Operations, Environment, Safety and Health (ESH), Human Resources, the TSMC Education and Culture Foundation, the TSMC Charity Foundation, and Public Relations. These departments address issues of concern to all stakeholders including employees, shareholders, customers, suppliers, government and society, and coordinate the Company’s resources and collaborate to further enhance TSMC’s positive corporate reputation.

In addition, to address crisis events that could affect the Company’s public reputation, including earthquakes, fires, IT service disruption, supply chain disruption, environmental events and utility supply disruption, TSMC employs numerous preventative measures and maintains a “TSMC Crisis Command Center Control Instruction” and a “TSMC Emergency Response Procedure” to establish its emergency response command structure. Each TSMC fab holds regular monthly meetings of the ESH committee, and relevant departments hold regular drills and strive to continuously improve their emergency response and notification procedures to ensure clear channels

of communication to stakeholders in crisis management. The Public Relations department serves as the designated window for external communications. In the event of an emergency, all departments immediately deploy emergency response measures to reduce casualties and minimize the impact on the surrounding environment, Company property and manufacturing operations. Responders also alert the public relations department at the first stage of response to ensure clear and consistent disclosure regarding the situation to maintain the Company’s reputation.

Risks Associated with Change in Management
After having led the Company for over 31 years, TSMC’s Founder, Dr. Morris Chang, retired from the Company after the Annual Shareholders’ Meeting on June 5, 2018. At the meeting, TSMC shareholders elected a new Board of Directors, which then convened to elect Dr. Mark Liu as Chairman and Dr. C.C. Wei as Chief Executive Officer (CEO) and Vice Chairman, completing the transition of responsibilities in accordance with the Company’s succession plan.

6.3.4 Financial Risks

Economic Risks

• Interest Rate Fluctuation

TSMC is exposed to interest rate risks primarily related to its investment portfolio and outstanding debt, which are most sensitive to fluctuations in U.S. and R.O.C. interest rates. Changes in U.S. and R.O.C. interest rates affect the interest earned on the Company’s cash, cash equivalents and marketable securities and the fair value of those securities, as well as interest paid on its debt.

The objective of TSMC’s investment policy is to achieve a return that will allow the Company to preserve principal and support liquidity requirements. TSMC invests primarily in time deposits and investment grade debt securities. By policy, TSMC limits the amount of credit exposure to any one issuer. TSMC’s investments in both fixed rate and floating rate interest earning securities carry a degree of interest rate risk. Fixed rate securities may have their fair market value adversely affected due to a rise in interest rates, while floating rate securities may generate less interest income than predicted if interest rates fall. As of December 31, 2018, a substantial majority of TSMC’s fixed income securities are classified as financial assets at fair value through other comprehensive income, and may have their market value adversely impacted due to the rise in interest rates. TSMC has

entered, and may enter in the future, into interest rate futures to partially hedge the interest rate risk on its fixed income investments. However, these hedges can offset only a small portion of the financial impact from movement in interest rates.

As of December 31, 2018, all of TSMC’s long-term debt are fixed-rate, NT dollar denominated bonds and measured at amortized costs. As such, changes in interest rate would not affect the future cash flows and the fair value.

● **Foreign Exchange Volatility**

More than 90% of TSMC’s revenue is denominated in U.S. dollar and over one-half of its capital expenditures are denominated in currencies other than NT dollar, primarily in U.S. dollar, Japanese yen, and Euro. As a result, any significant fluctuations to its disadvantage in exchange rate of NT dollar against such currencies, in particular a weakening of U.S. dollar against NT dollar, would have an adverse impact on the Company’s revenue and profit as expressed in NT dollar. For example, every one percent depreciation of the U.S. dollar against the NT dollar would result in approximately 0.4 percentage point decrease in TSMC’s operating margin based on TSMC’s 2018 results.

Conversely, if the U.S. dollar appreciates significantly versus other major currencies, the demand for the products and services of TSMC’s customers and for TSMC’s goods and services will likely decrease, which will negatively affect the Company’s revenue.

TSMC uses foreign currency derivatives contracts, such as currency forwards and cross-currency swaps, to protect against currency exchange rate risks associated with non-NT dollar-denominated assets and liabilities and certain forecasted transactions. The Company also utilizes U.S. dollar denominated debt to partially offset currency risk arising from U.S. dollar denominated receivables for balance sheet hedges. These hedges reduce, but do not entirely eliminate, the effect of foreign currency exchange rate movements on its assets and liabilities.

Fluctuations in the exchange rate between the U.S. dollar and the NT dollar may affect the U.S. dollar value of the Company’s common shares and the market price of the Company’s American Depositary Shares (ADSs) and of any cash dividends paid in NT dollar on TSMC’s common shares represented by ADSs.

● **Inflation, Deflation and Resulting Market Volatility**

The global economy is becoming more vulnerable to sudden unexpected fluctuations in inflationary and deflationary expectations and conditions. Expectations of high inflation or deflation each adversely affects the economy, at both macro and micro levels, by reducing economic efficiency and disrupting investment decisions. Recently, higher interest rates in the U.S., international trade tensions, and the possible changes in economic, fiscal and monetary policies in major economies have exacerbated, and may further exacerbate fluctuations in inflationary or deflationary expectations. Such volatility may negatively affect the costs of TSMC’s operations and the business operations of its customers who may be forced to plan their purchases of TSMC’s goods and services within an uncertain economy. Therefore, the demand for TSMC’s products and services could unexpectedly fluctuate severely in accordance with expectations of inflation or deflation as affected by market volatility.

● **Amendments to Tax Regulations or Implementation of New Tax Laws**

Any amendments to existing tax regulations or the implementation of any new tax laws in the jurisdictions in which TSMC operates its business may have an adverse effect on its net income.

While TSMC is subject to tax laws and regulations in various jurisdictions in which it operates or conduct business, TSMC’s principal operations are in the R.O.C. and it is exposed primarily to taxes levied by the R.O.C. government. Any unfavorable changes of tax laws and regulations in this jurisdiction could increase TSMC’s effective tax rate and have an adverse effect on its operating results.

In order to control the tax risk, TSMC closely monitors all domestic and foreign governmental policies and regulations that might impact its financial operations. TSMC has established risk management procedures to collect information, analyze potential tax implications, and develop countermeasures.

Risks Associated with External Financing

In times of market instability, sufficient external financing may not be available to the Company on a timely basis, on commercially reasonable terms to the Company, or at all. If sufficient external financing is not available, when TSMC needs such financing to meet its capital requirements, it may be forced

to curtail expansion, modify plans or delay the deployment of new or expanded services until it obtains such financing.

Risks Associated with High-Risk/Highly Leveraged Investments; Lending, Endorsements, and Guarantees for Other Parties; and Financial Derivative Transactions

TSMC did not make high-risk or highly leveraged financial investments in 2018 nor in 2019 up to the date of this annual report.

TSMC provided a guarantee to TSMC Global, a wholly-owned subsidiary of TSMC, for its issuance of U.S. dollar-denominated senior unsecured corporate bonds in April 2013. TSMC Global repaid the full amount of its U.S. dollar-denominated senior unsecured corporate bonds due in April 2018. TSMC also provided a guarantee amounting to no more than US\$83.21 million to TSMC North America, a wholly-owned subsidiary of TSMC, since November 2014 for its obligation to an office leasing contract.

As of February 28, 2019, TSMC had RMB 6 billion and US\$129 million intercompany loans arranged among the Company’s subsidiaries, which were all in compliance with relevant rules and regulations.

In 2018, the financial transactions of a derivative nature that TSMC entered into were strictly for hedging and not for any trading or speculative purposes. For more transaction information and risk assessment, please refer to Note 7, Note 13, and Note 36 of the annual report section (II), Financial Statements.

To control various types of financial transactions, the Company has established internal policies and procedures based on sound financial and business practices, all in compliance with the relevant rules and regulations issued by the Taiwan Securities and Futures Bureau. TSMC policies and procedures include “Policies and Procedures for Financial Derivative Transactions,” “Procedures for Lending Funds to Other Parties,” “Procedures for Acquisition or Disposal of Assets,” and “Procedures for Endorsement and Guarantee.”

Risks Associated with Impairment Charges

Under Taiwan-IFRSs, TSMC is required to evaluate its investments, in debt securities, investments accounted for using equity method, tangible assets and intangible assets for impairment

whenever triggering events or changes in circumstances indicate that the asset may be impaired. If certain criteria are met, TSMC is required to record an impairment charge. TSMC is also required under Taiwan-IFRSs to evaluate goodwill for impairment at least on an annual basis or more frequently whenever triggering events or changes in circumstances indicate that goodwill may be impaired and the carrying value may not be recoverable. TSMC holds investments in certain publicly listed and private companies, some of which have incurred certain impairment charges as disclosed in Annual Report section (II), Financial Statements.

The determination of an impairment charge at any given time is based significantly on the projected results of the Company’s operations over several years subsequent to that time. Consequently, an impairment charge is more likely to occur during a period when the Company’s operating results are otherwise already depressed.

TSMC has established the process and system to closely monitor and assess the risk of impairment charge. However, the management is unable to estimate the extent or timing of any impairment charge for future years, or whether such impairment charge may have a material adverse effect on the Company’s net income.

6.3.5 Hazardous Risks and Utility Supply Interruption or Shortage Risks

The frequency and severity of catastrophic events, including natural disasters and severe weather has been increasing, in part due to climate change or systemic regional geological changes that manifest in damaging earthquakes. TSMC has manufacturing and other operations in locations subject to natural disasters, such as flooding, earthquakes, tsunamis, typhoons, and droughts that may cause interruptions or shortages in the supply of utilities, such as water and electricity, that could disrupt operations. In addition, TSMC’s suppliers and customers also have operations in such locations. For example, most of TSMC’s production facilities, as well as those of many of its suppliers and customers and upstream providers of complementary semiconductor manufacturing services, are located in Taiwan and Japan, which are susceptible to earthquakes, tsunamis, flooding, typhoons, and droughts from time to time that may cause shortages in electricity and water or interruptions to our operations.

Thus, if one or more natural disasters that result in a prolonged disruption to TSMC’s operations or those of its customers or suppliers, or if any of its fabs or vendor facilities were to be damaged or cease operations as a result of an explosion or fire, it could reduce the Company’s manufacturing capacity and may cause us to lose important customers, thereby having a potentially adverse and material impact on our operational and financial performance.

TSMC has occasionally suffered power outages or surges in Taiwan caused by difficulties encountered by its electricity supplier, the Taiwan Power Company, or other power consumers on the same power grid, which have resulted in interruptions to our operations. Such shortages or interruptions in its electricity supply could further be exacerbated by changes in the energy policy of the government which will make Taiwan a nuclear-free country by 2025. If the Company is unable to secure reliable and uninterrupted supply of electricity to power its manufacturing fabs within Taiwan, its ability to satisfy the orders of its customers will be severely undercut.

TSMC maintains a comprehensive risk management system dedicated to the safety of people, the conservation of natural resources, and the protection of property. In order to effectively handle emergencies and natural disasters, at each facility management has developed comprehensive plans and procedures that focus on risk prevention, emergency response, crisis management and business continuity. All TSMC manufacturing fabs have been ISO 14001 certified (environmental management system) and OHSAS 18001 certified (occupational health and safety management system). All manufacturing fabs in Taiwan have also been TOSHMS (Taiwan Occupational Safety and Health Management System) certified. The new fabs will also attain the above certifications within 18 months after acquiring factory registration certification.

The Company pays special attention to preparedness of emergency response to disasters, such as typhoons, floods and droughts caused by climate change, earthquakes, pandemics (such as H1N1 influenza), and disruptions to water, electricity and other public utilities. TSMC has established a company-wide taskforce dedicated to managing the risk of a water or electricity shortage that might arise due to climate change. This taskforce monitors the external supply and internal demand for water and electricity, and collaborate with Taiwan Semiconductor Industry Association, the Allied Association for Science Park Industries, and related public agencies to ensure stable water and electricity supply.

TSMC has further strengthened its business continuity plans, which include periodic risk assessment, risk mitigation, and implementation through the establishment of emergency taskforces when necessary, combined with the preparation of a thorough analysis of the emergency, its impact, alternative actions, and solutions for each possible scenario together with appropriate precautionary and/or recovery measures. Each taskforce is given the responsibility of ensuring TSMC’s ability to minimize personal injury, business disruption and financial impact under the circumstances. TSMC periodically review business continuity plan and revise it according to exercise results and implementation.

In response to the impact of the earthquake that occurred in Taiwan, TSMC conducted a continuous improvements including enhancing earthquake emergency response, enhancing tool anchorage and seismic isolation facilities, preparedness for speeding up tool salvage and production recovery. The improvements also have been embedded in new fab design. TSMC business continuity procedures were enhanced with reference to ISO 22301 business continuity management.

TSMC and many of its suppliers use combustible and toxic materials in their manufacturing processes and are therefore subject to risks that cannot be completely eliminated arising from explosion, fire, or environmental influences. Although the Company maintains many overlapping risk prevention and protection systems, as well as fire and casualty insurance, TSMC’s risk management and insurance coverage may not always be sufficient to cover all of the Company’s potential losses. If any of TSMC’s fabs or vendor facilities were to be damaged or cease operations as a result of an explosion, fire or environmental causes, it could reduce the Company’s manufacturing capacity and may lead to the loss of important sales and customers, and impact on TSMC’s financial performance. In addition to periodic fire-protection inspections and firefighting drills, the Company has also carried out a corporate-wide fire risk mitigation project focused on managerial and hardware improvements.

6.3.6 Risks Associated with Non-Compliance with Environmental and Climate Related Laws and Regulations, and with Other International Laws, Regulations and Accords

Because TSMC engages in manufacturing activities in multiple jurisdictions and conducts business with customers located worldwide, such activities are subject to a myriad of

governmental regulations. For example, the manufacturing, assembling and testing of TSMC’s products require the use of metals, chemicals and materials that are subject to environmental, climate-related, health and safety, and humanitarian conflict-free sourcing laws, regulations and guidelines issued worldwide.

The Company’s failure to comply with any such laws or regulations, as amended from time to time, and its failure to comply with any information and document sharing requests from the relevant authorities in a timely manner could result in:

- significant penalties and legal liabilities, such as the denial of import permits or third party private lawsuits, criminal or administrative proceedings;
- the temporary or permanent suspension of production of the affected products;
- unfavorable alterations in TSMC manufacturing, fabrication and assembly and test processes;
- challenges from customers that place TSMC at a significant competitive disadvantage, such as loss of actual or potential sales contracts in case the Company is unable to satisfy the applicable legal standard or customer requirement;
- restrictions on TSMC operations or sales;
- loss of tax benefits, including termination of current tax incentives, disqualification of tax credit application and repayment of the tax benefits that the Company is not entitled to; and
- damage to TSMC’s goodwill and reputation.

Complying with applicable laws and regulations, such as environmental and climate related laws and regulations, could also require TSMC, among other things, to do the following: (1) purchase, use or install remedial equipment; (2) implement remedial programs such as climate change mitigation programs; (3) modify product designs and manufacturing processes, or incur other significant expenses such as obtaining substitute raw materials or chemicals that may cost more or be less available for the Company’s operations.

TSMC’s inability to timely obtain approvals necessary for the conduct of business could impair its operational and financial results. For example, if the Company is unable to timely obtain environmental related approvals needed to undertake the development and construction of a new fab or expansion project, then such inability may delay, limit, or increase the cost of its expansion plans that could also in turn adversely

affect its business and operational results. In light of increased public interest in environmental issues, TSMC’s operations and expansion plans may be adversely affected or delayed responding to public concern and social environmental pressures even if the Company complies with all applicable laws and regulations.

TSMC believes that climate change should be regarded as a significant corporate risk that must be controlled to improve competitiveness. Climate change has the potential to create legal, physical and other risks. TSMC’s control measures are as follows:

• Climate Regulatory Risks
Greenhouse gas (GHG) control regulations and agreements in countries around the world are becoming increasingly stringent. Enterprises are legally required to regularly disclose GHG-related information as well as limit GHG emissions. Future legal requirements, such as carbon or energy taxes and carbon emission cap-and-trade may drive up production costs, including material and energy costs. TSMC China is subject to the Shanghai carbon emission cap-and-trade regulation, which has had cost impacts since 2016. TSMC continues to monitor legislative trends and communicate with various governments through industrial organizations and associations to set reasonable and feasible legal requirements.

• Conflict Minerals Risks
For additional details, see the Supplier and Contractor Management section under 7.2.3 Safety and Health on page 128 of this annual report.

• Climate Disaster Risks
Abnormal climate caused by the greenhouse effect has increased the frequency and severity of climate disasters – storms, floods, drought, and water shortages – causing considerable impacts on business operations and supply chains. TSMC believes that climate change control should take into account both mitigation and adaption, and this requires cooperation among government, society and industry to reduce risk. To sustain electricity and raw water supplies, therefore, in addition to water-saving measures the Company undertakes at its own facilities and those of upstream and downstream partners, TSMC participates in the Taiwan Science Park Industrial Union Experts Committee platform, and is actively involved in regular meetings with Taipower Company and the Taiwan Water Corporation to discuss supply and allocation issues and disaster responses.

● **Other Climate Risks**

Climate change is a concern to the global supply chain, necessitating energy conservation, carbon reduction, and disaster prevention. For example, the Responsible Business Alliance (RBA) has also required members’ suppliers to disclose GHG emissions information. TSMC not only discloses its own GHG emissions information each year, but it also assists and requires its major suppliers to establish a GHG inventory system and conduct reduction programs. TSMC insists that its major suppliers submit GHG emissions and reduction information as an important index of sustainability scoring in its procurement strategy.

To mitigate risks resulting from climate change, TSMC continues to actively carry out energy conservation measures, participate in voluntary emission reduction projects for perfluorinated compounds (PFCs), and conduct GHG inventory and verification on an annual basis. TSMC has publicly disclosed climate change information annually through the following channels:

- GHG emissions and reduction-related information submitted for evaluation to the Dow Jones Sustainability Index every year since 2001.
- GHG-related information disclosed in its CSR report on the Company website annually since 2008. TSMC also provides information to customers and investors upon request.
- Participation in an annual survey conducted by the nonprofit Carbon Disclosure Project (CDP) since 2005. The survey includes GHG emission and reduction information for all TSMC fabs and subsidiaries.
- Adherence to the ISO 14064-1 standard to conduct a GHG inventory and acquire verification by an accrediting agency since 2006. TSMC also reports GHG inventory data to the Taiwan Environmental Protection Administration (EPA) and the Taiwan Semiconductor Industry Association (TSIA).

6.3.7 Other Risks

Potential Impact and Risks Associated with Sales of Significant Numbers of Shares by TSMC’s Directors, and/or Major Shareholders Who Own 10% or More of TSMC’s Total Outstanding Shares

The value of TSMC shareholders’ investment may be reduced by possible future sales of TSMC shares owned by major shareholders.

One or more of TSMC’s existing shareholders may, from time to time, dispose of significant numbers of TSMC common shares or ADSs. For example, the National Development Fund, Executive Yuan, R.O.C. which owned 6.38% of TSMC’s outstanding shares as of February 28, 2019, had from time to time in the past sold TSMC shares in the form of ADSs in several transactions.

As of the date of this annual report, no shareholder owns 10% or more of TSMC’s total outstanding shares.

Risks of Trade Policies

As TSMC’s revenue is primarily derived from sales to major economies in the world (please refer to “2.2.4 TSMC Position, Differentiation and Strategy” on page 13 of this annual report), any changes in the trade policies (such as the increase of tariffs on certain products, the implementation of import and export controls, and the adoption of other trade barriers) of such major economies can affect the sales of TSMC or its customers and thereby affect TSMC’s operating results. Accordingly, TSMC continues to monitor the recent shifts in trade policies and measures among the relevant major economies and will take corresponding responsive actions in accordance with subsequent developments.

Other Material Risks

During 2018 and in 2019 as of the date of this annual report, TSMC’s management is not aware of any other risk event that could impart a potentially material impact on the financial status of the Company.



Corporate Social Responsibility

7.1 Overview

Since its establishment, TSMC has not only strived for the highest achievements in its core business of dedicated IC foundry services but has also actively fulfilled its corporate social responsibility and developed positive relationships with all stakeholders including employees, shareholders, customers, suppliers, and society to create a sustainable future and embrace “uplifting society” as its main vision.

Guidance for the Implementation of CSR

“TSMC Corporate Social Responsibility Policy” is TSMC’s overall guiding principle for sustainable development. Following the Company vision of uplifting society, the three primary missions of TSMC are Acting with Integrity, Strengthening Environmental Protection, and Caring for the Disadvantaged. Corporate Social Responsibility Policy is TSMC’s overall guiding principle for sustainable development. The CSR matrix below clearly defines the scope of the Company’s responsibilities. The horizontal axis shows the seven areas where TSMC aims to set a benchmark for sustainability: morality, business ethics, economy, rule of law, sustainability, work/life balance and happiness, and philanthropy. On the vertical axis are actions that TSMC has taken to fulfill its responsibilities.

TSMC CSR Matrix

TSMC \ Society	Morality	Business Ethics	Economy	Rule of Law	Sustainability	Work/Life Balance Happiness	Philanthropy
Integrity	V	V					
Law Compliance				V			
Anti-Corruption Anti-Bribery Anti-Cronyism	V	V		V			
Environmental Protection Climate Control Energy Conservation				V	V		
Corporate Governance		V	V	V			
Provide Well-Paying Jobs			V			V	
Good Shareholder Return			V				
Employees' Work-Life Balance						V	
Encourage Innovation		V	V				
Good Work Environment						V	
TSMC Charity Foundation					V	V	V
TSMC Education and Culture Foundation							V

CSR Management

As the highest-level CSR decision-making center within TSMC, the Corporate Social Responsibility Committee is chaired by the CFO and serves as a cross-departmental communication platform for corporate social responsibility of TSMC. The committee sets the Company’s CSR targets and strategies for the year and meets each quarter to monitor the execution of budgets and performance by each department to ensure the guiding principles are implemented effectively in the Company’s daily operations.

The Corporate Social Responsibility Committee reports annually to the Board of Directors on implementation results of the prior year and the work planned for the upcoming year by adhering to the vision and mission of TSMC Corporate Social Responsibility Policy. The committee is comprised of representatives from each functional department, including legal, customer service, materials management, quality and reliability, research and development, risk management, finance, investor relations, operations, environment, safety and health, human resources, the TSMC Education and Culture Foundation, the TSMC Charity Foundation, and public relations. All departments collaborate to realize sustainability objectives of interest to stakeholders, namely employees, shareholders/investors, customers, suppliers, government, society, and others.

In 2018, the committee focused on climate change mitigation and adaption. TSMC optimized energy consumption efficiency, launched renewable energy adoption, and simultaneously strengthened responsible supply chain management by performing supplier risk assessments and signing Supplier Code of Conduct. For social engagement, the TSMC Education and Culture Foundation and the TSMC Charity Foundation also actively integrated internal and external resources provided by TSMC and its employees to enforce the responsibility of a corporate citizen to achieve positive social impacts.

The CSR plan for 2019 calls for TSMC to focus on climate change initiatives, strengthen responsible supply chain management, and integrate resources and strengths among divisions through the Corporate Social Responsibility Committee in order to continue aligning the Company’s sustainability targets with the United Nations sustainability development goals (SDGs).

Stakeholder Engagement

TSMC has established multiple systematic channels to communicate with stakeholders, including a “Contact Us” section on the corporate website and a CSR website, as well as a CSR mailbox. In order to understand the level of stakeholder interest in sustainability issues, TSMC conducted three studies focused on identification, prioritization and validation with regard to these material issues.

In 2018, the TSMC Corporate Social Responsibility mailbox received 361 emails, subjects included corporate governance, innovation and services, supply chain, green manufacturing, workplace, and social issues. Submissions were primarily regarding requests for visits, questions on daily operations, feedback from the public, and proposals for donations and collaboration. By responding with direct action from related departments and a timely reply from the Public Relations Department, the Company continues to support communication and exchange as well as positive developments in society.

Stakeholders and Communication Channels in 2018

Stakeholders	Communication Channels
Employees	• Corporate intranet, internal emails and other announcement channels (such as promotion posters at facilities) • Human resources representatives • Employee training and classroom courses • Regular and ad-hoc communication meetings, such as Manager Development Consulting Committee, Operations Engineer Training Committee, Manufacturing Department Technical Committee, etc. • Employee voice channels, such as Immediate Response System, Employee Opinion Box, Wellness Center, wellness website, each function’s PIP committee, Employee PIP Opinion Dedicated Line, etc. • Ombudsman System • Audit Committee Whistleblower System • EWC event questionnaire survey
Shareholders/Investors	• Annual shareholder meeting • Quarterly earnings conference call • Investor conferences and face-to-face meetings • Telephone and email responses to investors’ questions and feedback collection • Annual reports, CSR reports, 20-F filings to US SEC, material announcements to Taiwan Stock Exchange, and corporate news on the Company’s website
Customers	• Customer satisfaction survey • Customer meetings • Customer audits • Business and technology assessment • Email responses to the issues that customers are concerned about occasionally
Suppliers	• Supplier meetings • Supplier onsite audits • Supply Chain Management Forum • Supply Chain ESH Forum • Supplier Ethics Code Awareness Training • Advanced Process Material Workshop
Government	• Official correspondence and visits • Industry experience and advice sharing • Meetings (such as communication meetings, public hearings, forums, seminars or social gatherings) • Communication with government authorities through industry organizations, including the Association of Science Park Industries, Taiwan Semiconductor Industry Association, World Semiconductor Council, and Chinese National Federation of Industries
Society	• Arts events in the communities • Sponsorship of youth development events • Sponsorship of charity projects and emergency aid • Sponsorship of non-profit organizations to support educational projects • Professorship endowments and student scholarships at universities • Support of non-profit organizations and institutions via monetary and in-kind donation, as well as providing necessary manpower for a good cause • Regular visits to National Museum of Science, Hsinchu Veterans Home, St. Teresa Children Center, Jacana Ecology Education Park, remote schools and TSMC ecological parks to provide volunteer services • Annual volunteer activities in collaboration with TSMC fabs and divisions • TSMC corporate social responsibility website, newsletters and mailbox

Responsibilities of TSMC CSR Committee Members

Committee Members	Responsibilities	Stakeholders
Legal	Corporate Governance, Code of Conduct, Legal Compliance (including fair competition, privacy and personal information, and protection for whistle-blowers), Intellectual Property, Protection of Confidential Information	Employees Government Society (Note)
Customer Service	Customers Service and Satisfaction, Customer Trust, Customer Confidentiality, RBA and its Code of Conduct	Customers
Materials Management	Materials and Supply Chain Risk Management, Supplier Management, Conflict Minerals, RBA and its Code of Conduct	Suppliers
Quality and Reliability	Product Quality and Reliability, Product Recall Mechanism	Customers Suppliers
Research and Development	Innovation Management, Green Products	Employees Customers Suppliers
Risk Management	Risk Management, Crisis Management, Emergency Response and Action Plan	Employees Investors Customers Suppliers Government Society
Finance	Financial Disclosure, Dividend Policy, Tax Strategy	Employees Investors Customers Suppliers Government
Investor Relations	Resolving Issues of Stakeholder Concern, Establishing Trusting Long-term Relationships, Effective Two-way Communication, Annual Report Production	Investors
Operations	Operational Eco-efficiency, Pollution Prevention, Water Resource Risk Management, Green Manufacturing	Customers Investors Suppliers
Environment, Safety and Health	Environmental Policy and Management System, Climate Change Mitigation and Adaption, Pollution Prevention, Energy Consumption Efficiency, Carbon Emissions and Carbon Rights Management, Product Environmental Responsibility, Response Mechanism for Environmental Issues, Environmental Spending, Green Supply Chain, Policy and Management Systems for Occupational Health and Safety, Workplace Health and Safety, Occupational Disease Prevention and Health Promotion, Communication of ESH Regulations	Employees Investors Customers Suppliers Government Society
Human Resources	Talent Attraction and Retention, Proprietary Information Protection, Employees’ Physical and Mental Well-Being and Work-Life Balance, Labor-Management Relations and Employee Engagement, Labor Rights, Training and Development, Mobility, RBA and its Code of Conduct	Employees
TSMC Education and Culture Foundation, TSMC Charity Foundation	Philanthropy, Community Relations	Society
Public Relations	Stakeholder Engagement, Mechanism for Reflecting Issues of Social Concern, Media Relations	Society

Note: Society includes community, non-governmental organizations, non-profit organizations, and the public.

TSMC believes that enterprises and society are inseparable. As the only semiconductor company chosen for the Dow Jones Sustainability World Indices over the past 18 consecutive years, TSMC is laying the foundation of an enterprise built to last and creating sustainable value for the Company and society going forward by maintaining proactive communications and positive relationships with all stakeholders in economic, environmental and social dimensions.

Built on the cornerstone of integrity, TSMC believes that customer trust is enhanced if the Company follows the law and values corporate governance. Investors will be more willing to invest in the Company over the long-term if the Company maintains solid financial performance and a sustainable dividend policy. Employees are TSMC’s most important asset and they have made a reciprocal commitment to the Company to fulfill its core values. At TSMC’s urging, suppliers – both upstream and downstream – have been devoting more resources to manufacturing processes and working together to build green factories and supply chains that are friendly to the environment. TSMC combines the strengths that drive society forward, and hopes to build a better future together with the engagement of all stakeholders.

2018 CSR Awards, Recognitions and Ratings

Category	Organization	Awards and Recognitions
Overall CSR	Taiwan Institute of Sustainable Energy	• The Most Prestigious Sustainability Awards – Top Ten Domestic Corporates • Taiwan Top 50 Corporate Responsibility Report Awards – IT & IC Manufacturing Industry
	Dow Jones Sustainability Indices (DJSI)	• Dow Jones Sustainability World Index for the 18th consecutive year • Dow Jones Sustainability Emerging Markets Index
	MSCI ESG Indexes	• MSCI ACWI ESG Leaders Index component • MSCI ACWI SRI Index component
	FTSE4Good Index	• FTSE4Good Emerging Index component • FTSE4Good TIP Taiwan ESG Index component
	Sustainalytics	• Rated an ESG “Leader” within the Semiconductor Industry
	ISS-oekom	• “Prime” rated by ISS-oekom Corporate Rating
	Corporate Knights	• Global 100 Most Sustainable Corporations
	National Taipei University College of Business	• Taiwan Sustainability Index component
Economy, Governance	Institutional Investor Magazine	• Most Honored Company (Technology/Semiconductors) – All-Asia • Best CEO (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best CEO (Technology/Semiconductor) – 1st Place (buy-side)- All-Asia • Best CEO (Technology/Semiconductor) – 1st Place (sell-side)- All-Asia • Best CFO (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best CFO (Technology/Semiconductor) – 1st Place (buy-side)- All-Asia • Best CFO (Technology/Semiconductor) – 1st Place (sell-side)- All-Asia • Best Investor Relations Program (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best Investor Relations Program (Technology/Semiconductor) – 1st Place (buy-side)- All-Asia • Best Investor Relations Program (Technology/Semiconductor) – 1st Place (sell-side)- All-Asia • Best Investor Relations Professional (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best Investor Relations Professional (Technology/Semiconductor) – 1st Place (buy-side)- All-Asia • Best Investor Relations Professional (Technology/Semiconductor) – 1st Place (sell-side)- All-Asia • Best Corporate Governance (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best ESG/SRI Metrics (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia • Best Analyst Days (Technology/Semiconductor) – 1st Place (buy-side and sell-side)- All-Asia
	IR Magazine	• Best Investor Relations (Awards by region/Taiwan) • Best Crisis Management
	IFI Claims	• 2018 Top 50 US Patent Assignees
	Thomson Reuters	• Top 100 Global Technology Leaders
	FORTUNE	• Fortune Global 500
	Global Finance	• Best Corporate FX Awards-Asia-Pacific
	Nikkei	• Nikkei Asia 300 Indexes
	Taiwan Stock Exchange	• Top 5% in Corporate Governance Evaluation of Listed Companies for the 4th consecutive year • TWSE Corporate Governance 100 Index component
	R.O.C. Ministry of Economic Affairs Intellectual Property Office	• Ranked No. 1 in Top 100 Patent Applicants in Taiwan
	PricewaterhouseCoopers	• Global Top 100 Companies by market capitalization for the 6th consecutive year
	China Credit Information Service	• Ranked No. 1 in Profitability of Large Taiwan Companies
	CommonWealth Magazine	• Corporate Social Responsibility Award
	Asiamoney	• Overall Most Outstanding Company in Taiwan • Most Outstanding Company in Taiwan – Semiconductors & Semiconductor Equipment Sector
	24/7 Wall Street	• The World's 50 Most Innovative Companies
	IPBC Asia	• Asia IP Elite – Semiconductor Team of the Year

(Continued)

Category	Organization	Awards and Recognitions
Environment, Safety and Health	U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) certification	• "Gold" class certification – Fab 12 P7 Manufacturing Facility, Fab 12 P7 Office Building, Fab 14 P7 Office Building, Fab 15 P5 Manufacturing Facility, Fab 15 P6 Manufacturing Facility, Fab 16 P1 Manufacturing Facility
	R.O.C. Ministry of the Interior “Ecology, Energy Saving, Waste Reduction and Health (EEWH)” certification	• "Diamond" class of green building certification – Fab 15 P5 Manufacturing Facility
	R.O.C. Ministry of Economic Affairs	• Green Factory Label – Fab 12 P1/P2, Fab 12 P3, Fab 14 • Excellence in Carbon Reduction Award – Fab 12A, Fab 12B, Fab 14B • Water Conservation Award – Fab 15A • Excellence in Energy Conservation and Carbon Reduction Award, Electronic Industry – Fab 14B
	R.O.C. Ministry of Labor	• Excellence in Labor Safety and Hygiene Award – Fab 12B P6, Fab 14B, Fab 15A
	R.O.C. Environmental Protection Administration	• Enterprise Green Procurement Award – Fab 2 and Fab 5, Fab 3, Fab 6, Fab 8, Fab 12A, Fab 12B, Fab 14A, Fab 14B, Advanced Backend Fab, Advanced Backend Fab 3
	Hsinchu Science Park Administration	• Water Conservation Award – Advanced Backend Fab 3
	Central Taiwan Science Park Administration	• Excellence in Labor Safety and Hygiene Award – Fab 15A • Excellence in Waste Reduction and Resource Circulation Award – Fab 15 • Water Conservation Award – Fab 15A
	Southern Taiwan Science Park Administration	• Excellence in Environmental Protection – Fab 14A
	Hsinchu County Environmental Protection Bureau	• Enterprise Environmental Performance Evaluation – Fab 2 and Fab 5, Fab 3, Fab 12A, Fab 12B
	Taichung City Economic Development Bureau	• Renewable Energy Promoting Contribution Award
Society	Forbes	• World's Best Employers
	Veterans Affairs Council	• Certificate of Merit for Hiring Veterans

7.2 Environmental, Safety and Health (ESH) Management

TSMC believes its environmental, safety and health practices must not only meet legal requirements, but should also measure up to or exceed recognized international best practices. TSMC’s ESH policies aim to reach the goals of “zero incident” and “environmental sustainable development,” and to make TSMC a world-class company in environmental, safety and health management. The Company’s strategies for reaching these goals are to comply with regulations, promote safety and health, strengthen recycling and pollution prevention, manage ESH risks, instill an ESH culture, establish a green supply chain, and fulfill its related corporate social responsibilities.

All TSMC manufacturing facilities have received ISO 14001: 2015 certification for environmental management systems and OHSAS 18001: 2007 certification for occupational safety and health management systems. All fabs in Taiwan have also been TOSHMS (Taiwan Occupational Safety and Health Management System) certified since 2009.

TSMC strives for continuous improvement and actively seeks to enhance climate-change management, pollution prevention and control, power and resource conservation, waste reduction and recycling, safety and health management, fire and explosion prevention as well as to minimize the impact of earthquake damage, so as to reduce overall environmental, safety and health risks.

In order to meet regulatory and customer needs for the management of hazardous materials, TSMC adopted the IECQ QC 080000 Hazardous Substance Process Management (HSPM) System. All TSMC manufacturing facilities have been QC 080000 certified since 2007. By practicing QC 080000, TSMC ensures that its products comply with regulatory and customer requirements, including the European Union’s “Restriction of Hazardous Substances (RoHS) Directive,” the EU’s “Registration, Evaluation, Authorization and Restriction of Chemicals (REACH),” the “Montreal Protocol on Substances that Deplete the Ozone Layer” (the “halogen-free in electronic products” initiative), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA) and its related substances restriction standards. In addition, TSMC started a reduction project for the hazardous substance n-methylpyrrolidinone (NMP). This project reduced NMP usage by 48% in 2018 and will be continued to promote further reduction.

Since 2011, TSMC has adopted the ISO 50001 Energy Management System for the continuous improvement of energy conservation. TSMC’s Fab 12 Phase 4 data center is Taiwan’s first facility to earn the ISO 50001 certification for a high-density computing data center. As of 2016, TSMC has three fabs – Fab 12 Phase 4/5/6, Fab 14 Phase 3/4 and Fab 15 – that earned ISO 50001 certifications. Other TSMC fabs also implement energy management measures consistent with ISO 50001. Furthermore, TSMC plans to earn the ISO 50001 certification for all fabs from the third party by the end of 2019.

In order to establish the healthiest workplace possible, in 2017 TSMC formed a corporate-level health promotion committee, led by vice president management level. The committee members include site directors, safety and health department managers, wellness, HR and legal affairs representatives as well as invited external experts to discuss the potential risks of occupational diseases in semiconductor manufacturing process and develop occupational disease preventive plans. To mitigate health risks to employees, suppliers, and contractors in the workplace, TSMC has adopted rigorous safety and health control measures to prevent occupational injuries and diseases and promote employee safety and mental health.

To mitigate the supply chain risk and fulfill corporate social responsibility, TSMC not only does its best to manage ESH but also strives to improve ESH performance of its suppliers and contractors through audits and counselling.

TSMC uses priority work management and self-management to govern work performed by contractors. The Company requires contractors performing level-one high-risk operations to complete certification for technicians and to establish their own OHSAS 18001 safety and health management system. This promotion of self-management is aimed at increasing the sense of responsibility of TSMC’s contractors, with the goal of promoting safety awareness and technical improvement for all contractors in the industry. For onsite contractor personnel, TSMC standardizes safety and health training courses and increases their frequency every year, with the aim of improving training effectiveness and safety awareness. To facilitate the program and mitigate onsite operational risks, TSMC also establishes a two-way electronic communication platform that enables instant requirements delivery.

TSMC collaborates with suppliers to improve the sustainability of the Company’s supply chain regarding ESH-related issues such as environmental protection, safety and hygiene code compliance, hazardous substance management, fire protection, and natural disaster mitigation. TSMC not only performs ESH audits at its suppliers’ manufacturing sites but also proactively assists them with improving ESH performance.

In addition, TSMC also monitors potential climate-change related risks in the supply chain. The Company requests that suppliers conduct carbon emissions inventory and encourages them to implement measures to save energy, reduce carbon emissions, conserve water and reduce waste.

In recent years, TSMC suppliers’ performance on pollution control and safety management has made good progress in procedure establishment and implementation. To take a step further, the Company gives greater attention to occupational hygiene issues directly related to labor health. Since 2017, TSMC and the Ministry of Labor Occupational Safety and Health Administration (OHSA) have jointly launched the “Semiconductor Supply Chain Safety and Health Promotion Project.” TSMC invited suppliers to participate in the project. As engaged by OSHA, a professional team has taken on the responsibility of providing consultation through document review and onsite inspection to participating suppliers on management procedures and hardware setup in order to improve the working environment and labor health management.

7.2.1 Environmental Protection

Greenhouse Gas (GHG) Emission Reduction

TSMC actively participates in the World Semiconductor Council (WSC) in its efforts to set up a global voluntary PFC (perfluorinated compounds) emissions reduction goal for the 2011 to 2020, and has incorporated past experience to develop best practices. The implementation of best practices has been adopted by the WSC as a major element of the 2020 goal. In 2013, in accordance with the “EPA Early Actions for Carbon Credit of Greenhouse Gases Reduction” regulation, TSMC applied for the recognition of greenhouse reduction from 2005 to 2011, and received 5.28 million tons of carbon dioxide credits in 2015. Those carbon credits can be used to offset greenhouse gas emissions of new manufacturing facilities regulated by Environmental Impact Assessment (EIA) Act, which can mitigate climate-change risk and support the Company’s sustainable operations.

Since 2005, TSMC has completed the GHG (Greenhouse Gas) inventory program and taken a complete inventory of its GHG emissions to gain ISO 14064 certification. The inventory shows that the major direct GHG emissions are PFCs, which are widely used in the semiconductor manufacturing process. The primary indirect GHG emission is electricity consumption. The analysis of the inventory data is not only to meet domestic regulatory reporting requirements but also to serve as a baseline reference for TSMC’s strategy to reduce GHG emissions.

In response to the commitment of global climate summit “Paris Agreement” and the Republic of China “Greenhouse Gas Reduction and Management Act” promulgated in 2015, TSMC initiated a cross-functional platform for corporate carbon management in 2016. The three focuses of this platform are legal compliance, carbon emission reduction, and carbon credit acquisition. In addition to participating in official regulatory consultation and communications meetings, TSMC also sets short-, medium- and long-term reduction targets through the “Energy and Carbon Reduction Committee” led by vice president of operations, which are carried out by energy and carbon reduction teams of individual fabs, as the Company continues to strengthen climate mitigation and adaption. Because more than 70% of TSMC’s GHG emissions come from electricity consumption, TSMC always emphasizes energy saving and carbon reduction initiatives. TSMC has not only adopted energy-conserving designs in its manufacturing fabs and offices, but has also continuously improved the energy efficiency of its facilities during operation. These efforts simultaneously reduce both carbon dioxide gas emissions and costs. TSMC has accumulated 900 million kilowatt hours (kWh) power conservation since 2016.

Since 2015, TSMC has actively participated in the Republic of China Ministry of Economic Affairs’ voluntary “Green Power Purchasing Program.” for three consecutive years. During this time, TSMC was the largest green power purchaser in Taiwan, purchasing 400 million kilowatt hours (kWh) of green power. Although the Taiwan Power Company has stopped selling green power since 2018, TSMC still aggressively negotiates the purchase of renewable energy with renewable energy suppliers in Taiwan, and is committed to using 20% renewable energy in newly constructed fabs in the future. Since 2018, the overseas manufacturing fabs and offices purchased renewable energy and carbon credits to offset all carbon emissions caused by power consumption. This is a clear manifestation of the Company’s active support of the United Nations Sustainable Development Goals (SDGs).

Air and Water Pollution Control

The Company has installed effective air and water pollution control equipment in each wafer fab to meet regulatory emissions standards. In addition, TSMC maintains backup pollution control systems, including emergency power supplies, to lower the risk of pollutant emissions in the event of equipment failure. TSMC centrally monitors the operations of its air and water pollution control equipment around the clock and treats system effectiveness as an important tracking item to ensure the quality of emitted air and discharged water.

To make the most effective use of Taiwan’s limited water resources, all TSMC fabs strive to increase water reclamation rates by adjusting the water usage of manufacturing equipment and improving wastewater reclamation systems. All fabs meet or exceed the process water reclamation rate standard of the Science Park Administration. Some fabs are able to reclaim more than 90% of process water, outperforming most semiconductor fabs around the world. TSMC also makes every effort to reduce non-manufacturing-related water consumption, including water used in air conditioning systems, sanitary facilities, cleaning and landscaping activities and kitchens. TSMC uses an intranet website to collect and measure water recycling volumes company-wide.

Since water resources are inherently local, TSMC shares its water saving experiences with other semiconductor companies through the Association of Science-Based Industrial Park to promote water conservation in order to achieve the Science Park’s goals and ensure a long-term balance of supply and demand. In addition, TSMC has committed to use partial reclaimed water in newly constructed fabs in the future in order to further reuse water resource and support the government policy for reclaimed water promotion.

Waste Management and Recycling

The Company has a designated unit responsible for waste recycling and disposal. To meet the goal of sustainable resource utilization, TSMC’s priorities are: (1) process waste reduction, (2) onsite regeneration and reuse, and (3) offsite recycling. The last option consists of treatment or disposal. To achieve raw material reduction, resource recycling and the goal of zero waste, for example, TSMC built an in-house waste sulfuric acid pre-treatment system, as electronic grade sulfuric acid can be used as a waste water treatment agent after the wafer fabrication process. In order to track waste flow and ensure that all waste is treated or recycled legally and properly, TSMC carefully selects waste disposal and recycling contractors. All recycling contractors must report their recycled product sales monthly. TSMC performs

regular onsite audits to check factory status and review the reported data with actual reuse and recycling data to assure recycled product flows downstream properly. TSMC also takes proactive steps to strengthen vendor auditing effectiveness. For example, all waste transportation contractors were asked and agreed to join the “GPS Satellite Fleet” so that all the cleanup transportation routes and abnormal stays for all trucks can be traced. In addition, all waste recycling and treatment vendors have installed closed-circuit TV systems at operating sites to monitor and audit the waste handling. Meanwhile, TSMC also conducts an ongoing survey of recycling product tracking. These actions were taken to ensure lawful and proper waste recycling and treatment.

In 2018, TSMC’s fabs in Taiwan achieved a 95% waste recycling rate for the tenth consecutive year, with a landfill rate below 1% for the ninth consecutive year. Also during the year, TSMC amended its articles of incorporation to add four business items for chemical materials to ensure waste flow and reduce risks of improper waste disposal by commissioned agencies. TSMC also set up onsite resource activation facilities to regenerate waste resources produced from process activities into products to be used onsite or to sell to other factories. As a result, TSMC has become a leading company in waste resources regeneration. In 2018, TSMC extended its capacity to regenerate used copper sulfate into copper tubes and took the further step of collaborating with raw material suppliers to produce electronic grade copper anodes using copper tubes regenerated in the TSMC manufacturing process. In addition, in order to achieve the target of “reclaiming all ammonia”, TSMC has built the first ammonium sulfate drying system, which successfully converted biologically toxic ammonia wastewater into industrial grade ammonium sulfate as valuable recycled products for sale.

Environmental Accounting

The purpose of TSMC’s environmental accounting system is to identify and calculate environmental costs for internal management. At the same time, the Company can also evaluate the savings or economic benefits of environmental protection programs so as to promote economically-effective programs. While environmental expenses are expected to continue growing, environmental accounting can help TSMC manage these costs more effectively. TSMC’s environmental accounting measures various environmental costs, establishes independent environmental account codes, and provides these to all units for use in annual budgeting. The Company’s economic benefit evaluation calculates cost savings for reduction of energy, water or waste and benefits from waste recycling in accordance with its environmental protection programs.

The environmental benefits disclosed in this report include real income from projects such as waste recycling and savings from major environmental projects. In 2018, 667 environmental projects of TSMC fabs were completed and the total benefits, including waste recycling, were more than NT\$1,500 million.

2018 Environmental Cost of TSMC Fabs in Taiwan

Unit: NT\$ thousands

Classification	Description	Expense	Investment
1. Direct Costs for Reducing Environmental Impact			
(1) Pollution Control	Fees for air pollution control, water pollution control, and others	5,556,000	3,881,000
(2) Resource Conservation	Costs for resource (e.g. water) conservation	-	6,042,000
(3) Industrial Waste Disposal and Recycling	Costs for waste treatment (including recycling, incineration and landfill)	2,266,000	-
2. Indirect Cost for Reducing Environmental Impact (Environmental Managerial Costs)	(1) Cost of training (2) Environmental management system and certification expenditures (3) Environmental impact measurement and monitoring fees (4) Environmental protection product costs (5) Environmental protection organization fees	265,000	158,000
3. Other Environmental Costs	(1) Costs for soil decontamination and natural environment remediation (2) Environmental damage insurance fees and environmental taxes and expenses (3) Costs related to environmental settlement, compensations, penalties and lawsuits	-	-
Total		8,087,000	10,081,000

2018 Environmental Efficiency of TSMC Fabs in Taiwan

Unit: NT\$ thousands

Category	Description	Efficiency
1. Cost Savings of Environmental Protection Projects	Energy savings: completed 433 projects	750,000
	Water savings: completed 11 projects	16,300
	Waste reduction: completed 223 projects	354,000
2. Real Income from Industrial Waste Recycling	Recycling of used chemicals, wafers, sputter targets, batteries, lamps, packaging materials, paper cardboard, metals, plastics, and other waste	388,405
Total		1,508,705

Green Building and Green Factory

Since 2006, TSMC has adopted standards from both the Taiwan “Green Building” and the evaluation of the U.S. Green Building Council – Leadership in Energy and Environmental Design (LEED) for new fab and office building designs to achieve better energy and resource efficiency than conventional designs. During this time, TSMC has also continued to upgrade existing office buildings to comply with the LEED standard each year. From 2008 to 2018, 30 of TSMC’s fabs and office buildings have achieved LEED certifications (3 platinum and 27 gold). Meanwhile, TSMC also received 5 Taiwan Intelligent Building diamond-class certifications and 21 Taiwan EEWB (ecology, energy saving, waste reduction and health) certifications (18 diamond, 2 gold and 1 silver).

TSMC believes that more manufacturing companies should convert their facilities into green factories to improve the environment and lower construction costs. Therefore, the Company freely shares its practical experience with industry, government and academia. As of the end of 2018, 12,545 visitors from more than 330 different industrial, government, academic and general community groups had contacted TSMC to have communication for the Company’s green building technology and practical experiences. Since 2009, TSMC has led the industry in support of the Taiwan government’s “Green Factory Label” standard which includes “Clean Production Evaluation System” and “Factory Green Building Evaluation System.” TSMC received Taiwan’s first “Green Factory Label” and 12 labels in total as of the end of 2018, and was the most awarded company in Taiwan.

7.2.2 Sustainable Products

TSMC collaborates with its upstream material and equipment suppliers, design ecosystem partners and downstream assembly and testing service providers to minimize environmental impact. Reducing the resources and energy consumed for each unit of production allows the Company to provide customers with more advanced, power efficient and ecologically sound products, such as ultra-low power chips for narrowband IoT, low Vdd (low operating voltage) chips for wearables and IoT devices, low-power chips for mobile devices, high-efficiency LED driver chips for flat panel display backlighting, indoor/outdoor solid state LED lighting, “Energy Star” certified low standby AC-DC adaptors chips, high-efficiency DC brushless motor chips, electric vehicle chips, and low-power server chips, etc. By leveraging TSMC’s superior energy-efficient technologies, these chips support sustainable city infrastructure, greener vehicles, smart grids, more energy efficient servers and data centers, and other applications. In addition to helping customers design low-power, high performance products to reduce resource consumption over the product’s life cycle, TSMC’s green manufacturing practices provide further green value to customers and other stakeholders.

TSMC-manufactured ICs are used in a broad variety of applications covering various segments of the computer, communications, consumer, industrial, electric vehicle, server and data center, and other electronics markets. Through TSMC’s manufacturing technologies, customers’ designs are realized and their products are incorporated into people’s lives. These chips, therefore, make significant contributions to the progress of modern society. TSMC works hard to achieve profitable growth while providing products that add environmental and social value. Listed below are several examples of how TSMC-manufactured products significantly contribute to the environment and society.

Environmental Contribution by TSMC Foundry Services

1. Continue to Drive Technology to Lower Power Consumption and Save Resources

- To improve sustainability, TSMC continues to drive the development of advanced semiconductor process technologies to support customer designs that result in the most advanced, energy-saving and environmentally friendly products. In each new technology generation, circuitry line widths shrink, making transistors smaller and reducing product power consumption for completing the same tasks or achieving the same level of performance.
- As TSMC quickly ramped up its 28nm and newer generation technologies, the combined wafer revenue contribution grew significantly from 12% in 2012 to 63% in 2018. TSMC’s

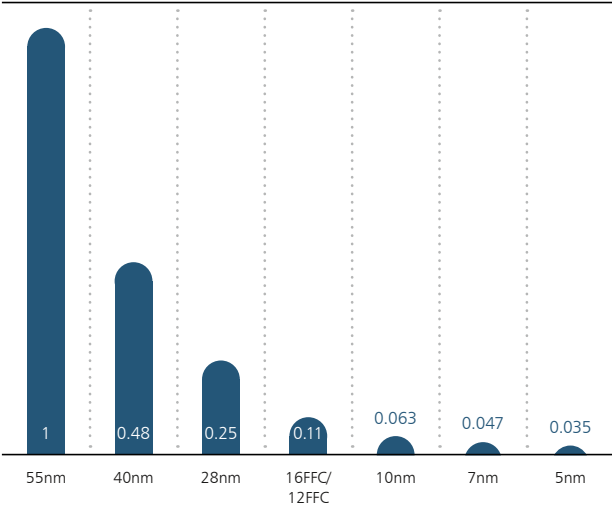
objective is to continue R&D investments and to increase the wafer revenue contribution in 28nm and beyond technologies, helping the Company achieve both profitable growth and sustainability.

TSMC Wafer Revenue Contribution from 28nm and Beyond Technologies

2014	2015	2016	2017	2018
42%	48%	54%	58%	63%

Chip Die Size Cross-Technology Comparison

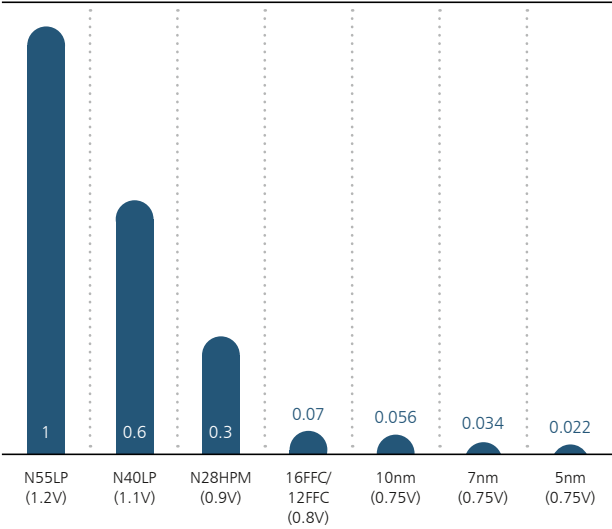
Die size is shrinking as line width shrinks



Note: The logic chip/SRAM/IO (Input/Output) ratio, which affects die size and power consumption, was re-aligned.

Chip Total Power Consumption Cross-Technology Comparison

More power is saved as line width shrinks



Note: The logic chip/SRAM/IO (Input/Output) ratio, which affects die size and power consumption, was re-aligned.

2. Provide Customers Leading Power Management IC Process with the Highest Efficiency

- TSMC’s leading manufacturing technology helps customers design and produce green products. Power Management ICs, the key components that supply and regulate power to all other IC components within electronic devices, are the most notable green IC products. TSMC helps customers produce industry-leading power management chips with more stable and efficient power supplies and lower energy consumption.
- In 2018, more than 2.6 million 8-inch equivalent wafers using TSMC’s HV/Power technologies were shipped to customers. Power Management ICs manufactured by TSMC are widely used in computer, communication, consumer, electric vehicle, server and data center, and other systems around the globe.

HV/Power Technologies Shipments

Unit: 8-inch equivalent wafer

2014	2015	2016	2017	2018
>1,800K	>2,000K	>2,100K	>2,500K	>2,600K

3. Drive Industry-leading, Comprehensive Ultra-low Power (ULP) Technology Platform

- To meet low-power consumption requirements for the wearable and IoT markets, TSMC continues to invest in expanding and enhancing its ultra-low power processes. TSMC provides industry’s leading and comprehensive ultra-low power (ULP) technology platform to support innovations for a wide range of IoT applications that demand increased computing in smart edge devices, including smart speakers, smart cameras, wearables, and various smart appliances. TSMC’s industry-leading offerings, including 55nm ULP, 40nm ULP, 28nm ULP, 22nm ULP/ULL (ultra-low leakage), have been widely adopted by various IoT customers. TSMC further extends its low Vdd (low operating voltage) offerings for extremely low power applications. In 2018, TSMC continued to develop 22nm low Vdd solutions to enable more advanced IoT products, including IoT WiFi and BLE (Bluetooth low energy) connectivity products.

4. Develop Greener Manufacturing to Lower Energy Consumption

- TSMC continues to develop more advanced and efficient technologies to reduce energy/resource consumption and pollution per unit during the manufacturing process as well as power consumption and pollution during product use. In each new technology generation, circuitry line widths shrink, making circuits smaller and lowering the energy

and raw materials consumed for per unit in manufacturing. In addition, the Company continuously provides process simplification and new design methodology based on its manufacturing excellence to help customers reduce design and process waste so as to produce more advanced, energy-saving and environmentally-friendly products. For total energy savings and benefits realized in 2018 through TSMC’s green manufacturing, see Environmental Accounting on page 122 in this annual report.

Social Contribution by TSMC Foundry Services

1. Unleash Customers’ Mobile and Wireless Chip

Innovations that Enhance Mobility and Convenience

- The rapid growth of smartphones and tablets in recent years reflects strong demand for mobile devices, which, in turn, offer remarkable convenience. TSMC contributes significant value to these devices in the following ways: (1) new TSMC process technologies help chips achieve faster computing speed in smaller die areas, leading to smaller form factors for these electronic devices. In addition, TSMC SoC technology integrates more functions into one chip, reducing the total number of chips in electronic devices, again resulting in a smaller system form factor; (2) new TSMC process technologies also help chips reduce power consumption, allowing mobile devices to be used for a longer period of time; and (3) TSMC helps spread the growth of more convenient wireless connectivity such as 3G/4G and WLAN/Bluetooth, meaning people can communicate more efficiently and “work anytime and anywhere,” significantly increasing the mobility of modern society.
- Mobile computing related segments represented 46% of TSMC wafer revenue in 2018 and included products such as baseband, RF transceivers, application processors (AP), wireless local area networks (WLAN), CMOS image sensors, near field communication (NFC), Bluetooth, and global positioning systems (GPS) among others.

TSMC Wafer Revenue Contribution from Mobile Computing Related Products

2014	2015	2016	2017	2018
48%	51%	52%	50%	46%

2. Unleash Customers’ CIS (CMOS image sensor) and MEMS (Micro-electromechanical Systems) Innovations that Enhance Human Health and Safety

- TSMC continues to enhance or develop innovative CIS and MEMS technologies, which are extended from traditional sensing to machine sensing, such as NIR (near infrared), ultrasound, and micro-actuators. These new technologies can support more product applications, ranging from smartphones and consumer electronics to automotive and health services. By combining advantages of traditional sensing and machine sensing, new products using TSMC CIS and MEMS technologies can be made smaller and faster, consume less power, and greatly enhance human convenience, health, and safety. For instance, TSMC customers’ CIS and MEMS products are used in a number of advanced medical treatments as well as in preventative health care applications. Examples include early warning systems to minimize the injury from falls for the elderly, systems to detect physiological changes, car safety systems and other applications that significantly improve human health and safety.

7.2.3 Safety and Health

Safety and Health Management

TSMC’s safety and health management is built on the framework of the OHSAS 18001 system and adheres to the management approach of “Plan, Do, Check, Act” to prevent accidents, promote employee safety and health and protect Company assets. All TSMC fabs in Taiwan have also received TOSHMS (Taiwan Occupational Safety and Health Management System) certification.

Besides accident prevention, TSMC has established emergency response procedures to protect employees and contractors if a disaster should occur, as well as to prevent and/or reduce the negative impact on society and the environment. TSMC continually communicates with its suppliers to ensure that potential risk in the operation of production equipment is minimized, and rigorously follows safety control procedures when installing production equipment. The Company places stringent controls on high-risk operations and also evaluates the seismic tolerance of its facilities and equipment to reduce the risk of earthquake damage.

For epidemics, TSMC has established corporate-level prevention committees and procedures for emergency response to outbreaks of infectious diseases.

Working Environment and Employee Safety and Health Protection

TSMC’s ESH policy is focused on establishing a safe working environment, preventing occupational injury and illness, keeping employees healthy, enhancing every employee’s awareness and sense of accountability to ESH, and building an ESH culture. TSMC safety and health management operations apply to:

● Equipment Safety and Health Management

In addition to meeting regulatory requirements and internal standards, as well as mitigating ESH-related risks when building or upgrading facilities, TSMC also maintains procedures governing new equipment and raw materials, requires safety approvals for bringing new tools online, updates safety rules, and implements seismic protection and other safety measures.

TSMC requires that all new tools meet SEMI-S8 requirements and that appropriate supplementary control measures be taken to reduce ergonomic risk. Moreover, TSMC endeavors to automate 300mm front-opening unified pod (FOUP) transportation to prevent accumulative physical damage caused by repetitive manual handling of 300mm FOUPs. TSMC 300mm fabs have completed automatic transportation control.

● Environmental, Safety and Health Evaluation of New Tools and New Chemical Substances

As a technology leader in the global semiconductor industry, TSMC operates more and more diversified process tools and introduces new chemicals in the R&D stage. Before using those new tools and new chemicals, they are reviewed carefully by the New Tools and New Chemical Review Committee. The purpose is to ensure that new tools are compliant with the semiconductor industry’s safety standards (such as SEMI S2) and that new chemicals’ environmental, safety and health concerns can be well controlled, including engineering controls, application of personal protection equipment, and operational safety training during storage, transportation, usage and disposal.

● General Safety Management, Training and Audit

All TSMC manufacturing facilities hold environmental, safety and health committee meetings on a monthly basis. TSMC has adopted multiple preventive measures such as controls on high-risk work, contractor management, chemical safety management, personal protective equipment requirements, and safety audit management. In addition, the Company maintains detailed disaster response procedures and performs regular drills designed to minimize harm to employees and property, as well as the impact on society and the environment in the event of a disaster.

● Working Environment Hazardous Factors Management

TSMC conducts workplace hazard assessments to provide a comfortable and safe workplace to employees. TSMC also educates and requires employees to use personal protective equipment (PPE) to prevent hazardous exposures.

TSMC performs semi-annual workplace environment assessments of physical and chemical hazards, including CO₂ concentration, illumination, noise, and hazardous chemical substances regulated by local laws. In addition, the Company has performed exposure assessments and has used hierarchy management control for chemicals with potential health hazards since 2015. If abnormal measurements or events happen or an exposure assessment indicates there is an adverse health effect for employees, ESH professionals immediately conduct onsite observation and interventions to reduce the exposure to acceptable levels.

● Health Promotion Program

In order to establish the healthiest possible workplace and prevent from occurrence of occupational disease, TSMC formed a corporate-level committee to execute health promotion programs covering three scopes:

- (1) Exposure and health risk assessment: develop an exposure assessment system to identify high health risk employees.
- (2) Hazardous training and notification: use standardized training materials for employees and contractors in all TSMC fabs. Inform them of the health risks and prevention measures at the workplace before working or providing any services there.
- (3) Strengthen management of high health concerned chemicals: sample raw materials used in the manufacturing process to confirm that they do not contain any carcinogenic, mutagenic or toxic-reproductive materials. Inform suppliers that all materials they provide to TSMC must comply with applicable laws including clear disclosure of any hazardous substances.

● Emergency Response

The planning and execution of an effective emergency response should identify potential high-risk events via risk assessment and be prepared for various scenarios. It should focus on continuous improvement and practice drills covering all potentially serious events. TSMC’s emergency response plans include procedures for rapid-response crisis management and disaster recovery to potential incidents.

All TSMC fabs conduct major annual emergency response exercises and evacuation drills. TSMC’s onsite service contractors are required to participate in emergency response planning and exercises to ensure cooperation in handling accidents and to effectively minimize any damage caused by disasters. At least every two years, each fab director invites fab management and support functions to participate in crisis management drills for potentially high-risk events such as earthquake, fire and flood (Tainan site). Beginning in 2018, TSMC has conducted complex type accident emergency response drills which include earthquakes, fire and chemical spills scenarios simultaneously to insure emergency response capability can handle a real disaster if it happened and keep losses to a minimum.

In addition to the regular emergency response drills held by engineering and facilities departments each quarter, the Company’s laboratory, canteen, dormitory, and shuttle bus personnel also hold emergency response drills to prepare for events such as earthquakes, chemical spills, ammonia release, fires and traffic accidents.

● Emerging Infectious Disease Response

TSMC has a dedicated corporate ESH organization to monitor emerging infectious diseases around the world, to assess any potential impact on the workplace, and to provide an appropriate strategic response plan. In previous outbreaks (such as SARS in 2003 and the H1N1 influenza outbreak in 2009), TSMC convened the corporate influenza response committee to develop the Company’s strategies. These strategies included educating employees in prevention and response, publishing guidelines for managers, establishing guidelines for employee sick leave due to flu, and installing alcohol-based hand sanitizers at appropriate locations. The Committee also monitors the status of employee leave due to illness and, at the same time, develops a continuity plan to address manpower shortages and minimize business impact.

● Employee Physical and Mental Health Enhancement

TSMC believes that employees’ physical and mental health is not only fundamental to maintaining normal business operations but also part of a corporation’s responsibility. To protect and promote employee physical and mental health, TSMC fosters collaboration among the onsite industrial safety and environmental protection department, onsite medical personnel of the health center, and physicians of occupational medicine. TSMC strives to reduce cerebral and cardiovascular disease that might be induced or aggravated by overwork, night work or shift work. The Company conducts maternal health protection programs and prevention

of cumulative trauma disorders as well. TSMC devotes significant resources to mental health awareness and related activities, which not only protect employees from hazards at work but also proactively promote employee health in general. In 2018, through planned personal health management, (1) 809 female employees participated in the maternal health program, the completion rate was 100%. 808 of them were at the first degree risk (there was no harm to the mother, infant, and baby). Only 1 employee, who were was unstable at the late stage of pregnancy, were at was reorganized into the second degree risk (possible harm to the mother, infant, and baby), we assisted her adjusted job content to and she smoothly give gave the birth afterward. (2) 306 employees were identified from annual health examination to be in a middle to high risk group for cerebral and cardiovascular diseases, we provide them health education, medical assistance, and 13 of them had been restricted their overtime to reduce risk. (3) 125 employees were in a high risk group for cumulative trauma disorders, 1 of them were assisted to adjust their job content to avoid possible risk from work. For seven consecutive years, TSMC has held a series of physical and mental health activities. During this time, 1,000 employees have joined the weight-control program, losing a total of 2,888 kilograms collectively and 271 attendees completed the stair climbing program to improve quality of life. Those employees who had joined both activities of weight-control and stair climbing showed better improvement in weight, waist circumference, liver function and cholesterol levels.

Supplier and Contractor Management

• Management Aspect

As a means of enhancing supply chain management, TSMC is committed to communicating with and encouraging its contractors and suppliers to improve their quality, cost effectiveness, delivery performance and sustainability on environmental protection, safety and health. Through regular communication with senior managers, site audits and experience sharing, TSMC collaborates with major suppliers and contractors to enhance partnerships and ensure continual improvement for better performance and increased joint contributions to society. As noted above, contractors performing high-risk activities must lay out clearly defined safety precautions and preventative measures. In addition, contractors working on high-risk engineering projects must establish OHSAS 18001 or ISO 45001 systems and the workers must successfully complete work skill training.

• Supply Chain Sustainability

TSMC works with suppliers in several fields of sustainable development, such as greening the supply chain, carbon management for climate change, mitigation of fire risk, ESH management and business continuity plans in the event of a natural disaster.

Since becoming a full member of the Responsible Business Alliance (RBA) in 2015, TSMC has completed the adoption of the RBA code of conduct throughout the Company by performing self-assessments at its facilities worldwide and reviewing policies and procedures in the areas of labor, health and safety, environment, ethics, and management systems.

To enhance supply chain sustainability and streamline risk management, TSMC is committed to collaborating with its suppliers to maintain full compliance with Taiwan’s environment, safety, health and fire protection regulations. In 2018, TSMC developed a supplier’s code of conduct, which affirmed basic labor rights and standards for health, safety, environment, ethics and management systems. TSMC works with suppliers to inspect the risk and performance on the aspects of economy, environment, and society and make continuous improvement. The Company has upgraded suppliers’ performance of sustainability through experience sharing and training and hopes to establish a world-class semiconductor supply chain that exceeds international standards and serves as a global benchmark.

TSMC is subject to the U.S. Securities & Exchange Commission (SEC) disclosure rule on conflict minerals released under Rule 13p-1 of the U.S. Securities Exchange Act of 1934. As a recognized global leader in the high-tech supply chain, the Company acknowledges its corporate social responsibility to strive to procure conflict-free minerals in an effort to recognize humanitarian and ethical social principles that protect the dignity of all people. To this end, TSMC has implemented a series of compliance safeguards in accordance with leading industry practices such as adopting the due diligence framework in the OECD’s Model Supply Chain Policy for a Responsible Global Supply Chain of Minerals from Conflict-Affected and High Risk Areas issued in 2011.

TSMC is one of the strongest supporters of the Responsible Business Alliance and the Global e-Sustainability Initiative (GeSI), which will help the Company’s suppliers source conflict-free minerals through their jointly developed Responsible Minerals Initiative (RMI). Since 2011, TSMC has asked its suppliers to disclose information and make timely updates on smelters and mines. The Company encourages suppliers to source minerals from facilities or smelters that have received a “conflict-free” designation by a recognized industry group (such as the RBA) and also requires those who have not received such designation to become compliant with Responsible Minerals Initiative or an equivalent third-party audit program. TSMC requires the use of tantalum, tin, tungsten and gold in its products that are conflict-free.

TSMC will continue to conduct the supplier survey annually and require suppliers to improve and expand their disclosure to fulfill regulatory and customer requirements. For further information, see the Company’s Form SD filed with the U.S. SEC. (https://www.tsmc.com/english/investorRelations/sec_filings.htm)

7.3 TSMC Education and Culture Foundation

The TSMC Education and Culture Foundation, led by TSMC board director F.C. Tseng, who serves as the foundation’s chairman, was established in 1998 to make CSR contributions. In 2018, to fulfill TSMC’s social responsibility, this foundation contributed over NT\$76.81 million to its three engagements: caring about the educational disadvantaged, supporting youth with multiple educational platforms, and promoting arts and culture.

**Collaboration with Educational Partners
Narrowing Educational Gap between Cities and Rural Regions**

Narrowing the educational gap between cities and rural regions is a major focus of the TSMC Education and Culture Foundation and the reason for its collaborations with several public and private educational institutions. In 2018, the foundation sponsored nearly NT\$13 million to commit to multiple educational programs in response to the needs of different communities.

To facilitate a reading culture in rural areas, the TSMC Education and Culture Foundation became the initial philanthropy partner of Hope Reading of the CommonWealth Foundation, and has been donating 100 books to each of 200 junior high schools and primary schools in Taiwan’s remote townships every year since 2004. As a result, more than 280,000 children have benefited from over 250,000 donated books. Adapting to the digital era, beginning in 2016 the foundation further sponsored Hope Reading 2.0 with NT\$6 million in three years, to encourage reading by e-learning systems. As of the end of the fall semester 2018, the average reading quantity of participant students has grown from 19 to 90 per year.

To help economically disadvantaged students lighten their burden and enable them to focus on their studies, the TSMC Education and Culture Foundation sponsors the Rising Sun Plan of National Tsing Hua University and the Sunflower Plan of National Central University, relaxing the admissions requirements and providing complete four-year scholarships for talented students with financial need. In 2018, the foundation provided 37 students with NT\$3.02 million in scholarships. To extend care to the educationally disadvantaged, the TSMC Education and Culture Foundation has continuously sponsored Junyi Academy,

Teach for Taiwan and the Boyo Social Welfare Foundation, providing free and quality digital learning tools and tutors, and aiding enthusiastic young teachers who will be deployed to rural schools to make up for teacher shortages.

**Building Educational Platforms
Encouraging Youth to Reach Their Dreams**

To encourage young people to explore and expand their interests and visions, in 2018 the TSMC Education and Culture Foundation contributed over NT\$40 million to hold activities both in sciences and humanities as well as communication platforms, providing youth with opportunities to develop multiple extracurricular experiences.

In 2018, the TSMC Dream Builders of Youth Project initiate the “issue-specific focus group” to encourage the younger generation to place emphasis on social issues. To this end, the TSMC Education and Culture Foundation collaborated on the pilot project of Aesthetics of Sea Waste with the Department of Arts and Design of National Tsing Hua University. This project invited the students to create wearable art works out of the litter they had collected at the beach, and showcased their works on a fashion runway at the East Hsinchu City Gate and at the TSMC Sports Day, highlighting this environmental theme. In 2018 the Dream Builders of Youth Project attracted the participation of young students in 67 teams from Taoyuan, Hsinchu and Miaoli; seven teams were awarded prizes totaling NT\$3 million to help them realize their dreams.

The TSMC Education and Culture Foundation has held the TSMC Youth Literature Award and the TSMC Youth Calligraphy and Seal-Carving Competition since 2004 and 2008, respectively, to encourage young people to develop proficiency in literature and calligraphy. For the Literature Award, a total of 2,078 works were submitted in 2018. Marking its 15th anniversary, the foundation invited young writers who had won the award before to share their literary experiences at university campuses. For the Youth Calligraphy and Seal-Carving Competition, the foundation expanded the “Scribes’ Group,” and the contest and workshops attracted 809 attendees in total.

Celebrating the 200th anniversary of the original publication of Mary Shelley’s novel Frankenstein, the 2018 Cup had a science fiction theme to let 540 students from K9 to K12 researching the scientific principles behind science fiction in both novels and movies. In the competition competitors must digest scientific knowledge and translate it into intelligible introductory articles and speeches in order to improve their science presentation skills. In 2018, the TSMC Education and Culture Foundation also

continued to support Wu Chien-Shiung Science Camp, Wu Ta-Yu Science Camp and Madame Curie Senior High School Chemistry Camps. The camps attracted 386 senior high school teachers and students and gave them the opportunity to meet and learn from world-class scientists and Nobel Prize masters with the aim of inspiring the students and helping them realize their potential.

Promoting Arts and Culture

Presenting Chinese Exquisite Theatric Beauty

The TSMC Education and Culture Foundation is devoted to promoting arts and culture. In 2018, the foundation contributed over NT\$20 million to organizing superb artistic performances of Chinese opera, music, children’s program and literature to enrich the community residents’ spiritual life and spotlight prominent Taiwanese artistic groups.

The 2018 TSMC Hsin-Chu Arts Festival centered on a cinematic theme, *Behind the Scenes, Beyond Imagination*, and attracted more than 13,000 people to experience cinema’s irresistible charms. The festival’s program included: a classical music concert presented by live orchestra, a concert and theater tailored for children, a series of movie lectures on pioneering fantasy worlds behind the scenes, and the modern Peking Opera as a fusion of Eastern and Western aestheticism. All in all, the 2018 Hsin-Chu Arts Festival arranged for 57 distinct performances, presenting a spiritual feast for community residents.

The TSMC Education and Culture Foundation has continuously sponsored local artistic groups. In 2018, the foundation sponsored Chen Xi-Huang, the master of Taiwanese Puppetry, Huang Yi, a stellar young dancer, and The Legacy of Chen Uen – Art Life and Philosophy, the exhibition at the National Palace Museum. The Taiwanese master Chen Uen, who passed away in 2017, had uplifted the comics to arts. He was the first comics artist whose work was displayed at the National Palace Museum. The exhibition featured Chen Uen’s comics manuscript, as lifelong creation, striking a significant chord with more 100,000 attendees. The foundation also arranged exhibition tours for junior high school students in rural areas to expand their artistic visions.

7.4 TSMC Charity Foundation

Since it was established in 2017, the TSMC Charity Foundation has focused on four main areas: taking care of elders, promoting filial piety, caring for the disadvantaged and protecting the environment. Under the leadership of Chairperson Sophie Chang,

the Foundation is known to pay close attention to social issues with heart, care for disadvantaged groups with love, and to cooperate with internal and external stakeholders to achieve the mission of making a better society.

The Charity Foundation continues to devote to charity and launched several new projects in 2018 to expand the service scope:

- **Taking care of elders:** Cooperating with the Networking of Love partners, the Foundation integrated medical resources in Taiwan in order to provide elders who live alone with more accessible medical resources and services to enhance their health and well-being. In 2018, the Foundation helped Fengyuan Hospital install a remote intelligence medical care system, and helped Miaoli day-care center install intelligence system to increase medical service effectiveness. Currently partners in Networking of Love include: Taipei Veterans General Hospital, Old Five Old Foundation, Miaoli General Hospital, Feng Yuan Hospital, China Medical University Hospital, Lin Welfare and Charity Foundation, Tainan Taiwan Puli Care Association, Sin-Lau Medical Foundation, Jianan Psychiatric Center, Hengchun Tourism Hospital, Mennonite Christian Hospital and its Charity Foundation, and Fooyin University.

- **Promoting filial piety:** The Foundation strives to increase awareness of Eastern culture filial piety in the younger generation to reduce potential social risks in an aged society. In 2018, TSMC Charity Foundation collaborated with K-12 Education Administration, Ministry of Education to publish teaching materials on filial piety to 2,660 elementary schools. The Ministry of Education will also start a filial piety culture promotion program in Taiwan. The Foundation also invited five companies in Hsinchu Science Park to establish the first group of filial piety volunteers.

- **Caring for the disadvantaged:** Focusing on disadvantaged groups’ life and education, the Foundation provides goods and medical resources to them, and ensures they can have inclusive and equitable education resources. This will also go a long way towards achieving the United Nations’ goal to “End poverty in all its forms.” In 2018, the Foundation launched the “Sending Love” program, visited and identified cases that required urgent financial aid and helped them improve their quality of life through fundraising from TSMC employees and external donations. Including filial piety volunteers, which was first established in 2018, TSMC’s volunteers in this effort now number more than 10,200.

- **Protecting the environment:** Promoting environmental education and knowledge to increase people’s awareness of the importance of prevention and adaptation regarding climate change. In 2018 the “Cherish Food” program was launched, in cooperation with CHIMEI FROZEN FOOD, off-grade products (food with disqualified packaging) are regularly donated to TSMC’s partner organizations that look after disadvantaged groups in order to reduce food waste and protect the environment. TSMC’s ecology volunteers continuously provide ecology tours in Hsinchu Fab 12B, Taichung Fab 15, and Tainan Jacana Ecology Education Park. TSMC’s professional energy-saving volunteers assist schools at all levels on energy-saving assessment and improvement. The service locations cover: Taipei, Hsinchu, Taichung, Tainan and Kaohsiung such areas.

In February 2018, an earthquake with a magnitude of 6.4 on the Richter scale occurred in Hualien. The TSMC Charity Foundation visited the site at the first opportunity and dispatched manpower, donations and materials to support affected households in returning to normal life. Specifically, the Foundation:

- (1) Initiated a fundraising plan and donated around NT\$58.44 million. At the same time, water trucks were assigned to assist the affected area.
- (2) Assisted the reconstruction of over 400 households of disadvantaged groups and elders who live alone. The Foundation also held a camp in the local area to help children regain courage and confidence.
- (3) Organized a Hualien sightseeing train project with TSMC, the TSMC Employee Welfare Committee and the Taiwan Railways Administration in order to revitalize Hualien’s local economy. More than 7,500 people participated in this project. At the same time, TSMC employees started Hualien products group buying activities, with a total contribution of more than NT\$3.08 million.

This disaster relief operation was a result of the care and commitment from internal and external stakeholders such as TSMC employees, TSMC, social individuals and other companies. The TSMC Charity Foundation will continue to pay close attention to local emergency relief needs and provide immediate assistance when required.

7.5 TSMC i-Charity

“TSMC i-Charity” is an interactive online platform launched in 2014. The Company’s intranet provides a channel for employees to propose caring projects, share results, provide feedback and suggestions and participate in philanthropic events such as online donation directly and in a timely manner to give back to society.

In 2018, more than 19,000 attendees participated in the following projects, as over NT\$30 million in contributions were received:

- Hualien Earthquake Emergency Relief Project
- Junyi Academy Platform and Teach for Taiwan

From 2014 to 2018, TSMC i-Charity platform has received over NT\$99 million in contributions. TSMC will maintain its commitment to society and encourage employees to join in efforts to care for and give back to society in all ways.

7.6 Social Responsibility Implementation Status as Required by the Taiwan Financial Supervisory Commission

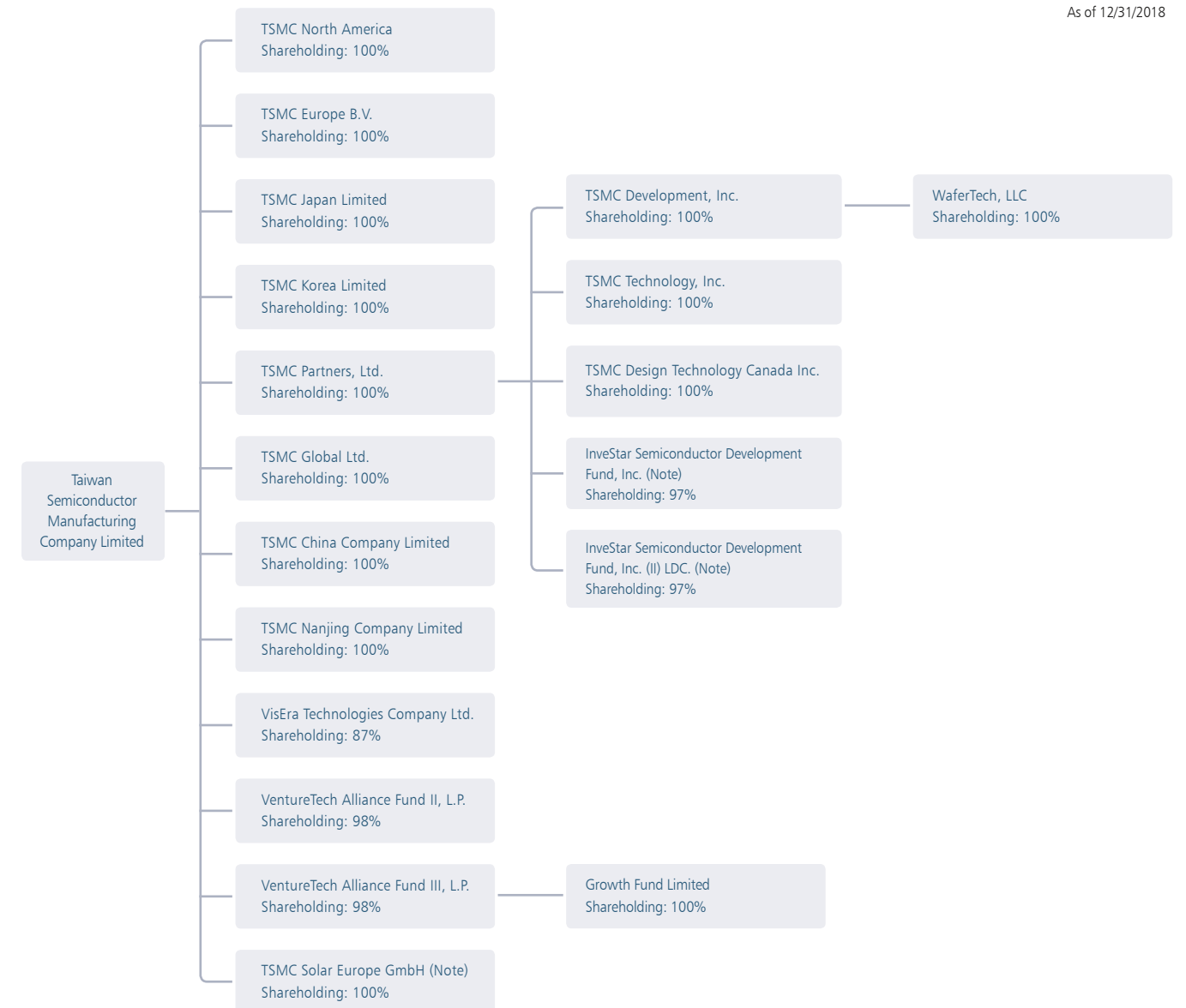
Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Summary	
1. Implementation of Corporate Governance (1) Does the Company have a corporate social responsibility policy and evaluate its implementation? (2) Does the Company hold regular CSR training? (3) Does the Company have a dedicated (or ad-hoc) CSR organization with Board of Directors authorization for senior management, which reports to the Board of Directors? (4) Does the Company set a reasonable compensation policy, integrate employee appraisal with CSR policy, and set clear and effective incentive and disciplinary policies?	V		(1) Please refer to “7. Corporate Social Responsibility” on pages 115-132 of this Annual Report. (2) Please refer to “3.5 Code of Ethics and Business Conduct” on pages 46-50 of this Annual Report (3) Please refer to “7. Corporate Social Responsibility” on pages 115-132 of this Annual Report. (4) Social responsibility is regarded as an integral part of corporate governance by TSMC. TSMC’s fair compensation policy is set with consideration of the goals of the Company’s corporate governance and operation; corporate social responsibility is included as part of its indices. For further details, please refer to “5.5 Human Capital” on pages 82-87 of this Annual Report.	None
2. Environmentally Sustainable Development (1) Is the Company committed to improving resource efficiency and to the use of renewable materials with low environmental impact? (2) Has the Company set an Environmental management system designed to industry characteristics? (3) Does the Company track the impact of climate change on operations, carry out greenhouse gas inventories, and set energy conservation and greenhouse gas reduction strategy	V		Please refer to “7.2.1 Environmental Protection” on pages 121-123 of this Annual Report.	None
3. Promotion of Social Welfare (1) Does the Company set policies and procedures in compliance with regulations and internationally recognized human rights principles? (2) Has the Company established appropriately managed employee appeal procedures? (3) Does the Company provide employees with a safe and healthy working environment, with regular safety and health training? (4) Has the Company established a mechanism for regular communication with employees and use reasonable measures to notify employees of operational changes which may cause significant impact to employees? (5) Has the Company established effective career development training plans? (6) Has the Company set polices and consumer appeal procedures in its R&D, purchasing, production, operations, and service processes? (7) Does the Company follow regulations and international standards in the marketing and labelling of its products and services? (8) Does the company evaluate environmental and social track records before engaging with potential suppliers? (9) Does the Company’s contracts with major suppliers include termination clauses if they violate CSR policy and cause significant environmental and social impact?	V		(1) Please refer to “5.5 Human Capital” on pages 82-87 of this Annual Report. (2) Please refer to “5.5 Human Capital” on pages 82-87 of this Annual Report. (3) Please refer to “7.2.3 Safety and Health” on pages 126-129 of this Annual Report. (4) Please refer to “5.5 Human Capital” on pages 82-87 of this Annual Report. (5) Please refer to “5.5 Human Capital” on pages 82-87 of this Annual Report. (6) Not applicable as TSMC is not an end product manufacturer. (7) Not applicable as TSMC is not an end product manufacturer. (8) Please refer to “Supplier and Contractor Management” on page 128 of this Annual Report. (9) Please refer to “Risks Associated with Purchase Concentration” in 6.3.3 Operational Risks of this Annual Report.	None
4. Enhanced Information Disclosure Does the Company disclose relevant and reliable CSR information on its website and the Taiwan Stock Exchange website?	V		TSMC has published a “Corporate Social Responsibility Report” since 2008, and discloses this on the Company’s website (https://www.tsmc.com/english/csr/index.htm).	None
5. If the company has established its corporate social responsibility code of practice according to “Listed Companies Corporate Social Responsibility Code of Practice,” please describe the operational status and differences. TSMC follows the Corporate Social Responsibility Policy set by the Chairman, Dr. Mark Liu. For corporate social responsibility operational status, please refer to “7. Corporate Social Responsibility” on pages 115-132 of this annual report and corporate social responsibility related information in our website: https://www.tsmc.com/english/csr/index.htm				
6. Other important information to facilitate better understanding of the company’s implementation of corporate social responsibility: Please refer to TSMC’s website for its corporate social responsibility implementation status: https://www.tsmc.com/english/csr/index.htm				
7. Other information regarding “Corporate Responsibility Report” which is verified by certifying bodies: TSMC’s Corporate Social Responsibility Report is in accordance with the GRI Standards and verified by certifying bodies.				

Subsidiary Information and Other Special Notes

8.1 Subsidiaries

8.1.1 TSMC Subsidiaries Chart

As of 12/31/2018



Note: The subsidiary is under liquidation procedures.

8.1.2 Business Scope of TSMC and Its Subsidiaries

TSMC and its subsidiaries strive to provide the best foundry services. Subsidiaries in North America, Europe, Japan, China and South Korea are dedicated to timely serving TSMC customers worldwide. WaferTech in the United States and TSMC China provide additional 8-inch wafer capacity. TSMC Nanjing also began to provide additional 12-inch wafer capacity in 2018. Other subsidiaries support the Company’s core foundry business with related services such as design service and investment in start-up companies involved in design, manufacturing, and other related businesses in the semiconductor industry.

8.1.3 TSMC Subsidiaries

Unit: NT\$ (USD, EUR, JPY, KRW, RMB, CAD) thousands

As of 12/31/2018

Company	Date of Incorporation	Place of Registration	Capital Stock	Business Activities
TSMC North America	Jan. 18, 1988	San Jose, California, U.S.	US\$ 11,000	Selling and marketing of integrated circuits and semiconductor devices
TSMC Europe B.V.	Mar. 04, 1994	Amsterdam, The Netherlands	EUR 100	Customer service and supporting activities
TSMC Japan Limited	Sep. 10, 1997	Yokohama, Japan	JPY 300,000	Customer service and supporting activities
TSMC Korea Limited	May 2, 2006	Seoul, Korea	KRW 400,000	Customer service and supporting activities
TSMC China Company Limited	Aug. 04, 2003	Shanghai, China	RMB 4,502,080	Manufacturing, selling, testing, and computer-aided design of integrated circuits and other semiconductor devices
TSMC Nanjing Company Limited	May 16, 2016	Nanjing, China	RMB 6,650,119	Manufacturing, selling, testing, and computer-aided design of integrated circuits and other semiconductor devices
TSMC Technology, Inc.	Feb. 20, 1996	Delaware, U.S.	US\$ 0.001	Engineering support activities
InveStar Semiconductor Development Fund, Inc. (Note)	Sep. 10, 1996	Cayman Islands	US\$ 489	Investing in new start-up technology companies
InveStar Semiconductor Development Fund, Inc. (II) LDC. (Note)	Aug. 25, 2000	Cayman Islands	US\$ 0	Investing in new start-up technology companies
TSMC Development, Inc.	Feb. 16, 1996	Delaware, U.S.	US\$ 0.001	Investing in companies involved in the manufacturing related business in the semiconductor industry
WaferTech, LLC	Jun. 03, 1996	Delaware, U.S.	US\$ 0	Manufacturing, selling, and testing of integrated circuits and other semiconductor devices
TSMC Partners, Ltd.	Mar. 26, 1998	British Virgin Islands	US\$ 988,268	Investing in companies involved in the design, manufacture, and other related business in the semiconductor industry and other investment activities
TSMC Design Technology Canada Inc.	May 28, 2007	Ontario, Canada	CAD 2,434	Engineering support activities
TSMC Global Ltd.	Jul. 13, 2006	British Virgin Islands	US\$ 11,284,000	Investment activities
VentureTech Alliance Fund II, L.P.	Feb. 27, 2004	Cayman Islands	US\$ 4,087	Investing in new start-up technology companies
VentureTech Alliance Fund III, L.P.	Mar. 25, 2006	Cayman Islands	US\$ 96,169	Investing in new start-up technology companies
Growth Fund Limited	May 30, 2007	Cayman Islands	US\$ 2,154	Investing in new start-up technology companies
TSMC Solar Europe GmbH (Note)	Dec. 17, 2010	Hamburg, Germany	EUR 400	Selling of solar modules and related products and providing customer service
VisEra Technologies Company Ltd.	Dec.1, 2003	Hsinchu, Taiwan	NT\$ 2,911,531	Engaged in manufacturing electronic spare parts and in researching, developing, designing, manufacturing, selling, packaging and testing of color filter

Note: InveStar Semiconductor Development Fund, Inc., InveStar Semiconductor Development Fund, Inc. (II) LDC., and TSMC Solar Europe GmbH are under liquidation procedures.

8.1.4 Shareholders in Common of TSMC and Its Subsidiaries with Deemed Control and Subordination: None.

8.1.5 Rosters of Directors, Supervisors, and Presidents of TSMC’s Subsidiaries

Unit: NT\$ (USD), except shareholding

As of 12/31/2018

Company	Title	Name	Shareholding	
			Shares (Investment Amount)	% (Investment Holding %)
TSMC North America	Director Director President	Sylvia Fang	-	-
		Rick Cassidy	-	-
		David Keller	-	-
		TSMC holds 11,000,000 shares		100%
TSMC Europe B.V.	Director Director President	Wendell Huang	-	-
		Maria Marced	-	-
		Maria Marced	-	-
		TSMC holds 200 shares		100%
TSMC Japan Limited	Director Director Supervisor President	Sylvia Fang	-	-
		Makoto Onodera	-	-
		Lora Ho (Note 1)	-	-
		Makoto Onodera	-	-
		TSMC holds 6,000 shares		100%
TSMC Korea Limited	Director Director Director	C.C. Pan	-	-
		Chih-Chun Tsai	-	-
		Wendell Huang	-	-
		TSMC holds 80,000 shares		100%
TSMC China Company Limited	Chairman Director Director Supervisor President	F.C. Tseng	-	-
		J.K. Wang	-	-
		L.C. Tu	-	-
		Lora Ho	-	-
		L.C. Tu	-	-
		(TSMC’s investment US\$596,000,000)		(100%)
TSMC Nanjing Company Limited	Chairman Director Director Director Supervisor Supervisor President	Lora Ho	-	-
		J.K. Wang	-	-
		Cliff Hou	-	-
		Roger Luo	-	-
		Wendell Huang	-	-
		Sylvia Fang	-	-
		Roger Luo	-	-
		(TSMC’s investment US\$1,000,000,000)		(100%)
TSMC Technology, Inc.	Chairman Director President	Lora Ho	-	-
		Cliff Hou	-	-
		Cliff Hou	-	-
		TSMC Partners, Ltd. holds 10 shares		100%
InveStar Semiconductor Development Fund, Inc. (Note 2)	Director	Wendell Huang	-	-
		TSMC Partners, Ltd. holds 582,523 shares		97.09%
InveStar Semiconductor Development Fund, Inc. (II) LDC (Note 2)	Director	Wendell Huang	-	-
		TSMC Partners, Ltd. holds 9,298,625 shares		97.09%
TSMC Development, Inc.	Chairman Director President	Lora Ho	-	-
		Sylvia Fang	-	-
		Lora Ho	-	-
		TSMC Partners, Ltd. holds 10 shares		100%
WaferTech, LLC	Director Director President	Y.L. Wang	-	-
		Wendell Huang	-	-
		Tsung-Chia Kuo	-	-
		TSMC Development, Inc. holds 293,636,833 shares		100%
TSMC Partners, Ltd.	Director Director President	Lora Ho	-	-
		Sylvia Fang	-	-
		Lora Ho	-	-
		TSMC holds 988,268,244 shares		100%

(Continued)

Company	Title	Name	Shareholding	
			Shares (Investment Amount)	% (Investment Holding %)
TSMC Design Technology Canada Inc.	Director Director Director President	Cliff Hou	-	-
		Cormac Michael O’Connell	-	-
		Sylvia Fang	-	-
		Cliff Hou	-	-
		TSMC Partners, Ltd. holds 2,300,000 shares		100%
TSMC Global Ltd.	Director Director	Lora Ho	-	-
		Sylvia Fang	-	-
		TSMC holds 11,284 shares		100%
VentureTech Alliance Fund II, L.P.	None	None	(TSMC’s investment US\$3,789,066)	(98.00%)
VentureTech Alliance Fund III, L.P.	None	None	(TSMC’s investment US\$94,246,012)	(98.00%)
Growth Fund Limited	None	None	(VentureTech Alliance Fund III, L.P.’s investment US\$2,153,768)	(100%)
TSMC Solar Europe GmbH (Note 2)	Liquidator	Liham Chu	-	-
		TSMC holds 800 shares		100%
VisEra Technologies Company Ltd.	Chairman Director Director Supervisor President	Robert Kuan	54,600 shares	0.02%
		C.S. Yoo	-	-
		George Liu	-	-
		Wendell Huang	-	-
		S.C. Hsin	-	-
		TSMC holds 253,120,000 shares		86.94%

Note 1: Deputy Chief Financial Officer Wendell Huang replaced Senior Vice President and Chief Financial Officer Lora Ho as the statutory auditor of TSMC Japan, effective February 26, 2019.
Note 2: InveStar Semiconductor Development Fund, Inc., InveStar Semiconductor Development Fund, Inc. (II) LDC., and TSMC Solar Europe GmbH are under liquidation procedures.

8.1.6 Operational Highlights of TSMC Subsidiaries

Unit: NT\$ thousands, except EPS (NT\$)						As of 12/31/2018		
Company	Capital Stock	Assets	Liabilities	Net Worth	Net Revenues	Income (Loss) from Operation	Net Income (Loss)	Basic Earnings (Loss) Per Share
TSMC North America	338,140	96,075,151	91,805,759	4,269,393	657,168,665	197,336	117,948	10.72
TSMC Europe B.V.	3,522	585,792	139,964	445,828	525,641	56,391	41,697	208,485.23
TSMC Japan Limited	83,490	199,782	58,646	141,136	225,922	9,122	4,035	672.54
TSMC Korea Limited	11,040	42,492	1,526	40,966	21,185	1,953	2,170	27.12
TSMC Development, Inc.	0.03	28,920,857	0	28,920,857	1,966,940	1,966,771	1,863,196	186,319,593.80
TSMC Partners, Ltd.	30,379,366	52,396,272	0	52,396,272	2,505,290	2,499,370	2,499,370	2.53
TSMC Global Ltd.	346,870,160	400,399,084	6,821,153	393,577,931	11,025,427	9,271,650	9,271,602	845,894.15
WaferTech, LLC	0	5,526,309	612,632	4,913,677	8,194,379	1,851,567	1,473,555	5.02
TSMC China Company Limited	20,157,163	58,650,900	3,064,082	55,586,818	17,659,567	4,785,348	5,397,462	NA
TSMC Nanjing Company Limited	29,774,580	55,324,312	34,486,833	20,837,480	6,910,049	(7,890,838)	(8,215,989)	NA
VisEra Technologies Company Ltd.	2,911,531	6,015,755	864,736	5,151,018	2,748,420	481,896	412,283	1.42
TSMC Technology, Inc.	0.03	1,148,761	561,753	587,008	2,044,078	97,409	47,866	4,786,620.90
TSMC Design Technology Canada Inc.	55,005	241,004	35,581	205,423	297,926	27,084	32,224	14.01
InveStar Semiconductor Development Fund, Inc.	15,031	532	7	525	0	0	0	0.00
InveStar Semiconductor Development Fund, Inc. (II) LDC.	0	0	0	0	0	(6,781)	(6,781)	(0.71)
VentureTech Alliance Fund II, L.P.	125,643	125,013	0	125,013	0	(3,712)	(3,726)	NA
VentureTech Alliance Fund III, L.P.	2,956,247	175,013	0	175,013	(863)	(3,416)	(3,416)	NA
TSMC Solar Europe GmbH	14,088	0	20,106	(20,106)	0	(1)	(21)	(25.73)
Growth Fund Limited	66,207	97,782	0	97,782	766	(597)	(597)	NA

8.2 Status of TSMC Common Shares and ADRs Acquired, Disposed of, and Held by Subsidiaries: None.

8.3 Special Notes

8.3.1 Private Placement Securities in 2018 and as of the Date of this Annual Report: None.

8.3.2 Regulatory Authorities’ Legal Penalties to the Company or Its Employees, and the Company’s Resulting Punishment on Its Employees for Violations of Internal Control System Provisions, Principal Deficiencies, and the State of Any Efforts to Make Improvements in 2018 and as of the Date of this Annual Report

In 2018 and as of the date of this Annual Report, the Company complied with the Taiwan Company Law and Securities Trading Act relevant laws and regulations. The Company was issued two fines totaling NT\$60,000 for violations of the labor related laws. (1) One case was due to four employees’ overtime application and approval not being processed in time. The Company has enhanced the communication and training on overtime application and management. (2) The second case occurred during a fab’s annual maintenance work, where an unexpected maintenance response resulted in excess work hours of seven employees. The Company has reviewed and strengthened the manpower planning for annual maintenance work. In addition, the Company was issued two fines totaling NT\$100,000 for violations of occupational safety and health related laws. (1) One case involved chemical storage in a non-compliant location. The Company immediately reviewed and completed the necessary process improvements. (2) The second case involved a subcontractor personnel who accidentally broke a waste chemical pipe while working on electrical cable wiring, which lead to chemical exposure for two workers from leakage of the residual chemical. The Company has reviewed the management of the working environment and safety practices, and strengthened pre-work evaluation and prevention measures.

8.3.3 Any Events in 2018 and as of the Date of this Annual Report that Had Significant Impacts on Shareholders’ Right or Security Prices as Stated in Item 3 Paragraph 2 of Article 36 of Securities and Exchange Law of Taiwan: None.

8.3.4 Other Necessary Supplement: None.

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16, Zifeng Road, Pukou Economic Development Zone, Nanjing
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TSMC Spokesperson

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TSMC Deputy Spokesperson/Corporate Communications

Name: Elizabeth Sun
Title: Senior Director, TSMC Corporate Communications Division
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Email: elizabeth_sun@tsmc.com

Auditors

Company: Deloitte & Touche
Auditors: Mei-Yen Chiang, Yu-Feng Huang
Address: 20F, No. 100, Songren Rd., Xinyi Dist.,Taipei 11073, Taiwan, R.O.C.
Tel: +886-2-27259988 Fax: +886-2-40516888
Website: http://www.deloitte.com.tw

Common Share Transfer Agent and Registrar

Company: The Transfer Agency Department of CTBC Bank
Address: 5F, 83, Sec. 1, Chung-Ching S. Rd., Taipei 10008, Taiwan, R.O.C.
Tel: +886-2-66365566 Fax: +886-2-23116723
Website: http://www.ctbcbank.com

ADR Depositary Bank

Company: Citibank, N.A.
Depositary Receipts Services
Address: 388 Greenwich Street, New York, NY 10013, U.S.A.
Website: http://www.citi.com/dr
Tel: +1-877-2484237 (toll free) Tel: +1-781-5754555 (out of US)
Fax: +1-201-3243284
E-mail: citibank@shareholders-online.com

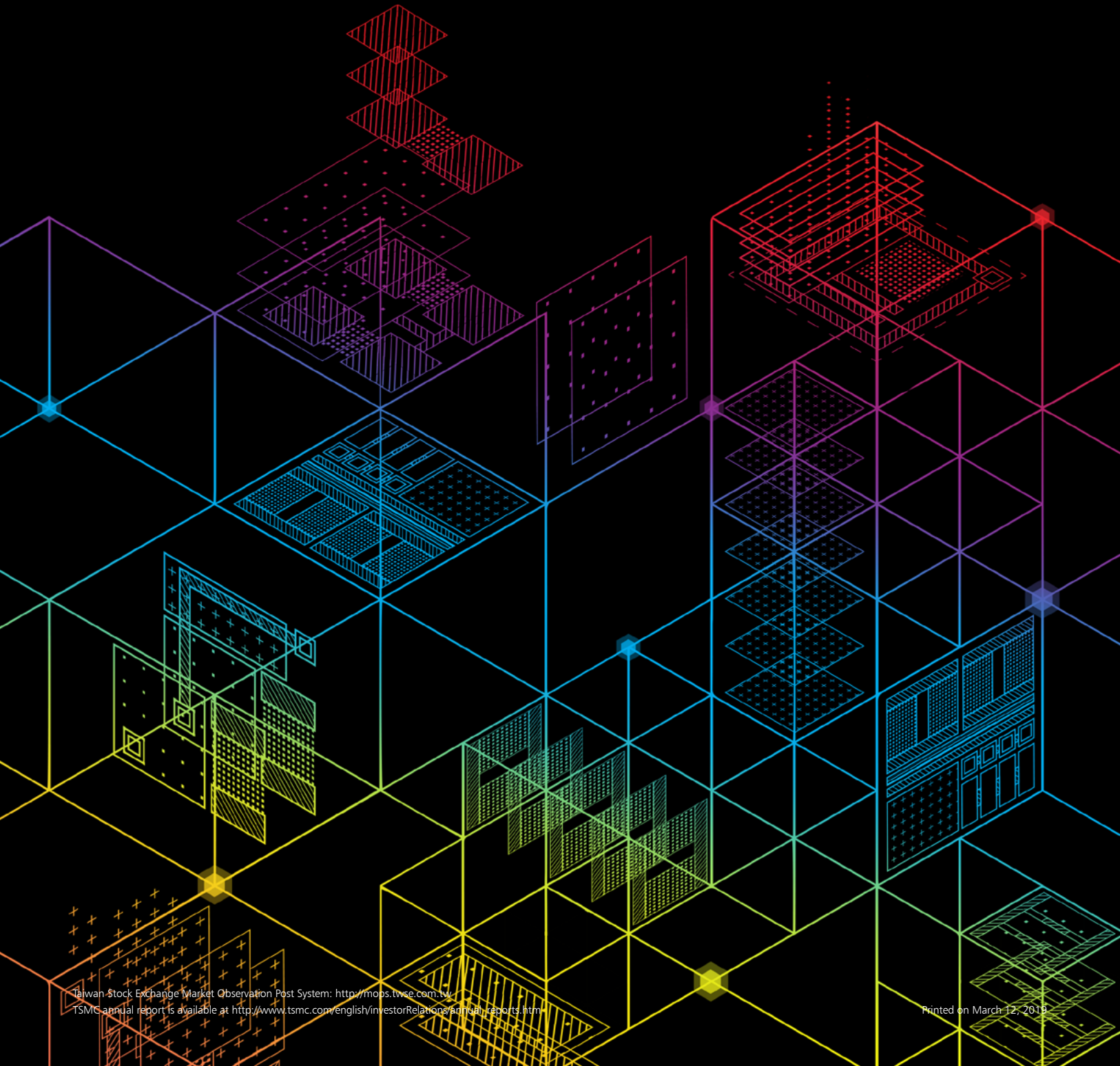
TSMC's depositary receipts of the common shares are listed on New York
Stock Exchange (NYSE) under the symbol TSM. The information relating to
TSM is available at http://www.nyse.com and http://mops.twse.com.tw



TSE: 2330
NYSE: TSM

TSMC Annual Report 2018 (II)

Financial Statements



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**Taiwan Semiconductor Manufacturing
Company Limited and Subsidiaries**

**Consolidated Financial Statements for the
Years Ended December 31, 2018 and 2017 and
Independent Auditors' Report**

REPRESENTATION LETTER

The entities that are required to be included in the combined financial statements of Taiwan Semiconductor Manufacturing Company Limited as of and for the year ended December 31, 2018, under the Criteria Governing the Preparation of Affiliation Reports, Consolidated Business Reports and Consolidated Financial Statements of Affiliated Enterprises are the same as those included in the consolidated financial statements prepared in conformity with the International Financial Reporting Standard 10, "Consolidated Financial Statements." In addition, the information required to be disclosed in the combined financial statements is included in the consolidated financial statements. Consequently, Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries do not prepare a separate set of combined financial statements.

Very truly yours,

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED

By

MARK LIU
Chairman

February 19, 2019

INDEPENDENT AUDITORS' REPORT

The Board of Directors and Shareholders
Taiwan Semiconductor Manufacturing Company Limited

Opinion

We have audited the accompanying consolidated financial statements of Taiwan Semiconductor Manufacturing Company Limited and subsidiaries (the "Company"), which comprise the consolidated balance sheets as of December 31, 2018 and 2017, and the consolidated statements of comprehensive income, changes in equity and cash flows for the years then ended, and the notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2018 and 2017, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the International Financial Reporting Standards (IFRS), International Accounting Standards (IAS), IFRIC Interpretations (IFRIC), and SIC Interpretations (SIC) endorsed and issued into effect by the Financial Supervisory Commission of the Republic of China.

Basis for Opinion

We conducted our audits in accordance with the Regulations Governing Auditing and Attestation of Financial Statements by Certified Public Accountants and auditing standards generally accepted in the Republic of China. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are independent of the Company in accordance with The Norm of Professional Ethics for Certified Public Accountant of the Republic of China and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements for the year ended December 31, 2018. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Key audit matters for the Company's consolidated financial statements for the year ended December 31, 2018 are stated as follows:

Estimate for sales returns and allowances

In consideration of business volume and market conditions, the Company provides a variety of business incentives to specific customers or products. The estimate for sales returns and allowance is based on historical experience and the varying contractual terms. Please refer to Notes 4, 5 and 26 to the consolidated financial statements for the details of the information about estimate for sales returns and allowances. Since the estimate for sales returns and allowances is subject to accounting judgment and estimation, and the result could also affect the net revenue in the consolidated financial statements, it has been identified as a key audit matter.

Our key audit procedures performed in respect of the above area included the following:

1. Understood and tested the design and operating effectiveness of the key controls over estimate for sales returns and allowances;
2. Understood and assessed the reasonableness of assumptions made and methodology used in estimating sales returns and allowances;
3. Sampled and inspected the sales contracts of main products by agreeing the contractual terms and performed an analysis to challenge the estimation on possibility that specific products could meet business incentives condition to verify the reasonableness of the accrual of the sales returns and allowances;
4. Performed a retrospective review to comparatively analyze the historical accuracy of judgments with reference to actual sales returns and allowance paid.

Timing to commence depreciation of property, plant and equipment (PP&E)

The Company continues to invest in capital expenditures to develop and build capacity in leading-edge technologies to meet customers' demand. Please refer to Notes 4, 5 and 17 to the consolidated financial statements for the details of the information and accounting policy about the depreciation of PP&E. According to IAS 16, depreciation of PP&E begins when the assets are available for use, and in the condition necessary for the assets to be capable of operating in the intended manner. Due to the significant capital expenditures of the Company, and the criteria to determine whether such assets are available for their intended use vary within categories of assets as well as involve subjective judgments, the validity of the timing to commence depreciation of PP&E could have a material impact on its financial performance. Consequently, the validity of the timing to commence depreciation of PP&E is identified as a key audit matter.

Our key audit procedures performed in respect of the above area included the following:

1. Understood and tested the design and operating effectiveness of the key controls over the timing to commence depreciation of PP&E;
2. Understood the criteria the assets are defined as available for their intended use and the corresponding accounting treatments;

3. Sampled and reviewed the appropriateness of the timing for commencing depreciation after the assets met the criteria of available for use in current year;
4. Performed an observation on the physical count of equipment under installation and construction in progress; sampled and inspected the supporting documentation to verify that the status of equipment under installation and construction in progress are not available for use;
5. Sampled equipment under installation and construction in progress which met the criteria of available for use and were transferred in the subsequent period to evaluate the reasonableness of the timing for commencing depreciation;
6. Sampled and reviewed the appropriateness of the equipment under installation and construction in progress which are not available for their intended use.

Other Matter

We have also audited the parent company only financial statements of Taiwan Semiconductor Manufacturing Company Limited as of and for the years ended December 31, 2018 and 2017 on which we have issued an unmodified opinion.

Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the IFRS, IAS, IFRIC, and SIC endorsed and issued into effect by the Financial Supervisory Commission of the Republic of China, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance (including members of the Audit Committee) are responsible for overseeing the Company's financial reporting process.

Auditors' Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the auditing standards generally accepted in the Republic of China will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with the auditing standards generally accepted in the Republic of China, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

1. Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
2. Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
3. Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
4. Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.
5. Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
6. Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Company to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

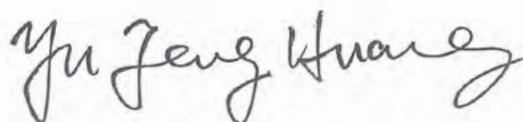
We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements for the year ended December 31, 2018 and are therefore the key audit matters. We describe these matters in our auditors' report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partners on the audit resulting in this independent auditors' report are Mei Yen Chiang and Yu Feng Huang.



Deloitte & Touche
Taipei, Taiwan
Republic of China



February 19, 2019

Notice to Readers

The accompanying consolidated financial statements are intended only to present the consolidated financial position, financial performance and cash flows in accordance with accounting principles and practices generally accepted in the Republic of China and not those of any other jurisdictions. The standards, procedures and practices to audit such consolidated financial statements are those generally applied in the Republic of China.

For the convenience of readers, the independent auditors' report and the accompanying consolidated financial statements have been translated into English from the original Chinese version prepared and used in the Republic of China. If there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese-language independent auditors' report and consolidated financial statements shall prevail.

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED BALANCE SHEETS (In Thousands of New Taiwan Dollars)

ASSETS	December 31, 2018		December 31, 2017	
	Amount	%	Amount	%
CURRENT ASSETS				
Cash and cash equivalents (Note 6)	\$ 577,814,601	28	\$ 553,391,696	28
Financial assets at fair value through profit or loss (Note 7)	3,504,590	-	569,751	-
Financial assets at fair value through other comprehensive income (Note 8)	99,561,740	5	-	-
Available-for-sale financial assets (Note 9)	-	-	93,374,153	5
Held-to-maturity financial assets (Note 10)	-	-	1,988,385	-
Financial assets at amortized cost (Note 11)	14,277,615	1	-	-
Hedging derivative financial assets (Note 13)	-	-	34,394	-
Hedging financial assets (Note 13)	23,497	-	-	-
Notes and accounts receivable, net (Note 14)	128,613,391	6	121,133,248	6
Receivables from related parties (Note 37)	584,412	-	1,184,124	-
Other receivables from related parties (Note 37)	65,028	-	171,058	-
Inventories (Notes 5, 15 and 41)	103,230,976	5	73,880,747	4
Other financial assets (Note 38)	18,597,448	1	7,253,114	-
Other current assets (Note 19)	5,406,423	-	4,222,440	-
Total current assets	951,679,721	46	857,203,110	43
NONCURRENT ASSETS				
Financial assets at fair value through other comprehensive income (Notes 5 and 8)	3,910,681	-	-	-
Held-to-maturity financial assets (Note 10)	-	-	18,833,329	1
Financial assets at amortized cost (Note 11)	7,528,277	-	-	-
Financial assets carried at cost (Note 12)	-	-	4,874,257	-
Investments accounted for using equity method (Notes 5 and 16)	17,865,838	1	17,861,488	1
Property, plant and equipment (Notes 5 and 17)	1,072,050,279	51	1,062,542,322	53
Intangible assets (Notes 5 and 18)	17,002,137	1	14,175,140	1
Deferred income tax assets (Notes 5 and 31)	16,806,387	1	12,105,463	1
Refundable deposits	1,700,071	-	1,283,414	-
Other noncurrent assets (Note 19)	1,584,647	-	2,983,120	-
Total noncurrent assets	1,138,448,317	54	1,134,658,533	57
TOTAL	\$ 2,090,128,038	100	\$ 1,991,861,643	100
LIABILITIES AND EQUITY				
CURRENT LIABILITIES				
Short-term loans (Notes 20 and 34)	\$ 88,754,640	4	\$ 63,766,850	3
Financial liabilities at fair value through profit or loss (Note 7)	40,825	-	26,709	-
Hedging derivative financial liabilities (Note 13)	-	-	15,562	-
Hedging financial liabilities (Note 13)	155,832	-	-	-
Accounts payable	32,980,933	2	28,412,807	1
Payables to related parties (Note 37)	1,376,499	-	1,656,356	-
Salary and bonus payable	14,471,372	1	14,254,871	1
Accrued profit sharing bonus to employees and compensation to directors and supervisors (Notes 25 and 33)	23,981,154	1	23,419,135	1
Payables to contractors and equipment suppliers	43,133,659	2	55,723,774	3
Income tax payable (Notes 5 and 31)	38,987,053	2	33,479,311	2
Provisions (Notes 5 and 21)	-	-	13,961,787	1
Long-term liabilities - current portion (Note 22)	34,900,000	2	58,401,122	3
Accrued expenses and other current liabilities (Notes 5, 24, 26 and 34)	61,760,619	3	65,588,396	3
Total current liabilities	340,542,586	17	358,706,680	18
NONCURRENT LIABILITIES				
Bonds payable (Notes 22 and 34)	56,900,000	3	91,800,000	5
Deferred income tax liabilities (Notes 5 and 31)	233,284	-	302,205	-
Net defined benefit liability (Notes 5 and 23)	9,651,405	-	8,850,704	1
Guarantee deposits (Notes 24 and 34)	3,353,378	-	7,586,790	-
Others	1,950,989	-	1,855,621	-
Total noncurrent liabilities	72,089,056	3	110,395,320	6
Total liabilities	412,631,642	20	469,102,000	24
EQUITY ATTRIBUTABLE TO SHAREHOLDERS OF THE PARENT				
Capital stock (Note 25)	259,303,805	12	259,303,805	13
Capital surplus (Note 25)	56,315,932	3	56,309,536	3
Retained earnings (Note 25)				
Appropriated as legal capital reserve	276,033,811	13	241,722,663	12
Appropriated as special capital reserve	26,907,527	1	-	-
Unappropriated earnings	1,073,706,503	52	991,639,347	49
	1,376,647,841	66	1,233,362,010	61
Others (Note 25)	(15,449,913)	(1)	(26,917,818)	(1)
Equity attributable to shareholders of the parent	1,676,817,665	80	1,522,057,533	76
NON - CONTROLLING INTERESTS	678,731	-	702,110	-
Total equity	1,677,496,396	80	1,522,759,643	76
TOTAL	\$ 2,090,128,038	100	\$ 1,991,861,643	100

The accompanying notes are an integral part of the consolidated financial statements.

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In Thousands of New Taiwan Dollars, Except Earnings Per Share)

	2018		2017	
	Amount	%	Amount	%
NET REVENUE (Notes 5, 26, 37 and 45)	\$1,031,473,557	100	\$ 977,447,241	100
COST OF REVENUE (Notes 5, 15, 33, 37 and 41)	<u>533,487,516</u>	<u>52</u>	<u>482,616,286</u>	<u>49</u>
GROSS PROFIT BEFORE UNREALIZED GROSS PROFIT ON SALES TO ASSOCIATES	497,986,041	48	494,830,955	51
UNREALIZED GROSS PROFIT ON SALES TO ASSOCIATES	<u>(111,788)</u>	<u>-</u>	<u>(4,553)</u>	<u>-</u>
GROSS PROFIT	<u>497,874,253</u>	<u>48</u>	<u>494,826,402</u>	<u>51</u>
OPERATING EXPENSES (Notes 5, 33 and 37)				
Research and development	85,895,569	8	80,732,463	8
General and administrative	20,265,883	2	21,196,717	2
Marketing	<u>5,987,828</u>	<u>1</u>	<u>5,972,488</u>	<u>1</u>
Total operating expenses	<u>112,149,280</u>	<u>11</u>	<u>107,901,668</u>	<u>11</u>
OTHER OPERATING INCOME AND EXPENSES, NET (Notes 17, 18, 27 and 33)	<u>(2,101,449)</u>	<u>-</u>	<u>(1,365,511)</u>	<u>(1)</u>
INCOME FROM OPERATIONS (Note 45)	<u>383,623,524</u>	<u>37</u>	<u>385,559,223</u>	<u>39</u>
NON-OPERATING INCOME AND EXPENSES				
Share of profits of associates	3,057,781	-	2,985,941	1
Other income (Note 28)	14,852,814	2	9,610,294	1
Foreign exchange gain (loss), net (Note 43)	2,438,171	-	(1,509,473)	-
Finance costs (Note 29)	(3,051,223)	-	(3,330,313)	-
Other gains and losses, net (Note 30)	<u>(3,410,804)</u>	<u>-</u>	<u>2,817,358</u>	<u>-</u>
Total non-operating income and expenses	<u>13,886,739</u>	<u>2</u>	<u>10,573,807</u>	<u>2</u>
INCOME BEFORE INCOME TAX	397,510,263	39	396,133,030	41
INCOME TAX EXPENSE (Notes 5 and 31)	<u>46,325,857</u>	<u>5</u>	<u>52,986,182</u>	<u>6</u>
NET INCOME	<u>351,184,406</u>	<u>34</u>	<u>343,146,848</u>	<u>35</u>

(Continued)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In Thousands of New Taiwan Dollars, Except Earnings Per Share)

	2018		2017	
	Amount	%	Amount	%
OTHER COMPREHENSIVE INCOME (LOSS)				
(Notes 5, 23, 25 and 31)				
Items that will not be reclassified subsequently to profit or loss:				
Remeasurement of defined benefit obligation	\$ (861,162)	-	\$ (254,681)	-
Unrealized loss on investments in equity instruments at fair value through other comprehensive income	(3,309,089)	-	-	-
Gain on hedging instruments	40,975	-	-	-
Share of other comprehensive loss of associates	(14,217)	-	(20,853)	-
Income tax benefit related to items that will not be reclassified subsequently	<u>195,729</u>	<u>-</u>	<u>30,562</u>	<u>-</u>
	<u>(3,947,764)</u>	<u>-</u>	<u>(244,972)</u>	<u>-</u>
Items that may be reclassified subsequently to profit or loss:				
Exchange differences arising on translation of foreign operations	14,562,386	1	(28,259,627)	(3)
Changes in fair value of available-for-sale financial assets	-	-	(218,832)	-
Cash flow hedges	-	-	4,683	-
Unrealized loss on investments in debt instruments at fair value through other comprehensive income	(870,906)	-	-	-
Share of other comprehensive income (loss) of associates	93,260	-	(99,347)	-
Income tax expense related to items that may be reclassified subsequently	<u>-</u>	<u>-</u>	<u>(3,536)</u>	<u>-</u>
	<u>13,784,740</u>	<u>1</u>	<u>(28,576,659)</u>	<u>(3)</u>
Other comprehensive income (loss) for the year, net of income tax	<u>9,836,976</u>	<u>1</u>	<u>(28,821,631)</u>	<u>(3)</u>
TOTAL COMPREHENSIVE INCOME FOR THE YEAR	<u>\$ 361,021,382</u>	<u>35</u>	<u>\$ 314,325,217</u>	<u>32</u>
NET INCOME ATTRIBUTABLE TO:				
Shareholders of the parent	\$ 351,130,884	34	\$ 343,111,476	35
Non-controlling interests	<u>53,522</u>	<u>-</u>	<u>35,372</u>	<u>-</u>
	<u>\$ 351,184,406</u>	<u>34</u>	<u>\$ 343,146,848</u>	<u>35</u>

(Continued)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In Thousands of New Taiwan Dollars, Except Earnings Per Share)

	2018		2017	
	Amount	%	Amount	%
TOTAL COMPREHENSIVE INCOME				
ATTRIBUTABLE TO:				
Shareholders of the parent	\$ 360,965,015	35	\$ 314,294,993	32
Non-controlling interests	<u>56,367</u>	<u>-</u>	<u>30,224</u>	<u>-</u>
	<u>\$ 361,021,382</u>	<u>35</u>	<u>\$ 314,325,217</u>	<u>32</u>
	2018		2017	
	Income Attributable to Shareholders of the Parent		Income Attributable to Shareholders of the Parent	
EARNINGS PER SHARE (NT\$, Note 32)				
Basic earnings per share	<u>\$ 13.54</u>		<u>\$ 13.23</u>	
Diluted earnings per share	<u>\$ 13.54</u>		<u>\$ 13.23</u>	

The accompanying notes are an integral part of the consolidated financial statements.

(Concluded)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY
(in Thousands of New Taiwan Dollars, Except Dividends Per Share)

	Equity Attributable to Shareholders of the Parent													Others			Non-controlling Interests	Total Equity
	Capital Stock - Common Stock						Unrealized Gain (Loss) on Financial Assets at Fair Value Through Comprehensive Income											
	Shares (In Thousands)	Amount	Capital Surplus	Legal Capital Reserve	Special Capital Reserve	Retained Earnings	Total	Foreign Currency Translation Reserve	Unrealized Gain (Loss) from Available-for-sale Financial Assets	Unrealized Gain (Loss) on Other Comprehensive Income	Cash Flow Hedge Reserve	Gain (Loss) on Hedging Instruments	Unearned Stock-Based Compensation	Total				
BALANCE, JANUARY 1, 2017	25,930,380	\$ 259,303,805	\$ 56,272,304	\$ 208,297,945	\$ -	\$ 863,710,224	\$ 1,072,008,169	\$ 1,661,237	\$ 2,641	\$ -	\$ 105	\$ -	\$ -	\$ 1,663,983	\$ 1,389,248,261	\$ 802,865	\$ 1,390,051,126	
Appropriations of prior year's earnings	-	-	-	-	-	(33,424,718)	(181,512,663)	-	-	-	-	-	-	-	(181,512,663)	-	(181,512,663)	
Legal capital reserve	-	-	-	33,424,718	-	(181,512,663)	(181,512,663)	-	-	-	-	-	-	-	(181,512,663)	-	(181,512,663)	
Cash dividends to shareholders - NT\$7 per share	-	-	-	-	-	343,111,476	343,111,476	-	-	-	-	-	-	-	343,111,476	35,372	343,146,848	
Net income in 2017	-	-	-	-	-	(244,922)	(244,922)	(28,358,912)	(216,715)	-	4,121	-	-	(28,571,511)	(28,816,483)	(5,148)	(28,821,631)	
Other comprehensive income (loss) in 2017, net of income tax	-	-	-	-	-	-	-	(28,358,912)	(216,715)	-	4,121	-	-	(28,571,511)	(28,816,483)	39,224	314,325,217	
Total comprehensive income (loss) in 2017	-	-	-	-	-	-	342,866,504	(28,358,912)	(216,715)	-	4,121	-	-	(28,571,511)	314,294,993	-	-	
Adjustments to share of changes in equities of associates	-	-	7,085	-	-	-	-	-	-	-	-	-	(10,290)	(10,290)	(3,205)	-	(3,205)	
From share of changes in equities of subsidiaries	-	-	10,994	-	-	-	-	-	-	-	-	-	-	-	10,994	(10,994)	-	
Donation from shareholders	-	-	19,153	-	-	-	-	-	-	-	-	-	-	-	19,153	1,684	20,837	
Decrease in non-controlling interests	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(113,675)	(113,675)	
Effect of disposal of subsidiary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(7,984)	(7,984)	
BALANCE, DECEMBER 31, 2017	25,930,380	259,303,805	56,109,536	241,722,663	-	991,639,347	1,233,362,010	(26,697,680)	(214,074)	-	4,226	-	(10,290)	(26,917,818)	1,522,057,533	702,110	1,522,759,643	
Effect of retrospective application	-	-	-	-	-	1,556,321	1,556,321	-	214,074	(524,915)	(4,226)	-	-	(310,841)	1,245,480	342	1,245,822	
ADJUSTED BALANCE, JANUARY 1, 2018	25,930,380	259,303,805	56,109,536	241,722,663	-	993,195,668	1,234,918,331	(26,697,680)	-	(524,915)	-	4,226	(10,290)	(27,228,659)	1,523,303,013	702,452	1,524,005,465	
Appropriations of prior year's earnings	-	-	-	34,311,148	-	(34,311,148)	-	-	-	-	-	-	-	-	-	-	-	
Legal capital reserve	-	-	-	26,907,527	-	(26,907,527)	-	-	-	-	-	-	-	-	(207,443,044)	-	(207,443,044)	
Special capital reserve	-	-	-	-	-	26,907,527	26,907,527	-	-	-	-	-	-	-	(207,443,044)	-	(207,443,044)	
Cash dividends to shareholders - NT\$8 per share	-	-	-	-	-	351,130,884	351,130,884	-	-	-	-	-	-	-	351,130,884	53,522	351,184,406	
Net income in 2018	-	-	-	-	-	(786,224)	(786,224)	14,655,333	-	(4,097,465)	-	41,537	-	10,599,405	9,834,131	2,845	9,836,976	
Other comprehensive income (loss) in 2018, net of income tax	-	-	-	-	-	-	-	14,655,333	-	(4,097,465)	-	41,537	-	10,599,405	9,834,131	2,845	9,836,976	
Total comprehensive income (loss) in 2018	-	-	-	-	-	-	350,365,610	14,655,333	-	(4,097,465)	-	41,537	-	10,599,405	360,965,015	56,367	361,021,382	
Disposal of investments in equity instruments at fair value through other comprehensive income	-	-	-	-	-	(1,193,056)	(1,193,056)	-	-	1,193,056	-	-	-	1,193,056	-	-	-	
Basis adjustment for loss on hedging instruments	-	-	-	-	-	-	-	-	-	-	-	(22,162)	-	(22,162)	(22,162)	-	(22,162)	
Adjustments to share of changes in equities of associates	-	-	(6,420)	-	-	-	-	-	-	-	-	-	8,447	8,447	2,027	-	2,027	
From share of changes in equities of subsidiaries	-	-	2,681	-	-	-	-	-	-	-	-	-	-	-	2,681	(2,681)	-	
Donation from shareholders	-	-	10,135	-	-	-	-	-	-	-	-	-	-	-	10,135	6	10,141	
Decrease in non-controlling interests	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(77,413)	(77,413)	
BALANCE, DECEMBER 31, 2018	25,930,380	259,303,805	56,315,932	276,033,811	\$ 26,907,527	\$ 1,073,706,503	\$ 1,376,647,841	\$ (12,042,347)	\$ -	\$ (3,429,224)	\$ -	\$ 23,601	\$ (1,843)	\$ (15,449,913)	\$ 1,676,817,665	\$ 638,731	\$ 1,677,456,396	

The accompanying notes are an integral part of the consolidated financial statements.

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In Thousands of New Taiwan Dollars)

	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES		
Income before income tax	\$ 397,510,263	\$ 396,133,030
Adjustments for:		
Depreciation expense	288,124,897	255,795,962
Amortization expense	4,421,405	4,346,736
Reversal of expected credit losses on investments in debt instruments	(2,383)	-
Finance costs	3,051,223	3,330,313
Share of profits of associates	(3,057,781)	(2,985,941)
Interest income	(14,694,456)	(9,464,706)
Loss on disposal or retirement of property, plant and equipment, net	1,005,644	1,097,908
Gain on disposal of intangible assets, net	(436)	-
Impairment loss on property, plant and equipment	423,468	-
Impairment loss on intangible assets	-	13,520
Impairment loss on financial assets	-	29,603
Loss on financial instruments at fair value through profit or loss, net	358,156	-
Loss on disposal of investments in debt instruments at fair value through other comprehensive income, net	989,138	-
Gain on disposal of available-for-sale financial assets, net	-	(76,986)
Gain on disposal of financial assets carried at cost, net	-	(12,809)
Gain from disposal of subsidiaries	-	(17,343)
Unrealized gross profit on sales to associates	111,788	4,553
Loss (gain) on foreign exchange, net	2,916,659	(9,118,580)
Dividend income	(158,358)	(145,588)
Loss arising from fair value hedges, net	2,386	30,293
Changes in operating assets and liabilities:		
Financial instruments at fair value through profit or loss	480,109	5,645,093
Notes and accounts receivable, net	(13,271,268)	1,061,805
Receivables from related parties	599,712	(214,565)
Other receivables from related parties	106,030	(13,873)
Inventories	(29,369,975)	(25,229,101)
Other financial assets	(4,601,295)	(502,306)
Other current assets	(513,051)	12,085
Other noncurrent assets	152,555	(1,276,130)
Accounts payable	4,540,583	2,572,072
Payables to related parties	(279,857)	394,182
Salary and bonus payable	216,501	582,054
Accrued profit sharing bonus to employees and compensation to directors and supervisors	562,019	525,129
Accrued expenses and other current liabilities	(20,226,384)	30,435,424
Provisions	-	(4,057,900)
Net defined benefit liability	(60,461)	44,615
Cash generated from operations	619,336,831	648,938,549
Income taxes paid	(45,382,523)	(63,620,382)
Net cash generated by operating activities	573,954,308	585,318,167

(Continued)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In Thousands of New Taiwan Dollars)

	2018	2017
CASH FLOWS FROM INVESTING ACTIVITIES		
Acquisitions of:		
Financial instruments at fair value through profit or loss - debt instruments	\$ (310,478)	\$ -
Financial assets at fair value through other comprehensive income	(96,412,786)	-
Available-for-sale financial assets	-	(100,510,905)
Held-to-maturity financial assets	-	(1,997,076)
Financial assets at amortized cost	(2,294,098)	-
Financial assets carried at cost	-	(1,313,124)
Property, plant and equipment	(315,581,881)	(330,588,188)
Intangible assets	(7,100,306)	(4,480,588)
Land use right	-	(819,694)
Proceeds from disposal or redemption of:		
Financial instruments at fair value through profit or loss - debt instruments	487,216	-
Financial assets at fair value through other comprehensive income	86,639,322	-
Available-for-sale financial assets	-	69,480,675
Held-to-maturity financial assets	-	17,980,640
Financial assets at amortized cost	2,032,442	-
Financial assets carried at cost	-	58,237
Property, plant and equipment	181,450	326,232
Intangible assets	492	-
Proceeds from return of capital of investments in equity instruments at fair value through other comprehensive income	127,878	-
Proceeds from return of capital of financial assets carried at cost	-	14,828
Derecognition of hedging derivative financial instruments	-	33,008
Derecognition of hedging financial instruments	250,538	-
Interest received	14,660,388	9,526,253
Proceeds from government grants - property, plant and equipment	-	2,629,747
Proceeds from government grants - land use right and others	-	1,811
Cash outflow from disposal of subsidiary	-	(4,080)
Other dividends received	158,358	145,588
Dividends received from investments accounted for using equity method	3,262,910	4,245,772
Refundable deposits paid	(2,227,541)	(1,326,983)
Refundable deposits refunded	<u>1,857,188</u>	<u>432,944</u>
Net cash used in investing activities	<u>(314,268,908)</u>	<u>(336,164,903)</u>

(Continued)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In Thousands of New Taiwan Dollars)

	2018	2017
CASH FLOWS FROM FINANCING ACTIVITIES		
Increase in short-term loans	\$ 23,922,975	\$ 10,394,290
Repayment of bonds	(58,024,900)	(38,100,000)
Repayment of long-term bank loans	-	(31,460)
Interest paid	(3,233,331)	(3,482,703)
Guarantee deposits received	1,668,887	950,928
Guarantee deposits refunded	(1,948,106)	(3,823,183)
Cash dividends	(207,443,044)	(181,512,663)
Donation from shareholders	10,141	20,837
Decrease in non-controlling interests	<u>(77,413)</u>	<u>(113,675)</u>
Net cash used in financing activities	<u>(245,124,791)</u>	<u>(215,697,629)</u>
EFFECT OF EXCHANGE RATE CHANGES ON CASH AND CASH EQUIVALENTS	<u>9,862,296</u>	<u>(21,317,772)</u>
NET INCREASE IN CASH AND CASH EQUIVALENTS	24,422,905	12,137,863
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR	<u>553,391,696</u>	<u>541,253,833</u>
CASH AND CASH EQUIVALENTS, END OF YEAR	<u>\$ 577,814,601</u>	<u>\$ 553,391,696</u>

The accompanying notes are an integral part of the consolidated financial statements.

(Concluded)

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

1. GENERAL

Taiwan Semiconductor Manufacturing Company Limited (TSMC), a Republic of China (R.O.C.) corporation, was incorporated on February 21, 1987. TSMC is a dedicated foundry in the semiconductor industry which engages mainly in the manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing of masks.

On September 5, 1994, TSMC's shares were listed on the Taiwan Stock Exchange (TWSE). On October 8, 1997, TSMC listed some of its shares of stock on the New York Stock Exchange (NYSE) in the form of American Depositary Shares (ADSs).

The address of its registered office and principal place of business is No. 8, Li-Hsin Rd. 6, Hsinchu Science Park, Taiwan. The principal operating activities of TSMC's subsidiaries are described in Note 4.

2. THE AUTHORIZATION OF FINANCIAL STATEMENTS

The accompanying consolidated financial statements were approved and authorized for issue by the Board of Directors on February 19, 2019.

3. APPLICATION OF NEW AND REVISED INTERNATIONAL FINANCIAL REPORTING STANDARDS

- a. Initial application of the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the International Financial Reporting Standards (IFRS), International Accounting Standards (IAS), IFRIC Interpretations (IFRIC), and SIC Interpretations (SIC) (collectively, "IFRSs") endorsed and issued into effect by the Financial Supervisory Commission (FSC)

Except for the following, the initial application of the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the IFRSs endorsed and issued into effect by the FSC did not have a significant effect on TSMC and its subsidiaries' (collectively as the "Company") accounting policies:

- 1) IFRS 9 "Financial Instruments" and related amendment

IFRS 9 supersedes IAS 39 "Financial Instruments: Recognition and Measurement", with consequential amendments to IFRS 7 "Financial Instruments: Disclosures" and other standards. IFRS 9 sets out the requirements for classification, measurement and impairment of financial assets and hedge accounting. Please refer to Note 4 for information relating to the relevant accounting policies.

Classification, measurement and impairment of financial assets and financial liabilities

The Company elects not to restate prior reporting period when applying the requirements for the classification, measurement and impairment of financial assets and financial liabilities under IFRS 9 with the cumulative effect of the initial application recognized at the date of initial application.

The impact on measurement categories, carrying amount and related reconciliation for each class of the Company's financial assets and financial liabilities when retrospectively applying IFRS 9 on January 1, 2018 is detailed below:

	Measurement Category		Carrying Amount		Note
	IAS 39	IFRS 9	IAS 39	IFRS 9	
Financial Assets					
Cash and cash equivalents	Loans and receivables	Amortized cost	\$ 553,391,696	\$ 553,391,696	(1)
Derivatives	Held for trading	Mandatorily at fair value through profit or loss (FVTPL)	569,751	569,751	
	Hedging instruments	Hedging instruments	34,394	34,394	
Equity securities	Available-for-sale	Fair value through other comprehensive income (FVTOCI)	7,422,311	8,389,438	(2)
Debt securities	Available-for-sale	Mandatorily at FVTPL	-	779,489	(3)
		FVTOCI	90,826,099	90,046,610	(3)
	Held-to-maturity	Amortized cost	20,821,714	20,813,462	(4)
Notes and accounts receivable (including related parties), other receivables and refundable deposits	Loans and receivables	Amortized cost	131,024,958	131,269,731	(1)

Financial Liabilities					
Derivatives	Held for trading	Held for trading	26,709	26,709	
	Hedging instruments	Hedging instruments	15,562	15,562	
Short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable and guarantee deposits	Amortized cost	Amortized cost	340,501,266	340,501,266	

Financial Assets	Carrying Amount as of December 31, 2017 (IAS 39)	Reclassifications	Remeasurements	Carrying Amount as of January 1, 2018 (IFRS 9)	Retained Earnings Effect on January 1, 2018	Other Equity Effect on January 1, 2018	Note
FVTPL	\$ 569,751	\$ -	\$ -	\$ 569,751	\$ -	\$ -	
- Debt instruments							
Add: From available for sale	-	779,489	-	779,489	(10,085)	10,085	(3)
	569,751	779,489	-	1,349,240	(10,085)	10,085	
FVTOCI	-	-	-	-	-	-	
- Equity instruments							
Add: From available for sale	-	7,422,311	967,127	8,389,438	1,294,528	(325,858)	(2)
- Debt instruments							
Add: From available for sale	-	90,046,610	-	90,046,610	(30,658)	30,658	(3)
	-	97,468,921	967,127	98,436,048	1,263,870	(295,200)	
Amortized cost	-	-	-	-	-	-	
Add: From held to maturity	-	20,821,714	(8,252)	20,813,462	(8,252)	-	(4)
Add: From loans and receivables	-	684,416,654	244,773	684,661,427	244,773	-	(1)
	-	705,238,368	236,521	705,474,889	236,521	-	
Hedging instruments	34,394	-	-	34,394	-	-	
Total	\$ 604,145	\$ 803,486,778	\$ 1,203,648	\$ 805,294,571	\$ 1,490,306	\$ (285,115)	

	Carrying Amount as of December 31, 2017 (IAS 39)	Adjustments Arising from Initial Application	Carrying Amount as of January 1, 2018 (IFRS 9)	Retained Earnings Effect on January 1, 2018	Other Equity Effect on January 1, 2018	Note
Investments accounted for using equity method	\$ 17,861,488	\$ 8,259	\$ 17,869,747	\$ 33,985	\$ (25,726)	(5)

- (1) Cash and cash equivalents, notes and accounts receivable (including related parties), other receivables and refundable deposits that were classified as loans and receivables under IAS 39 are now classified at amortized cost with assessment of future 12-month or lifetime expected credit loss under IFRS 9. As a result of retrospective application, the adjustments would result in a decrease in loss of allowance for accounts receivable of NT\$244,773 thousand and an increase in retained earnings of NT\$244,773 thousand on January 1, 2018.
- (2) As equity investments that were previously classified as available-for-sale financial assets under IAS 39 are not held for trading, the Company elected to designate all of these investments as at FVTOCI under IFRS 9. As a result, the related other equity-unrealized gain or loss on available-for-sale financial assets of NT\$228,304 thousand is reclassified to increase other equity - unrealized gain or loss on financial assets at FVTOCI.

As equity investments previously measured at cost under IAS 39 are remeasured at fair value under IFRS 9, the adjustments would result in an increase in financial assets at FVTOCI of NT\$967,127 thousand, an increase in other equity-unrealized gain or loss on financial assets at FVTOCI of NT\$968,670 thousand and a decrease in non-controlling interests of NT\$1,543 thousand on January 1, 2018.

For those equity investments previously classified as available-for-sale financial assets (including measured at cost financial assets) under IAS 39, the impairment losses that the Company had recognized have been accumulated in retained earnings. Since these investments were designated as at FVTOCI under IFRS 9 and no impairment assessment is required, the adjustments would result in a decrease in other equity - unrealized gain or loss on financial assets at FVTOCI of NT\$1,294,528 thousand and an increase in retained earnings of NT\$1,294,528 thousand on January 1, 2018.

- (3) Debt investments were previously classified as available-for-sale financial assets under IAS 39. Under IFRS 9, except for debt instruments of NT\$779,489 thousand whose contractual cash flows are not solely payments of principal and interest on the principal outstanding and therefore are classified as at FVTPL with the related other equity-unrealized gain or loss on available-for-sale financial assets of NT\$10,085 thousand being consequently reclassified to decrease retained earnings, the remaining debt investments are classified as at FVTOCI with assessment of future 12-month expected credit loss because these investments are held within a business model whose objective is both to collect the contractual cash flows and sell the financial assets. The related other equity-unrealized gain or loss on available-for-sale financial assets of NT\$434,403 thousand is reclassified to decrease other equity-unrealized gain or loss on financial assets at FVTOCI. As a result of retrospective application of future 12-month expected credit loss, the adjustments would result in an increase in other equity - unrealized gain or loss on financial assets at FVTOCI of NT\$30,658 thousand and a decrease in retained earnings of NT\$30,658 thousand on January 1, 2018.
- (4) Debt investments previously classified as held-to-maturity financial assets and measured at amortized cost under IAS 39 are classified as measured at amortized cost with assessment of future 12-month expected credit loss under IFRS 9 because the contractual cash flows are solely payments of principal and interest on the principal outstanding and these investments are held within a business model whose objective is to collect the contractual cash flows. As a result of retrospective application of future 12-month expected credit loss, the adjustments would result in an increase in loss allowance of NT\$8,252 thousand and a decrease in retained earnings of NT\$8,252 thousand on January 1, 2018.

- (5) With the retrospective adoption of IFRS 9 by associates accounted for using equity method, the corresponding adjustments made by the Company would result in an increase in investments accounted for using equity method of NT\$8,259 thousand, a decrease in other equity- unrealized gain or loss on financial assets at FVTOCI of NT\$23,616 thousand, a decrease in other equity- unrealized gain or loss on available-for-sale financial assets of NT\$2,110 thousand and an increase in retained earnings of NT\$33,985 thousand on January 1, 2018.

Hedge accounting

The Company prospectively applies the requirements for hedge accounting upon initial application of IFRS 9. In addition, due to the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers, all derivative and non-derivative financial assets and financial liabilities which are designated as hedging instruments are presented as financial assets and financial liabilities for hedging starting 2018.

2) IFRS 15 “Revenue from Contracts with Customers” and related amendments

IFRS 15 establishes principles for recognizing revenue that apply to all contracts with customers, and will supersede IAS 18, “Revenue,” IAS 11, “Construction Contracts,” and a number of revenue-related interpretations. Please refer to Note 4 for information relating to the relevant accounting policies.

The Company elected only to retrospectively apply IFRS 15 to contracts that were not completed on January 1, 2018 and elected not to restate prior reporting period with the cumulative effect of the initial application recognized at the date of initial application.

The impact on assets, liabilities and equity when retrospectively applying IFRS 15 on January 1, 2018 is detailed below:

	Carrying Amount as of December 31, 2017 (IAS 18 and Revenue-related Interpretations)	Adjustments Arising from Initial Application	Carrying Amount as of January 1, 2018 (IFRS 15)	Note
Inventories	\$ 73,880,747	\$ (19,745)	\$ 73,861,002	(1)
Contract assets	-	34,177	34,177	(1)
Investments accounted for using equity method	17,861,488	<u>19,483</u>	17,880,971	(1)
Total effect on assets		<u>\$ 33,915</u>		
Provisions - current	13,961,787	\$ (13,961,787)	-	(2)
Accrued expenses and other current liabilities	65,588,396	<u>13,961,787</u>	79,550,183	(2)
Total effect on liabilities		<u>\$ -</u>		
Retained earnings	1,233,362,010	\$ 32,030	1,233,394,040	(1)
Non-controlling interests	702,110	<u>1,885</u>	703,995	(1)
Total effect on equity		<u>\$ 33,915</u>		

- (1) Prior to the application of IFRS 15, the Company recognizes revenue based on the accounting treatment of the sales of goods. Under IFRS 15, certain subsidiaries and associates accounted for using equity method will change to recognize revenue over time because customers are deemed to have control over the products when the products are manufactured. As a result, the Company will recognize contract assets (classified under other current assets) and adjust related assets and equity accordingly.
- (2) Prior to the application of IFRS 15, the Company recognized the estimation of sales returns and allowance as provisions. Under IFRS 15, the Company recognizes such estimation as refund liability (classified under accrued expenses and other current liabilities).

The following table shows the amount affected in the current period by the application of IFRS 15 as compared to IAS 18:

Impact on Assets, Liabilities and Equity

	December 31, 2018
Decrease in inventories	\$ (29,610)
Increase in contract assets	52,470
Increase in investments accounted for using equity method	<u>15,163</u>
Total effect on assets	<u>\$ 38,023</u>
Decrease in provisions - current	\$ (22,672,634)
Increase in accrued expenses and other current liabilities	22,671,587
Increase in income tax payable	<u>4,781</u>
Total effect on liabilities	<u>\$ 3,734</u>
Increase in retained earnings	\$ 31,791
Increase in non-controlling interests	<u>2,498</u>
Total effect on equity	<u>\$ 34,289</u>

Impact on Total Comprehensive Income

	Year Ended December 31, 2018
Increase in net revenue	\$ 53,517
Increase in cost of revenue	(29,610)
Increase in share of the profit or loss of associates	15,163
Increase in income tax expense	<u>(4,781)</u>
Increase in net income for the year	<u>\$ 34,289</u>
Increase in net income/total comprehensive income attributable to:	
Shareholders of the parent	\$ 31,791
Non-controlling interests	<u>2,498</u>
	<u>\$ 34,289</u>

- 3) Please refer to Note 34 for the disclosure of amendment to IAS 7 “Disclosure Initiative”
- b. Amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers for application starting from 2019 and the IFRSs issued by IASB and endorsed by FSC with effective date starting 2019

New, Amended or Revised Standards and Interpretations (the “New IFRSs”)	Effective Date Announced by IASB (Note 1)
Annual Improvements to IFRSs 2015-2017 Cycle	January 1, 2019
Amendments to IFRS 9 “Prepayment Features with Negative Compensation”	January 1, 2019 (Note 2)
IFRS 16 “Leases”	January 1, 2019
Amendments to IAS 19 “Plan Amendment, Curtailment or Settlement”	January 1, 2019 (Note 3)
Amendments to IAS 28 “Long-term Interests in Associates and Joint Ventures”	January 1, 2019
IFRIC 23 “Uncertainty over Income Tax Treatments”	January 1, 2019

Note 1: Unless stated otherwise, the above New IFRSs are effective for annual periods beginning on or after their respective effective dates.

Note 2: The FSC permits the election for early adoption of the amendments starting from 2018.

Note 3: The Company shall apply these amendments to plan amendments, curtailments or settlements occurring on or after January 1, 2019.

Except for the following items, the Company believes that the adoption of aforementioned standards or interpretations will not have a significant effect on the Company’s accounting policies.

1) IFRS 16 “Leases”

IFRS 16 sets out the accounting standards for leases that will supersede IAS 17 “Leases”, IFRIC 4 “Determining whether an Arrangement contains a Lease”, and a number of related interpretations.

Definition of a lease

Upon initial application of IFRS 16, the Company will apply the guidance of IFRS 16 in determining whether contracts are, or contain, a lease only to contracts entered into (or changed) on or after January 1, 2019. Contracts identified as containing a lease under IAS 17 and IFRIC 4 will not be reassessed and will be accounted for in accordance with the transitional provisions under IFRS 16.

The Company as lessee

Upon initial application of IFRS 16, except for payments for low-value asset and short-term leases which will be recognized as expenses on a straight-line basis, the Company will recognize right-of-use assets and lease liabilities for all leases on the consolidated balance sheets. On the consolidated statements of comprehensive income, the Company will present the depreciation expense charged on right-of-use assets separately from the interest expense accrued on lease liabilities and computed using the effective interest method. On the consolidated statements of cash flows, cash payments for both the principal portion and the interest portion of lease liabilities are classified within financing activities.

Upon initial application of IFRS 16, the Company will apply IFRS 16 retrospectively with the cumulative effect of the initial application recognized at the date of initial application but will not restate comparative information.

Leases agreements classified as operating leases under IAS 17, except for leases of low-value asset and short-term leases, will be measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate on January 1, 2019. Right-of-use assets are measured at an amount equal to the lease liabilities, adjusted by the amount of any prepaid or accrued lease payments. Right-of-use assets are subject to impairment testing under IAS 36.

The Company will apply the following practical expedients to measure right-of-use assets and lease liabilities on January 1, 2019 :

- a) The Company will apply a single discount rate to a portfolio of leases with reasonably similar characteristics to measure lease liabilities.
- b) The Company will account for those leases for which the lease term ends on or before December 31, 2019 as short-term leases.
- c) Except for lease payment, the Company will exclude incremental costs of obtaining the lease from the measurement of right-of-use assets on January 1, 2019.
- d) The Company will determine lease terms (e.g. lease periods) based on the projected status on January 1, 2019, to measure lease liabilities.

The weighted average lessee's incremental borrowing rate used by the Company to calculate lease liabilities recognized on January 1, 2019 is 1.46%. The reconciliation between the lease liabilities recognized and the future minimum lease payments of non-cancellable operating lease on December 31, 2018 is presented as follows:

The future minimum lease payments of non-cancellable operating lease on December 31, 2018	\$ 20,849,585
Less: Recognition exemption for short-term leases	<u>(3,189,821)</u>
Undiscounted gross amounts on January 1, 2019	<u>\$ 17,659,764</u>
Discounted using the incremental borrowing rate on January 1, 2019	\$ 16,465,599
Add: Adjustments as a result of a different treatment of extension and purchase options	<u>3,438,016</u>
Lease liabilities recognized on January 1, 2019	<u>\$ 19,903,615</u>

The Company as lessor

Except for sublease transactions, the Company will not make any adjustments for leases in which it is a lessor, and will account for those leases under IFRS 16 starting from January 1, 2019. On the basis of the remaining contractual terms and conditions on January 1, 2019, all of the Company's subleases will be classified as operating leases.

Impact on assets, liabilities and equity on January 1, 2019

	Carrying Amount as of December 31, 2018	Adjustments Arising from Initial Application	Adjusted Carrying Amount as of January 1, 2019
Other current assets	\$ 5,406,423	\$ (118,242)	\$ 5,288,181
Right-of-use assets	-	20,082,875	20,082,875
Other noncurrent assets	1,584,647	<u>(77,171)</u>	1,507,476
Total effect on assets		<u>\$ 19,887,462</u>	
Accrued expenses and other current liabilities	61,760,619	\$ 2,627,334	64,387,953
Lease liabilities - noncurrent	-	17,269,317	17,269,317
Other noncurrent liabilities	1,950,989	<u>(9,189)</u>	1,941,800
Total effect on liabilities		<u>\$ 19,887,462</u>	
Total effect on equity		<u>\$ -</u>	

- c. The IFRSs issued by IASB but not yet endorsed and issued into effect by FSC

New, Revised or Amended Standards and Interpretations	Effective Date Issued by IASB
Amendments to IFRS 3 “Definition of a Business”	January 1, 2020 (Note 1)
Amendments to IFRS 10 and IAS 28 “Sale or Contribution of Assets between an Investor and its Associate or Joint Venture”	To be determined by IASB
Amendments to IAS 1 and IAS 8 “Definition of Material”	January 1, 2020 (Note 2)

Note 1: The Company shall apply these amendments to business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after January 1, 2020 and to asset acquisitions that occur on or after the beginning of that period.

Note 2: The Company shall apply these amendments prospectively for annual reporting periods beginning on or after January 1, 2020.

As of the date the accompanying consolidated financial statements were issued, the Company continues in evaluating the impact on its financial position and financial performance as a result of the initial adoption of the aforementioned standards or interpretations. The related impact will be disclosed when the Company completes the evaluation.

4. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

For the convenience of readers, the accompanying consolidated financial statements have been translated into English from the original Chinese version prepared and used in the R.O.C. If there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese-language consolidated financial statements shall prevail.

Statement of Compliance

The accompanying consolidated financial statements have been prepared in conformity with the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the IFRSs endorsed by the FSC with the effective dates (collectively, “Taiwan-IFRSs”).

Basis of Preparation

The accompanying consolidated financial statements have been prepared on the historical cost basis except for financial instruments that are measured at fair values, as explained in the accounting policies below. Historical cost is generally based on the fair value of the consideration given in exchange for the assets.

Basis of Consolidation

The basis for the consolidated financial statements

The consolidated financial statements incorporate the financial statements of TSMC and entities controlled by TSMC (its subsidiaries).

Income and expenses of subsidiaries acquired or disposed of are included in the consolidated statement of comprehensive income from the effective date of acquisition and up to the effective date of disposal, as appropriate. Total comprehensive income of subsidiaries is attributed to the shareholders of the parent and to the non-controlling interests even if this results in the non-controlling interests having a deficit balance.

When necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies into line with those used by the Company.

All intra-group transactions, balances, income and expenses are eliminated in full on consolidation.

Changes in the Company’s ownership interests in subsidiaries that do not result in the Company losing control over the subsidiaries are accounted for as equity transactions. The carrying amounts of the Company’s interests and the non-controlling interests are adjusted to reflect the changes in their relative interests in the subsidiaries. Any difference between the amount by which the non-controlling interests are adjusted and the fair value of the consideration paid or received is recognized directly in equity and attributed to shareholders of the parent.

When the Company loses control of a subsidiary, a gain or loss is recognized in profit or loss and is calculated as the difference between:

- a. the aggregate of the fair value of consideration received and the fair value of any retained interest at the date when control is lost; and
- b. the previous carrying amount of the assets (including goodwill), and liabilities of the subsidiary and any non-controlling interest.

The Company shall account for all amounts recognized in other comprehensive income in relation to the subsidiary on the same basis as would be required if the Company had directly disposed of the related assets and liabilities.

The fair value of any investment retained in the former subsidiary at the date when control is lost is regarded as the cost on initial recognition of an investment in an associate.

The subsidiaries in the consolidated financial statements

The detail information of the subsidiaries at the end of reporting period was as follows:

Name of Investor	Name of Investee	Main Businesses and Products	Establishment and Operating Location	Percentage of Ownership		Note
				December 31, 2018	December 31, 2017	
TSMC	TSMC North America	Selling and marketing of integrated circuits and other semiconductor devices	San Jose, California, U.S.A.	100%	100%	-
	TSMC Europe B.V. (TSMC Europe)	Customer service and supporting activities	Amsterdam, the Netherlands	100%	100%	a)
	TSMC Japan Limited (TSMC Japan)	Customer service and supporting activities	Yokohama, Japan	100%	100%	a)
	TSMC Korea Limited (TSMC Korea)	Customer service and supporting activities	Seoul, Korea	100%	100%	a)
	TSMC Partners, Ltd. (TSMC Partners)	Investing in companies involved in the design, manufacture, and other related business in the semiconductor industry and other investment activities	Tortola, British Virgin Islands	100%	100%	a)
	TSMC Global, Ltd. (TSMC Global)	Investment activities	Tortola, British Virgin Islands	100%	100%	-
	TSMC China Company Limited (TSMC China)	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	Shanghai, China	100%	100%	-
	TSMC Nanjing Company Limited (TSMC Nanjing)	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	Nanjing, China	100%	100%	b)
	VisEra Technologies Company Ltd. (VisEra Tech)	Engaged in manufacturing electronic spare parts and in researching, developing, designing, manufacturing, selling, packaging and testing of color filter	Hsin-Chu, Taiwan	87%	87%	-
	VentureTech Alliance Fund II, L.P. (VTAF II)	Investing in new start-up technology companies	Cayman Islands	98%	98%	a)
TSMC Partners	VentureTech Alliance Fund III, L.P. (VTAF III)	Investing in new start-up technology companies	Cayman Islands	98%	98%	a)
	TSMC Solar Europe GmbH	Selling of solar related products and providing customer service	Hamburg, Germany	100%	100%	a), c)
	TSMC Development, Inc. (TSMC Development)	Investing in companies involved in the manufacturing related business in the semiconductor industry	Delaware, U.S.A.	100%	100%	-
	TSMC Technology, Inc. (TSMC Technology)	Engineering support activities	Delaware, U.S.A.	100%	100%	a)
	TSMC Design Technology Canada Inc. (TSMC Canada)	Engineering support activities	Ontario, Canada	100%	100%	a)
	InveStar Semiconductor Development Fund, Inc. (ISDF)	Investing in new start-up technology companies	Cayman Islands	97%	97%	a), c)
	InveStar Semiconductor Development Fund, Inc. (II) LDC. (ISDF II)	Investing in new start-up technology companies	Cayman Islands	97%	97%	a), c)
TSMC Development	WaferTech, LLC (WaferTech)	Manufacturing, selling and testing of integrated circuits and other semiconductor devices	Washington, U.S.A.	100%	100%	-
VTAF III	Growth Fund Limited (Growth Fund)	Investing in new start-up technology companies	Cayman Islands	100%	100%	a)

Note a: This is an immaterial subsidiary for which the consolidated financial statements are not audited by the Company's independent auditors.

Note b: Under the investment agreement entered into with the municipal government of Nanjing, China, the Company will make an investment in Nanjing in the amount of approximately US\$3 billion to establish a subsidiary operating a 300mm wafer fab with the capacity of 20,000 12-inch wafers per month, and a design service center.

Note c: The subsidiary is under liquidation procedures.

Foreign Currencies

The financial statements of each individual consolidated entity were expressed in the currency which reflected its primary economic environment (functional currency). The functional currency of TSMC and presentation currency of the consolidated financial statements are both New Taiwan Dollars (NT\$). In preparing the consolidated financial statements, the operating results and financial positions of each consolidated entity are translated into NT\$.

In preparing the financial statements of each individual consolidated entity, transactions in currencies other than the entity's functional currency (foreign currencies) are recognized at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Such exchange differences are recognized in profit or loss in the year in which they arise. Non-monetary items measured at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Exchange differences arising on the retranslation of non-monetary items are

included in profit or loss for the year except for exchange differences arising on the retranslation of non-monetary items in respect of which gains and losses are recognized directly in other comprehensive income, in which case, the exchange differences are also recognized directly in other comprehensive income. Non-monetary items that are measured in terms of historical cost in foreign currencies are not retranslated.

For the purposes of presenting consolidated financial statements, the assets and liabilities of the Company's foreign operations are translated into NT\$ using exchange rates prevailing at the end of each reporting period. Income and expense items are translated at the average exchange rates for the period. Exchange differences arising, if any, are recognized in other comprehensive income and accumulated in equity (attributed to non-controlling interests as appropriate).

Classification of Current and Noncurrent Assets and Liabilities

Current assets are assets held for trading purposes and assets expected to be converted to cash, sold or consumed within one year from the end of the reporting period. Current liabilities are obligations incurred for trading purposes and obligations expected to be settled within one year from the end of the reporting period. Assets and liabilities that are not classified as current are noncurrent assets and liabilities, respectively.

Cash Equivalents

Cash equivalents, for the purpose of meeting short-term cash commitments, consist of highly liquid time deposits and investments that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

Financial Instruments

Financial assets and liabilities shall be recognized when the Company becomes a party to the contractual provisions of the instruments.

Financial assets and liabilities are initially recognized at fair values. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognized immediately in profit or loss.

Financial Assets

The classification of financial assets depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Regular way purchases or sales of financial assets are recognized and derecognized on a trade date or settlement date basis for which financial assets were classified in the same way, respectively. Regular way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace.

a. Category of financial assets and measurement

2018

Financial assets are classified into the following categories: financial assets at FVTPL, investments in debt instruments and equity instruments at FVTOCI, and financial assets at amortized cost.

1) Financial asset at FVTPL

For certain financial assets which include debt instruments that do not meet the criteria of amortized cost or FVTOCI, it is mandatorily required to measure them at FVTPL. Any gain or loss arising from remeasurement is recognized in profit or loss. The net gain or loss recognized in profit or loss incorporates any interest earned on the financial asset.

2) Investments in debt instruments at FVTOCI

Debt instruments with contractual terms specifying that cash flows are solely payments of principal and interest on the principal amount outstanding, together with objective of collecting contractual cash flows and selling the financial assets, are measured at FVTOCI.

Interest income calculated using the effective interest method, foreign exchange gains and losses and impairment gains or losses on investments in debt instruments at FVTOCI are recognized in profit or loss. Other changes in the carrying amount of these debt instruments are recognized in other comprehensive income and will be reclassified to profit or loss when these debt instruments are disposed.

3) Investments in equity instruments at FVTOCI

On initial recognition, the Company may irrevocably designate investments in equity investments that is not held for trading as at FVTOCI.

Investments in equity instruments at FVTOCI are subsequently measured at fair value with gains and losses arising from changes in fair value recognized in other comprehensive income and accumulated in other equity.

Dividends on these investments in equity instruments at FVTOCI are recognized in profit or loss when the Company's right to receive the dividends is established, unless the Company's rights clearly represent a recovery of part of the cost of the investment.

4) Measured at amortized cost

Cash and cash equivalents, debt instrument investments, notes and accounts receivable (including related parties), other receivables and refundable deposits are measured at amortized cost.

Debt instruments with contractual terms specifying that cash flows are solely payments of principal and interest on the principal amount outstanding, together with objective of holding financial assets in order to collect contractual cash flows, are measured at amortized cost.

Subsequent to initial recognition, financial assets measured at amortized cost are measured at amortized cost, which equals to carrying amount determined by the effective interest method less any impairment loss.

2017

Financial assets are classified into the following specified categories: Financial assets at FVTPL, available-for-sale financial assets, held-to-maturity financial assets and loans and receivables.

1) Financial asset at FVTPL

Financial assets are classified as at fair value through profit or loss when the financial asset is either held for trading or it is designated as at fair value through profit or loss.

Financial assets at fair value through profit or loss are stated at fair value, with any gains or losses arising on remeasurement recognized in profit or loss.

2) Available-for-sale financial assets

Available-for-sale financial assets are non-derivative financial assets that are either designated as available-for-sale or are not classified as (a) loans and receivables, (b) held-to-maturity financial assets or (c) financial assets at fair value through profit or loss.

Available-for-sale financial assets are measured at fair value. Interest income from available-for-sale monetary financial assets and dividends on available-for-sale equity investments are recognized in profit or loss. Other changes in the carrying amount of available-for-sale financial assets are recognized in other comprehensive income. When the investment is disposed of or is determined to be impaired, the cumulative gain or loss previously recognized in other comprehensive income is reclassified to profit or loss.

Dividends on available-for-sale equity instruments are recognized in profit or loss when the Company's right to receive the dividends is established.

Available-for-sale equity instruments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured are measured at cost less any identified impairment losses at the end of each reporting period. Such equity instruments are subsequently remeasured at fair value when their fair value can be reliably measured, and the difference between the carrying amount and fair value is recognized in profit or loss or other comprehensive income.

3) Held-to-maturity financial assets

Held-to-maturity investments are non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the Company has the positive intent and ability to hold to maturity. Subsequent to initial recognition, held-to-maturity financial assets are measured at amortized cost using the effective interest method less any impairment.

4) Loans and receivables

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. Loans and receivables including cash and cash equivalents, notes and accounts receivable and other receivables are measured at amortized cost using the effective interest method, less any impairment, except for those loans and receivables with immaterial discounted effect.

b. Impairment of financial assets

2018

At the end of each reporting period, a loss allowance for expected credit loss is recognized for financial assets at amortized cost (including accounts receivable) and for investments in debt instruments that are measured at FVTOCI.

The loss allowance for accounts receivable is measured at an amount equal to lifetime expected credit losses. For financial assets at amortized cost and investments in debt instruments that are measured at FVTOCI, when the credit risk on the financial instrument has not increased significantly since initial recognition, a loss allowance is recognized at an amount equal to expected credit loss resulting from possible default events of a financial instrument within 12 months after the reporting date. If, on the other hand, there has been a significant increase in credit risk since initial recognition, a loss allowance is recognized at an amount equal to expected credit loss resulting from all possible default events over the expected life of a financial instrument.

The Company recognizes an impairment loss in profit or loss for all financial instruments with a corresponding adjustment to their carrying amount through a loss allowance account, except for investments in debt instruments that are measured at FVTOCI, for which the loss allowance is recognized in other comprehensive income and does not reduce the carrying amount of the financial asset.

2017

Financial assets, other than those carried at FVTPL, are assessed for indicators of impairment at the end of each reporting period. Those financial assets are considered to be impaired when there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial assets, their estimated future cash flows have been affected.

For financial assets carried at amortized cost, such as trade receivables, assets that are assessed not to be impaired individually are, in addition, assessed for impairment on a collective basis. The Company assesses the collectability of receivables by performing the account aging analysis and examining current trends in the credit quality of its customers.

For financial assets carried at amortized cost, the amount of the impairment loss is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate.

For financial assets measured at amortized cost, if, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment loss was recognized, the previously recognized impairment loss is reversed through profit or loss to the extent that the carrying amount of the financial assets at the date the impairment loss is reversed does not exceed what the amortized cost would have been had the impairment loss not been recognized.

When an available-for-sale financial asset is considered to be impaired, cumulative gains or losses previously recognized in other comprehensive income are reclassified to profit or loss in the year.

In respect of available-for-sale equity instruments, impairment losses previously recognized in profit or loss are not reversed through profit or loss. Any increase in fair value subsequent to the recognition of an impairment loss is recognized in other comprehensive income and accumulated under the heading of unrealized gains or losses from available-for-sale financial assets.

For financial assets carried at cost, the amount of the impairment loss is measured as the difference between the asset's carrying amount and the present value of the estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment loss will not be reversed in subsequent periods.

The carrying amount of the financial asset is reduced by the impairment loss directly for all financial assets with the exception of trade receivables, where the carrying amount is reduced through the use of an allowance account. When a trade receivable is considered uncollectible, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited against the allowance account.

c. Derecognition of financial assets

2018

The Company derecognizes a financial asset only when the contractual rights to the cash flows from the financial asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the financial asset to another entity.

On derecognition of a financial asset at amortized cost in its entirety, the difference between the asset's carrying amount and the sum of the consideration received and receivable is recognized in profit or loss. On derecognition of an investment in a debt instrument at FVTOCI, the difference between the asset's carrying amount and the sum of the consideration received and receivable and the cumulative gain or loss that had been recognized in other comprehensive income is recognized in profit or loss. However, on derecognition of an investment in an equity instrument at FVTOCI, the cumulative gain or loss that had been recognized in other comprehensive income is transferred directly to retained earnings, without recycling through profit or loss.

2017

The Company derecognizes a financial asset only when the contractual rights to the cash flows from the financial asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the financial asset to another entity.

On derecognition of a financial asset in its entirety, the difference between the financial asset's carrying amount and the sum of the consideration received and receivable and the cumulative gain or loss that had been recognized in other comprehensive income and accumulated in equity is recognized in profit or loss.

Financial Liabilities and Equity Instruments

Classification as debt or equity

Debt and equity instruments issued by the Company are classified as either financial liabilities or as equity in accordance with the substance of the contractual arrangements and the definitions of a financial liability and an equity instrument.

Equity instruments

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the Company are recognized at the proceeds received, net of direct issue costs.

Financial liabilities

Financial liabilities are subsequently measured either at amortized cost using effective interest method or at FVTPL.

Financial liabilities are classified as at fair value through profit or loss when the financial liability is either held for trading or is designated as at fair value through profit or loss.

Financial liabilities at fair value through profit or loss are stated at fair value, with any gains or losses arising on remeasurement recognized in profit or loss.

Financial liabilities other than those held for trading purposes and designated as at FVTPL are subsequently measured at amortized cost at the end of each reporting period.

Derecognition of financial liabilities

The Company derecognizes financial liabilities when, and only when, the Company's obligations are discharged, cancelled or they expire. The difference between the carrying amount of the financial liability derecognized and the consideration paid and payable is recognized in profit or loss.

Derivative Financial Instruments

Derivative financial instruments are initially recognized at fair value at the date the derivative contracts are entered into and are subsequently remeasured to their fair value at the end of each reporting period. The resulting gain or loss is recognized in profit or loss immediately unless the derivative financial instrument is designated and effective as a hedging instrument, in which event the timing of the recognition in profit or loss depends on the nature of the hedge relationship.

Financial Instruments Designated as at Fair Value through Profit or Loss

A financial instrument may be designated as at FVTPL upon initial recognition. The financial instrument forms part of a group of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Company's documented risk management or investment strategy, and information about the grouping is provided internally on that basis.

Hedge Accounting

a. Fair value hedge

The Company designates certain hedging instruments, such as interest rate futures contracts, to partially hedge against the price risk caused by changes in interest rates in the Company's investments in fixed income securities as fair value hedge. Changes in the fair value of hedging instrument that are designated and qualify as fair value hedges are recognized in profit or loss immediately, together with any changes in the fair value of the hedged asset that are attributable to the hedged risk.

b. Cash flow hedge

The Company designates certain hedging instruments, such as forward exchange contracts and foreign currency deposits, to partially hedge its foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). The effective portion of changes in the fair value of hedging instruments is recognized in other comprehensive income. When the forecast transactions actually take place, the associated gains or losses that were recognized in other comprehensive income are removed from equity and included in the initial cost of the hedged items. The gains or losses from hedging instruments relating to the ineffective portion are recognized immediately in profit or loss.

2018

The Company prospectively discontinues hedge accounting only when the hedging relationship ceases to meet the qualifying criteria; for instance when the hedging instrument expires or is sold, terminated or exercised.

2017

Hedge accounting was discontinued prospectively when the Company revoked the designated hedging relationship, when the hedging instrument expired or was sold, terminated, or exercised; or no longer met the criteria for hedge accounting.

Inventories

Inventories are stated at the lower of cost or net realizable value. Inventories are recorded at standard cost and adjusted to approximate weighted-average cost at the end of the reporting period. Net realizable value represents the estimated selling price of inventories less all estimated costs of completion and costs necessary to make the sale.

Investments Accounted for Using Equity Method

Investments accounted for using the equity method are investments in associates.

An associate is an entity over which the Company has significant influence and that is neither a subsidiary nor a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of the investee but is not control or joint control over those policies.

The operating results and assets and liabilities of associates are incorporated in these consolidated financial statements using the equity method of accounting. Under the equity method, an investment in an associate is initially recognized in the consolidated statement of financial position at cost and adjusted thereafter to recognize the Company's share of profit or loss and other comprehensive income of the associate as well as the distribution received. The Company also recognizes its share in the changes in the equities of associates.

Any excess of the cost of acquisition over the Company's share of the net fair value of the identifiable assets, liabilities and contingent liabilities of an associate recognized at the date of acquisition is recognized as goodwill, which is included within the carrying amount of the investment. Any excess of the Company's share of the net fair value of the identifiable assets, liabilities and contingent liabilities over the cost of acquisition, after reassessment, is recognized immediately in profit or loss.

When necessary, the entire carrying amount of the investment (including goodwill) is tested for impairment as a single asset by comparing its recoverable amount (higher of value in use and fair value less costs to sell) with its carrying amount. Any impairment loss recognized forms part of the carrying amount of the investment. Any reversal of that impairment loss is recognized to the extent that the recoverable amount of the investment subsequently increases.

The Company discontinues the use of the equity method from the date when the Company ceases to have significant influence over an associate. When the Company retains an interest in the former associate, the Company measures the retained interest at fair value at that date. The difference between the carrying amount of the associate at the date the equity method was discontinued, and the fair value of any retained interest and any proceeds from disposing of a part interest in the associate is included in the determination of the gain or loss on disposal of the associate. In addition, the Company shall account for all amounts recognized in other comprehensive income in relation to that associate on the same basis as would be required if the associate had directly disposed of the related assets or liabilities. If the Company's ownership interest in an associate is reduced as a result of disposal, but the investment continues to be an associate, the Company should reclassify to profit or loss only a proportionate amount of the gain or loss previously recognized in other comprehensive income.

When the Company subscribes to additional shares in an associate at a percentage different from its existing ownership percentage, the resulting carrying amount of the investment differs from the amount of the Company's proportionate interest in the net assets of the associate. The Company records such a difference as an adjustment to investments with the corresponding amount charged or credited to capital surplus. If the Company's ownership interest is reduced due to the additional subscription to the shares of associate by other investors, the proportionate amount of the gains or losses previously recognized in other comprehensive income in relation to that associate shall be reclassified to profit or loss on the same basis as would be required if the associate had directly disposed of the related assets or liabilities.

When a consolidated entity transacts with an associate, profits and losses resulting from the transactions with the associate are recognized in the Company's consolidated financial statements only to the extent of interests in the associate that are not owned by the Company.

Property, Plant and Equipment

Property, plant and equipment are measured at cost less accumulated depreciation and accumulated impairment. Costs include any incremental costs that are directly attributable to the construction or acquisition of the item of property, plant and equipment.

Property, plant and equipment in the course of construction for production, supply or administrative purposes are carried at cost, less any recognized impairment loss. Such assets are classified to the appropriate categories of property, plant and equipment when completed and ready for intended use. Depreciation of these assets, on the same basis as other identical categories of property, plant and equipment, commences when the assets are available for their intended use.

Depreciation is recognized so as to write off the cost of the assets less their residual values over their useful lives, and it is computed using the straight-line method over the following estimated useful lives: land improvements - 20 years; buildings - 10 to 20 years; machinery and equipment - 2 to 5 years; and office equipment - 3 to 5 years. The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimates accounted for on a prospective basis. Land is not depreciated.

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use of the assets. Any gain or loss arising on the disposal or retirement of an item of property, plant and equipment is determined as the difference between the sales proceeds and the carrying amount of the asset and is recognized in profit or loss.

Leases

Leases are classified as finance lease whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

The Company as lessor

Rental income from operating leases is recognized on a straight-line basis over the term of the relevant lease.

The Company as lessee

Operating lease payments are recognized as an expense on a straight-line basis over the lease term.

Intangible Assets

Goodwill

Goodwill arising on an acquisition of a business is carried at cost as established at the date of acquisition of the business less accumulated impairment losses, if any.

Other intangible assets

Other separately acquired intangible assets with finite useful lives are carried at cost less accumulated amortization and accumulated impairment losses. Amortization is recognized using the straight-line method over the following estimated useful lives: Technology license fees - the estimated life of the technology or the term of the technology transfer contract; software and system design costs - 3 years or contract period; patent and others - the economic life or contract period. The estimated useful life and amortization method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for on a prospective basis.

Impairment of Tangible and Intangible Assets

Goodwill

Goodwill is not amortized and instead is tested for impairment annually, or more frequently when there is an indication that the cash generating unit may be impaired. For the purpose of impairment testing, goodwill is allocated to each of the Company's cash-generating units or groups of cash-generating units that are expected to benefit from the synergies of the combination. If the recoverable amount of a cash-generating unit is less than its carrying amount, the difference is allocated first to reduce the carrying amount of any goodwill allocated to such cash generating unit and then to the other assets of the cash generating unit pro rata based on the carrying amount of each asset in the cash generating unit. Any impairment loss for goodwill is recognized directly in profit or loss. An impairment loss recognized for goodwill is not reversed in subsequent periods.

Other tangible and intangible assets

At the end of each reporting period, the Company reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss. When it is not possible to estimate the recoverable amount of an individual asset, the Company estimates the recoverable amount of the cash-generating unit to which the asset belongs. When a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual cash-generating units, or otherwise they are allocated to the smallest group of cash-generating units for which a reasonable and consistent allocation basis can be identified.

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset or cash-generating unit is estimated to be less than its carrying amount, the carrying amount of the asset or cash-generating unit is reduced to its recoverable amount. An impairment loss is recognized immediately in profit or loss.

When an impairment loss subsequently reverses, the carrying amount of the asset or a cash-generating unit is increased to the revised estimate of its recoverable amount, but the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset or cash-generating unit in prior years. A reversal of an impairment loss is recognized immediately in profit or loss.

Provision

Provisions are recognized when the Company has a present obligation (legal or constructive) as a result of a past event, it is probable that the Company will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation.

The amount recognized as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking into account the risks and uncertainties surrounding the obligation. When a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows.

Guarantee Deposit

Guarantee deposit mainly consists of cash received under deposit agreements with customers to ensure they have access to the Company's specified capacity; and as guarantee of accounts receivable to ensure payment from customers. Cash received from customers is recorded as guarantee deposit upon receipt. Guarantee deposits are refunded to customers when terms and conditions set forth in the deposit agreements have been satisfied.

Revenue Recognition

2018

The Company recognizes revenue when performance obligations are satisfied. The performance obligations are satisfied when customers obtain control of the promised goods which is generally when the goods are delivered to the customers' specified locations.

Revenue from sale of goods is measured at the fair value of the consideration received or receivable. Revenue is reduced for estimated customer returns, rebates and other similar allowances. Estimated sales returns and other allowances is generally made and adjusted based on historical experience and the consideration of varying contractual terms to recognize refund liabilities, which is classified under accrued expenses and other current liabilities.

In principle, payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. Due to the short term nature of the receivables from sale of goods with the immaterial discounted effect, the Company measures them at the original invoice amounts without discounting.

2017

Revenue is measured at the fair value of the consideration received or receivable. Revenue is reduced for estimated customer returns, rebates and other similar allowances.

Sale of goods

Revenue from the sale of goods is recognized when the goods are delivered and titles have passed, at which time all the following conditions are satisfied:

- The Company has transferred to the buyer the significant risks and rewards of ownership of the goods;
- The Company retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- The amount of revenue can be measured reliably;
- It is probable that the economic benefits associated with the transaction will flow to the Company; and
- The costs incurred or to be incurred in respect of the transaction can be measured reliably.

In principle, payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. Due to the short term nature of the receivables from sale of goods with the immaterial discounted effect, the Company measures them at the original invoice amounts without discounting.

Dividend and interest income

Dividend income from investments is recognized when the shareholder's right to receive payment has been established, provided that it is probable that the economic benefits will flow to the Company and the amount of income can be measured reliably.

Interest income from a financial asset is recognized when it is probable that the economic benefits will flow to the Company and the amount of income can be measured reliably. Interest income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable.

Employee Benefits

Short-term employee benefits

Liabilities recognized in respect of short-term employee benefits are measured at the undiscounted amount of the benefits expected to be paid in exchange for service rendered by employees.

Retirement benefits

For defined contribution retirement benefit plans, payments to the benefit plan are recognized as an expense when the employees have rendered service entitling them to the contribution. For defined benefit retirement benefit plans, the cost of providing benefit is recognized based on actuarial calculations.

Defined benefit costs (including service cost, net interest and rereasurement) under the defined benefit retirement benefit plans are determined using the Projected Unit Credit Method. Service cost (including current service cost), and net interest on the net defined benefit liability (asset) are recognized as employee benefits expense in the period they occur. Rereasurement, comprising actuarial gains and losses and the return on plan assets (excluding interest), is recognized in other comprehensive income in the period in which they occur. Rereasurement recognized in other comprehensive income is reflected immediately in retained earnings and will not be reclassified to profit or loss.

Net defined benefit liability represents the actual deficit in the Company's defined benefit plan.

Taxation

Income tax expense represents the sum of the tax currently payable and deferred tax.

Current tax

Income tax on unappropriated earnings (excluding earnings from foreign consolidated subsidiaries) is expensed in the year the shareholders approved the appropriation of earnings which is the year subsequent to the year the earnings are generated.

Adjustments of prior years' tax liabilities are added to or deducted from the current year's tax provision.

Deferred tax

Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities in the consolidated financial statements and the corresponding tax bases used in the computation of taxable profit. Deferred tax liabilities are generally recognized for all taxable temporary differences. Deferred tax assets are generally recognized for all deductible temporary differences, net operating loss carryforwards and tax credits for research and development expenses to the extent that it is probable that taxable profits will be available against which those deductible temporary differences can be utilized.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in subsidiaries and associates, except where the Company is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. Deferred tax assets arising from deductible temporary differences associated with such investments are only recognized to the extent that it is probable that there will be sufficient taxable profits against which to utilize the benefits of the temporary differences and they are expected to reverse in the foreseeable future.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the deferred tax asset to be recovered. The deferred tax assets which originally not recognized is also reviewed at the end of each reporting period and recognized to the extent that it is probable that sufficient taxable profits will be available to allow all or part of the deferred tax asset to be recovered.

Deferred tax liabilities and assets are measured at the tax rates that are expected to apply in the year in which the liability is settled or the asset is realized, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Company expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Current and deferred tax for the year

Current and deferred tax are recognized in profit or loss, except when they relate to items that are recognized in other comprehensive income or directly in equity, in which case, the current and deferred tax are also recognized in other comprehensive income or directly in equity, respectively.

Government Grants

Government grants are not recognized until there is reasonable assurance that the Company will comply with the conditions attaching to them and that the grants will be received.

Government grants whose primary condition is that the Company should purchase, construct or otherwise acquire noncurrent assets (mainly including land use right and depreciable assets) are recognized as a deduction from the carrying amount of the related assets and recognized as a reduced depreciation or amortization charge in profit or loss over the contract period or useful lives of the related assets. Government grants that are receivables as compensation for expenses already incurred are deducted from incurred expenses in the period in which they become receivables.

5. CRITICAL ACCOUNTING JUDGMENTS AND KEY SOURCES OF ESTIMATION AND UNCERTAINTY

In the application of the aforementioned Company's accounting policies, the Company is required to make judgments, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the year in which the estimate is revised if the revision affects only that year, or in the year of the revision and future years if the revision affects both current and future years.

Revenue Recognition

The Company recognizes revenue when the conditions described in Note 4 are satisfied. The Company also records estimated future returns and other allowances in the same period the related revenue is recorded. Estimated sales returns and other allowances is generally made and adjusted based on historical experience and the consideration of varying contractual terms, and the Company periodically reviews the adequacy of the estimation used.

Timing to commence depreciation of property, plant and equipment

As described in Note 4, depreciation of property, plant and equipment begins when the assets are available for use, and in the condition necessary for the assets to be capable of operating in the intended manner. The criteria to determine whether assets are available for their intended use vary within categories of assets as well as involve subjective judgments, thus validity of the timing to commence depreciation of property, plant and equipment could have a material impact on the Company's financial performance.

Impairment of Tangible and Intangible Assets Other than Goodwill

In the process of evaluating the potential impairment of tangible and intangible assets other than goodwill, the Company is required to make subjective judgments in determining the independent cash flows, useful lives, expected future revenue and expenses related to the specific asset groups with the consideration of the nature of semiconductor industry. Any changes in these estimates based on changed economic conditions or business strategies could result in significant impairment charges or reversal in future years.

Impairment of Goodwill

The assessment of impairment of goodwill requires the Company to make subjective judgment to determine the identified cash-generating units, allocate the goodwill to relevant cash-generating units and estimate the recoverable amount of relevant cash-generating units.

Impairment Assessment on Investment Using Equity Method

The Company assesses the impairment of investments accounted for using the equity method whenever triggering events or changes in circumstances indicate that an investment may be impaired and carrying value may not be recoverable. The Company measures the impairment based on a projected future cash flow of the investees, including the underlying assumptions of sales growth rate and capacity utilization rate formulated by such investees' internal management team. The Company also takes into account market conditions and the relevant industry trends to ensure the reasonableness of such assumptions.

Realization of Deferred Income Tax Assets

Deferred tax assets are recognized to the extent that it is probable that future taxable profits will be available against which those deferred tax assets can be utilized. Assessment of the realization of the deferred tax assets requires subjective judgment and estimate, including the future revenue growth and profitability, tax holidays, the amount of tax credits can be utilized and feasible tax planning strategies. Any changes in the global economic environment, the industry trends and relevant laws and regulations could result in significant adjustments to the deferred tax assets.

Fair Value Measurement of Non-publicly Traded Equity Investments

The fair value measurement for non-publicly traded equity investments is determined by the estimated fair value under appropriate valuation methods primarily based on investees' financial positions, operation results and recent financing activities, the market transaction prices of similar investments, market conditions and the required discount factors. As such, the estimated fair value may be different from the actual disposal price in the future. The Company assesses the fair value quarterly based on market

conditions to ensure the appropriateness of fair value measurement of non-publicly traded equity investments.

Valuation of Inventory

Inventories are stated at the lower of cost or net realizable value, and the Company uses judgment and estimate to determine the net realizable value of inventory at the end of each reporting period.

The Company estimates the net realizable value of inventory for obsolescence and unmarketable items at the end of reporting period and then writes down the cost of inventories to net realizable value. The net realizable value of the inventory is mainly determined based on assumptions of future demand within a specific time horizon.

Recognition and Measurement of Defined Benefit Plans

Net defined benefit liability and the resulting defined benefit costs under defined benefit pension plans are calculated using the Projected Unit Credit Method. Actuarial assumptions comprise the discount rate, rate of employee turnover, and future salary increase rate. Changes in economic circumstances and market conditions will affect these assumptions and may have a material impact on the amount of the expense and the liability.

6. CASH AND CASH EQUIVALENTS

	December 31, 2018	December 31, 2017
Cash and deposits in banks	\$ 575,825,502	\$ 551,919,770
Repurchase agreements collateralized by corporate bonds	1,229,600	-
Commercial paper	759,499	695,901
Agency bonds	<u>-</u>	<u>776,025</u>
	<u>\$ 577,814,601</u>	<u>\$ 553,391,696</u>

Deposits in banks consisted of highly liquid time deposits that were readily convertible to known amounts of cash and were subject to an insignificant risk of changes in value.

7. FINANCIAL ASSETS AND LIABILITIES AT FAIR VALUE THROUGH PROFIT OR LOSS

	December 31, 2018	December 31, 2017
<u>Financial assets</u>		
Mandatorily measured at FVTPL		
Agency mortgage-backed securities	\$ 3,419,287	\$ -
Forward exchange contracts	<u>85,303</u>	<u>-</u>
	3,504,590	-
Held for trading		
Forward exchange contracts	<u>-</u>	<u>569,751</u>
	<u>\$ 3,504,590</u>	<u>\$ 569,751</u>
<u>Financial liabilities</u>		
Held for trading		
Forward exchange contracts	<u>\$ 40,825</u>	<u>\$ 26,709</u>

The Company entered into derivative contracts to manage exposures due to fluctuations of foreign exchange rates. These derivative contracts did not meet the criteria for hedge accounting. Therefore, the Company did not apply hedge accounting treatment for these derivative contracts.

Outstanding forward exchange contracts consisted of the following:

	Maturity Date	Contract Amount (In Thousands)
<u>December 31, 2018</u>		
Sell NT\$/Buy EUR	January 2019 to March 2019	NT\$18,545,854/EUR527,000
Sell NT\$/Buy JPY	January 2019 to March 2019	NT\$4,757,858/JPY17,200,000
Sell US\$/Buy EUR	January 2019	US\$495/EUR434
Sell US\$/Buy JPY	January 2019	US\$175,591/JPY19,389,014
Sell US\$/Buy RMB	January 2019	US\$318,000/RMB2,188,747
Sell US\$/Buy NT\$	January 2019 to February 2019	US\$127,000/NT\$3,908,635
Sell RMB/Buy US\$	January 2019	RMB667,539/US\$97,000
<u>December 31, 2017</u>		
Sell NT\$/Buy EUR	January 2018 to February 2018	NT\$6,002,786/EUR169,000
Sell NT\$/Buy JPY	February 2018	NT\$996,294/JPY3,800,000
Sell US\$/Buy JPY	January 2018	US\$2,191/JPY246,724
Sell US\$/Buy RMB	January 2018	US\$558,000/RMB3,679,575
Sell US\$/Buy NT\$	January 2018 to February 2018	US\$1,661,500/NT\$49,673,320
Sell RMB /Buy EUR	January 2018	RMB38,967/EUR4,994
Sell RMB/Buy JPY	January 2018	RMB409,744/JPY7,062,536
Sell RMB/Buy GBP	January 2018	RMB3,637/GBP413

Investments in debt instruments at FVTOCI were classified as available-for-sale financial assets under IAS 39. Refer to Notes 3 and 9 for information relating to their reclassification and comparative information for 2017.

8. FINANCIAL ASSETS AT FAIR VALUE THROUGH OTHER COMPREHENSIVE INCOME-2018

	December 31, 2018
Investments in debt instruments at FVTOCI	
Corporate bonds	\$ 40,753,582
Agency bonds/Agency mortgage-backed securities	31,288,762
Asset-backed securities	15,670,295
Government bonds	11,151,359
Commercial paper	107,590
	<u>98,971,588</u>
Investments in equity instruments at FVTOCI	
Non-publicly traded equity investments	3,910,681
Publicly traded stocks	590,152
	<u>4,500,833</u>
	<u>\$ 103,472,421</u>

(Continued)

	December 31, 2018
Current	\$ 99,561,740
Noncurrent	<u>3,910,681</u>
	<u>\$ 103,472,421</u> (Concluded)

These investments in equity instruments are held for medium to long-term purposes and therefore are accounted for as FVTOCI.

For the year ended December 31, 2018, the Company sold shares of stocks for NT\$840,605 thousand mainly because the strategic purpose no longer exists and the non-publicly traded investee has been merged. The related other equity-unrealized gain or loss on financial assets at FVTOCI of NT\$1,193,056 thousand was transferred to decrease retained earnings.

For dividends from equity investments designated as at FVTOCI recognized during the year ended December 31, 2018, please refer to Note 28. All the dividends are from investments held at the end of the reporting period.

As of December 31, 2018, the cumulative loss allowance for expected credit loss of NT\$29,723 thousand is recognized under investments in debt instruments at FVTOCI. Refer to Note 36 for information relating to their credit risk management and expected credit loss.

Investments in equity and debt instruments at FVTOCI were classified as available-for-sale financial assets and cost methods (only for equity instruments) under IAS 39. Refer to Notes 3, 9 and 12 (only for equity instruments) for information relating to their reclassification and comparative information for 2017.

9. AVAILABLE-FOR-SALE FINANCIAL ASSETS-2017

	December 31, 2017
Corporate bonds	\$ 40,165,148
Agency bonds/Agency mortgage-backed securities	29,235,388
Asset-backed securities	13,459,545
Government bonds	7,817,723
Publicly traded stocks	2,548,054
Commercial paper	<u>148,295</u>
	<u>\$ 93,374,153</u>

10. HELD-TO-MATURITY FINANCIAL ASSETS-2017

	December 31, 2017
Corporate bonds	\$ 19,338,764
Structured product	<u>1,482,950</u>
	<u>\$ 20,821,714</u>
Current portion	\$ 1,988,385
Noncurrent portion	<u>18,833,329</u>
	<u>\$ 20,821,714</u>

11. FINANCIAL ASSETS AT AMORTIZED COST-2018

	December 31, 2018
Corporate bonds	\$ 19,519,941
Commercial paper	2,294,098
Less: Allowance for impairment loss	<u>(8,147)</u>
	<u>\$ 21,805,892</u>
Current portion	\$ 14,277,615
Noncurrent portion	<u>7,528,277</u>
	<u>\$ 21,805,892</u>

Financial assets at amortized cost were classified as held-to-maturity financial assets under IAS 39. Refer to Notes 3 and 10 for information relating to their reclassification and comparative information for 2017. Refer to Note 36 for information relating to credit risk management and expected credit loss for financial assets at amortized cost.

12. FINANCIAL ASSETS CARRIED AT COST-2017

The Company's investment classified as financial assets carried at cost primarily consists of non-publicly traded equity investments. Since there is a wide range of estimated fair values of the Company's investments in non-publicly traded equity investments, the Company concludes that the fair value cannot be reliably measured and therefore should be measured at the cost less any impairment.

The stock of Aquantia was listed in November 2017. Accordingly, the Company reclassified the aforementioned investment from financial assets carried at cost to available-for-sale financial assets.

13. HEDGING FINANCIAL INSTRUMENTS

2018

**December 31,
2018**

Financial assets- current

Cash flow hedges	
Forward exchange contracts	<u>\$ 23,497</u>

Financial liabilities- current

Fair value hedges	
Interest rate futures contracts	\$ 153,891
Cash flow hedges	
Forward exchange contracts	<u>1,941</u>
	<u>\$ 155,832</u>

Fair value hedge

The Company entered into interest rate futures contracts, which are used to partially hedge against the price risk caused by changes in interest rates in the Company's investments in fixed income securities. The hedge ratio is adjusted in response to the changes in the financial market and capped at 100%.

On the basis of economic relationships, the Company expects that the value of the interest rate futures contracts and the value of the hedged financial assets will change in opposite directions in response to movements in interest rates.

The main source of hedge ineffectiveness in these hedging relationships is the credit risk of the hedged financial assets, which is not reflected in the fair value of the interest rate future contracts. No other sources of ineffectiveness emerged from these hedging relationships. Amount of hedge ineffectiveness recognized in profit or loss is classified under other gains and losses.

The following tables summarize the information relating to the hedges of interest rate risk as of December 31, 2018.

Hedging Instruments	Contract Amount (US\$ in Thousands)	Maturity
US treasury bonds interest rate futures contracts	US\$ 330,300	March 2019
Hedged Items	Asset Carrying Amount as of December 31, 2018	Asset Accumulated Amount of Fair Value Hedge Adjustments
Financial assets at FVTOCI	\$ 23,229,530	\$ (13,508)

The effect for the year ended December 31, 2018 is detailed below:

Hedging Instruments/Hedged Items	Increase (Decrease) in Value Used for Calculating Hedge Ineffectiveness
Hedging Instruments	
US treasury bonds interest rate futures contracts	\$ 11,460
Hedged Items	
Financial assets at FVTOCI	<u>(13,846)</u>
	<u>\$ (2,386)</u>

Cash flow hedge

The Company entered into forward exchange contracts and foreign currency deposits to partially hedge foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). The hedge ratio is adjusted in response to the changes in the financial market and capped at 100%. The forward exchange contracts have maturities of 12 months or less.

On the basis of economic relationships, the Company expects that the value of forward exchange contracts and foreign currency deposits and the value of hedged transactions will change in opposite directions in response to movements in foreign exchange rates.

The main source of hedge ineffectiveness in these hedging relationships is driven by the effect of the counterparty's own credit risk on the fair value of forward exchange contracts and foreign currency deposits. No other sources of ineffectiveness emerged from these hedging relationships. For the year ended December 31, 2018, refer to Note 25(d) for gain or loss arising from changes in the fair value of hedging instruments and the amount transferred to initial carrying amount of hedged items.

The following tables summarize the information relating to the hedges for foreign currency risk as of December 31, 2018.

Hedging Instruments	Contract Amount (in Thousands)	Maturity	Balance in Other Equity (Continuing Hedges)
Forward exchange contracts	NT\$ 3,917,657 /EUR 112,000	February 2019 to April 2019	\$ 23,601

The effect for the year ended December 31, 2018 is detailed below:

Hedged Items	Increase (Decrease) in Value Used for Calculating Hedge Ineffectiveness
Hedging Instruments	
Forward exchange contracts	\$ 34,563
Foreign currency deposits	<u>6,412</u>
	<u>\$ 40,975</u>
Hedged Items	
Forecast transaction (capital expenditures)	<u>\$ (40,975)</u>

2017

The Company's hedging policies for 2017 are the same as those mentioned previously in 2018, the instruments employed are as follows:

	December 31, 2017
<u>Financial assets- current</u>	
Fair value hedges	
Interest rate futures contracts	\$ 27,016
Cash flow hedges	
Forward exchange contracts	<u>7,378</u>
	<u>\$ 34,394</u>
<u>Financial liabilities- current</u>	
Cash flow hedges	
Forward exchange contracts	<u>\$ 15,562</u>

The Company entered into interest rate futures contracts, which are used to partially hedge against the price risk caused by changes in interest rates in the Company's investments in fixed income securities.

The outstanding interest rate futures contracts consisted of the following:

Maturity Period	Contract Amount (US\$ in Thousands)
<u>December 31, 2017</u>	
March 2018	US\$ 169,400

The Company entered into forward exchange contracts to partially hedge foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). These contracts have maturities of 12 months or less.

Outstanding forward exchange contracts consisted of the following:

	Maturity Date	Contract Amount (In Thousands)
<u>December 31, 2017</u>		
Sell NT\$/Buy EUR	February 2018 to May 2018	NT\$2,649,104/EUR75,000

14. NOTES AND ACCOUNTS RECEIVABLE, NET

	December 31, 2018	December 31, 2017
At amortized cost		
Notes and accounts receivable	\$ 125,025,575	\$ 121,604,989
Less: Loss allowance	<u>(7,253)</u>	<u>(471,741)</u>
	125,018,322	121,133,248
At FVTOCI	<u>3,595,069</u>	<u>-</u>
	<u>\$ 128,613,391</u>	<u>\$ 121,133,248</u>

The Company signed a contract with the bank to sell certain accounts receivable without recourse and transaction cost required. These accounts receivable are classified as at FVTOCI because they are held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets.

2018

In principle, the payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month when the invoice is issued. Aside from recognizing impairment losses on credit-impaired accounts receivable, the Company recognizes loss allowance based on the expected credit loss ratio of customers by different risk levels. Such risk levels are determined with factors of historical loss ratios and customers' financial conditions, competitiveness and business outlook. For accounts receivable past due over 90 days without collaterals or guarantees, the Company recognizes loss allowance at full amount.

Aging analysis of notes and accounts receivable, net

	December 31, 2018
Not past due	\$ 113,126,484
Past due	
Past due within 30 days	15,006,461
Past due 31-60 days	472,833
Past due 61-120 days	4,654
Past due over 121 days	<u>2,959</u>
	<u>\$ 128,613,391</u>

Movements of the loss allowance for accounts receivable

Balance at January 1, 2018 (IAS 39)	\$ 471,741
Effect of retrospective application of IFRS 9	<u>(244,773)</u>
Balance at January 1, 2018 (IFRS 9)	226,968
Provision (Reversal)	(219,714)
Effect of exchange rate changes	<u>(1)</u>
Balance at December 31, 2018	<u>\$ 7,253</u>

For the year ended December 31, 2018, the decrease in loss allowance was mainly due to the variations from accounts receivable balance of different risk levels.

2017

In principle, the payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. The allowance for doubtful receivables is assessed by reference to the collectability of receivables by performing the account aging analysis, historical experience and current financial condition of customers.

Except for those impaired, for the rest of the notes and accounts receivable, the account aging analysis at the end of the reporting period is summarized in the following table. There was no impairment concern for the accounts receivable that were past due without recognizing a specific allowance for doubtful receivables since there was no significant change in the credit quality of its customers after the assessment and the Company has obtained guarantee against certain receivables.

Aging analysis of notes and accounts receivable, net

	December 31, 2017
Neither past due nor impaired	\$ 105,295,219
Past due but not impaired	
Past due within 30 days	13,984,125
Past due 31-60 days	929,672
Past due 61-120 days	582,821
Past due over 121 days	<u>341,411</u>
	<u>\$ 121,133,248</u>

Movements of the allowance for doubtful receivables

	Individually Assessed for Impairment	Collectively Assessed for Impairment	Total
Balance at January 1, 2017	\$ 1,848	\$ 478,270	\$ 480,118
Reversal/Write-off	(1,848)	(6,305)	(8,153)
Effect of exchange rate changes	<u>-</u>	<u>(224)</u>	<u>(224)</u>
Balance at December 31, 2017	<u>\$ -</u>	<u>\$ 471,741</u>	<u>\$ 471,741</u>

15. INVENTORIES

	December 31, 2018	December 31, 2017
Finished goods	\$ 11,329,802	\$ 9,923,338
Work in process	72,071,861	53,362,160
Raw materials	15,233,877	7,143,806
Supplies and spare parts	<u>4,595,436</u>	<u>3,451,443</u>
	<u>\$ 103,230,976</u>	<u>\$ 73,880,747</u>

Write-down of inventories to net realizable value (excluding computer virus outbreak losses) and reversal of write-down of inventories resulting from the increase in net realizable value in the amount of NT\$1,259,472 thousand and NT\$840,861 thousand, respectively, were included in the cost of revenue for the years ended December 31, 2018 and 2017. Please refer to computer virus outbreak losses in Note 41.

16. INVESTMENTS ACCOUNTED FOR USING EQUITY METHOD

Associates consisted of the following:

Name of Associate	Principal Activities	Place of Incorporation and Operation	Carrying Amount		% of Ownership and Voting Rights Held by the Company	
			December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Vanguard International Semiconductor Corporation (VIS)	Manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing and design service of masks	Hsinchu, Taiwan	\$ 9,006,126	\$ 8,568,344	28%	28%
Systems on Silicon Manufacturing Company Pte Ltd. (SSMC)	Manufacturing and selling of integrated circuits and other semiconductor devices	Singapore	5,772,815	5,677,640	39%	39%
Xintec Inc. (Xintec)	Wafer level chip size packaging and wafer level post passivation interconnection service	Taoyuan, Taiwan	1,764,607	2,292,100	41%	41%
Global Unichip Corporation (GUC)	Researching, developing, manufacturing, testing and marketing of integrated circuits	Hsinchu, Taiwan	1,299,423	1,300,194	35%	35%
Mutual-Pak	Manufacturing of electronic parts, wholesaling and retailing of electronic materials, and researching, developing and testing of RFID	New Taipei, Taiwan	22,867	23,210	39%	39%
			<u>\$ 17,865,838</u>	<u>\$ 17,861,488</u>		

Starting December 2017, the Company no longer had the majority of voting power and control over Mutual-Pak. As a result, Mutual-Pak is no longer consolidated and is accounted for using the equity method.

As of December 31, 2018 and 2017, no investments in associates are individually material to the Company. Please refer to the consolidated statements of comprehensive income for recognition of share of both profit (loss) and other comprehensive income (loss) of associates that are not individually material.

The market prices of the investments accounted for using the equity method in publicly traded stocks calculated by the closing price at the end of the reporting period are summarized as follows. The closing price represents the quoted price in active markets, the level 1 fair value measurement.

Name of Associate	December 31, 2018	December 31, 2017
VIS	\$ 27,621,298	\$ 30,638,751
GUC	\$ 9,617,699	\$ 11,905,404
Xintec	\$ 3,783,585	\$ 9,180,759

17. PROPERTY, PLANT AND EQUIPMENT

	Land and Land Improvements	Buildings	Machinery and Equipment	Office Equipment	Equipment under Installation and Construction in Progress	Total
<u>Cost</u>						
Balance at January 1, 2018	\$ 3,983,243	\$ 379,134,613	\$ 2,487,752,265	\$ 42,391,516	\$ 167,353,490	\$ 3,080,615,127
Additions (Deductions)	-	40,396,404	247,042,281	6,773,376	5,812,340	300,024,401
Disposals or retirements	-	(410,891)	(5,972,482)	(790,793)	-	(7,174,166)
Effect of exchange rate changes	28,110	(405,841)	(61,937)	8,180	(254,841)	(686,329)
Balance at December 31, 2018	<u>\$ 4,011,353</u>	<u>\$ 418,714,285</u>	<u>\$ 2,728,760,127</u>	<u>\$ 48,382,279</u>	<u>\$ 172,910,989</u>	<u>\$ 3,372,779,033</u>
<u>Accumulated depreciation and impairment</u>						
Balance at January 1, 2018	\$ 510,498	\$ 194,446,521	\$ 1,795,448,842	\$ 27,666,944	\$ -	\$ 2,018,072,805
Additions	20,900	24,293,366	258,195,315	5,615,316	-	288,124,897
Disposals or retirements	-	(398,955)	(4,773,589)	(789,993)	-	(5,962,537)
Impairment	-	-	423,468	-	-	423,468
Effect of exchange rate changes	19,177	33,210	(15,128)	32,862	-	70,121
Balance at December 31, 2018	<u>\$ 550,575</u>	<u>\$ 218,374,142</u>	<u>\$ 2,049,278,908</u>	<u>\$ 32,525,129</u>	<u>\$ -</u>	<u>\$ 2,300,728,754</u>
Carrying amounts at December 31, 2018	<u>\$ 3,460,778</u>	<u>\$ 200,340,143</u>	<u>\$ 679,481,219</u>	<u>\$ 15,857,150</u>	<u>\$ 172,910,989</u>	<u>\$ 1,072,050,279</u>
<u>Cost</u>						
Balance at January 1, 2017	\$ 4,049,292	\$ 304,404,474	\$ 2,042,867,744	\$ 34,729,640	\$ 387,199,675	\$ 2,773,250,825
Additions (Deductions)	-	75,594,667	458,605,807	8,195,896	(219,902,510)	322,493,860
Disposals or retirements	-	(36,957)	(9,552,995)	(377,798)	-	(9,967,750)
Reclassification	-	-	8,791	1,507	-	10,298
Effect of disposal of subsidiary	-	-	(51,216)	(14,750)	(518)	(66,484)
Effect of exchange rate changes	(66,049)	(827,571)	(4,125,866)	(142,979)	56,843	(5,105,622)
Balance at December 31, 2017	<u>\$ 3,983,243</u>	<u>\$ 379,134,613</u>	<u>\$ 2,487,752,265</u>	<u>\$ 42,391,516</u>	<u>\$ 167,353,490</u>	<u>\$ 3,080,615,127</u>
<u>Accumulated depreciation and impairment</u>						
Balance at January 1, 2017	\$ 524,845	\$ 174,349,077	\$ 1,577,377,509	\$ 23,221,707	\$ -	\$ 1,775,473,138
Additions	27,790	20,844,584	229,985,588	4,938,000	-	255,795,962
Disposals or retirements	-	(28,816)	(8,114,327)	(377,470)	-	(8,520,613)
Reclassification	-	-	8,195	1,466	-	9,661
Effect of disposal of subsidiary	-	-	(42,830)	(13,838)	-	(56,668)
Effect of exchange rate changes	(42,137)	(718,324)	(3,765,293)	(102,921)	-	(4,628,675)
Balance at December 31, 2017	<u>\$ 510,498</u>	<u>\$ 194,446,521</u>	<u>\$ 1,795,448,842</u>	<u>\$ 27,666,944</u>	<u>\$ -</u>	<u>\$ 2,018,072,805</u>
Carrying amounts at December 31, 2017	<u>\$ 3,472,745</u>	<u>\$ 184,688,092</u>	<u>\$ 692,303,423</u>	<u>\$ 14,724,572</u>	<u>\$ 167,353,490</u>	<u>\$ 1,062,542,322</u>

The significant part of the Company's buildings includes main plants, mechanical and electrical power equipment and clean rooms, and the related depreciation is calculated using the estimated useful lives of 20 years, 10 years and 10 years, respectively.

For the year ended December 31, 2018, the Company recognized an impairment loss of NT\$423,468 thousand for certain machinery and equipment that was assessed to have no future use, and the recoverable amount of certain machinery and equipment was nil. Such impairment loss was recognized in other operating income and expenses.

18. INTANGIBLE ASSETS

	Goodwill	Technology License Fees	Software and System Design Costs	Patent and Others	Total
<u>Cost</u>					
Balance at January 1, 2018	\$ 5,648,702	\$ 10,443,257	\$ 25,186,218	\$ 5,716,146	\$ 46,994,323
Additions	-	533,669	4,601,885	1,969,439	7,104,993
Disposals or retirements	-	-	(186,671)	(31,183)	(217,854)
Effect of exchange rate changes	146,786	(2,468)	(6,949)	2,122	139,491
Balance at December 31, 2018	<u>\$ 5,795,488</u>	<u>\$ 10,974,458</u>	<u>\$ 29,594,483</u>	<u>\$ 7,656,524</u>	<u>\$ 54,020,953</u>
<u>Accumulated amortization and impairment</u>					
Balance at January 1, 2018	\$ -	\$ 7,694,857	\$ 20,376,693	\$ 4,747,633	\$ 32,819,183
Additions	-	1,063,616	2,835,265	522,524	4,421,405
Disposals or retirements	-	-	(186,615)	(31,183)	(217,798)
Effect of exchange rate changes	-	(2,468)	(1,845)	339	(3,974)
Balance at December 31, 2018	<u>\$ -</u>	<u>\$ 8,756,005</u>	<u>\$ 23,023,498</u>	<u>\$ 5,239,313</u>	<u>\$ 37,018,816</u>
Carrying amounts at December 31, 2018	<u>\$ 5,795,488</u>	<u>\$ 2,218,453</u>	<u>\$ 6,570,985</u>	<u>\$ 2,417,211</u>	<u>\$ 17,002,137</u>
<u>Cost</u>					
Balance at January 1, 2017	\$ 6,007,975	\$ 9,546,007	\$ 22,243,595	\$ 5,386,435	\$ 43,184,012
Additions	-	897,861	3,021,085	349,265	4,268,211
Retirements	-	-	(75,237)	-	(75,237)
Reclassification	-	-	7,662	(17,960)	(10,298)
Effect of disposal of subsidiary	(13,499)	-	(7,662)	-	(21,161)
Effect of exchange rate changes	(345,774)	(611)	(3,225)	(1,594)	(351,204)
Balance at December 31, 2017	<u>\$ 5,648,702</u>	<u>\$ 10,443,257</u>	<u>\$ 25,186,218</u>	<u>\$ 5,716,146</u>	<u>\$ 46,994,323</u>
<u>Accumulated amortization and impairment</u>					
Balance at January 1, 2017	\$ -	\$ 6,147,200	\$ 18,144,428	\$ 4,277,538	\$ 28,569,166
Additions	-	1,548,263	2,310,742	487,731	4,346,736
Retirements	-	-	(75,237)	-	(75,237)
Reclassification	-	-	7,409	(17,070)	(9,661)
Impairment	13,520	-	-	-	13,520
Effect of disposal of subsidiary	(13,499)	-	(7,554)	-	(21,053)
Effect of exchange rate changes	(21)	(606)	(3,095)	(566)	(4,288)
Balance at December 31, 2017	<u>\$ -</u>	<u>\$ 7,694,857</u>	<u>\$ 20,376,693</u>	<u>\$ 4,747,633</u>	<u>\$ 32,819,183</u>
Carrying amounts at December 31, 2017	<u>\$ 5,648,702</u>	<u>\$ 2,748,400</u>	<u>\$ 4,809,525</u>	<u>\$ 968,513</u>	<u>\$ 14,175,140</u>

The Company's goodwill has been tested for impairment at the end of the annual reporting period and the recoverable amount is determined based on the value in use. The value in use was calculated based on the cash flow forecast from the financial budgets covering the future five-year period, and the Company used annual discount rates of 9.0% and 8.5% in its test of impairment as of December 31, 2018 and 2017, respectively, to reflect the relevant specific risk in the cash-generating unit.

For the year ended December 31, 2018, the Company did not recognize any impairment loss on goodwill. For the year ended December 31, 2017, the Company assessed goodwill impairment and recognized an impairment loss of NT\$13,520 thousand related to a subsidiary since the operating result of this cash generating unit was not as expected and the recoverable amount of goodwill was nil. Such impairment loss was recognized in other operating income and expenses.

19. OTHER ASSETS

	December 31, 2018	December 31, 2017
Tax receivable	\$ 3,780,293	\$ 4,021,602
Prepaid expenses	1,298,710	1,559,963
Others	<u>1,912,067</u>	<u>1,623,995</u>
	<u>\$ 6,991,070</u>	<u>\$ 7,205,560</u>
Current portion	\$ 5,406,423	\$ 4,222,440
Noncurrent portion	<u>1,584,647</u>	<u>2,983,120</u>
	<u>\$ 6,991,070</u>	<u>\$ 7,205,560</u>

20. SHORT-TERM LOANS

	December 31, 2018	December 31, 2017
Unsecured loans		
Amount	<u>\$ 88,754,640</u>	<u>\$ 63,766,850</u>
Original loan content		
US\$ (in thousands)	\$ 2,610,000	\$ 2,150,000
EUR (in thousands)	242,000	-
Annual interest rate	0.01%-3.22%	1.54%-1.82%
Maturity date	Due by January 2019	Due by February 2018

21. PROVISIONS

The Company's current provisions were provisions for sales returns and allowances.

	Sales Returns and Allowances
<u>Year Ended December 31, 2017</u>	
Balance, beginning of year	\$ 18,037,789
Provision	44,833,557
Payment	(48,884,704)
Effect of exchange rate changes	<u>(24,855)</u>
Balance, end of year	<u>\$ 13,961,787</u>

Provisions for sales returns and allowances are estimated based on historical experience and the consideration of varying contractual terms, and are recognized as a reduction of revenue in the same year of the related product sales.

Starting from 2018, the Company recognizes the estimation of sales returns and allowance as refund liability (classified under accrued expenses and other current liabilities) upon initial application of IFRS 15.

22. BONDS PAYABLE

	December 31, 2018	December 31, 2017
Domestic unsecured bonds	\$ 91,800,000	\$ 116,100,000
Overseas unsecured bonds	-	34,107,850
	<u>91,800,000</u>	<u>150,207,850</u>
Less: Discounts on bonds payable	-	(6,728)
Less: Current portion	<u>(34,900,000)</u>	<u>(58,401,122)</u>
	<u>\$ 56,900,000</u>	<u>\$ 91,800,000</u>

The major terms of domestic unsecured bonds are as follows:

Issuance	Tranche	Issuance Period	Total Amount	Coupon Rate	Repayment and Interest Payment
100-1	B	September 2011 to September 2018	\$ 7,500,000	1.63%	Bullet repayment; interest payable annually
100-2	A	January 2012 to January 2017	10,000,000	1.29%	The same as above
	B	January 2012 to January 2019	7,000,000	1.46%	The same as above
101-1	A	August 2012 to August 2017	9,900,000	1.28%	The same as above
	B	August 2012 to August 2019	9,000,000	1.40%	The same as above
101-2	A	September 2012 to September 2017	12,700,000	1.28%	The same as above
	B	September 2012 to September 2019	9,000,000	1.39%	The same as above
101-3	-	October 2012 to October 2022	4,400,000	1.53%	The same as above
101-4	A	January 2013 to January 2018	10,600,000	1.23%	The same as above
	B	January 2013 to January 2020	10,000,000	1.35%	The same as above
	C	January 2013 to January 2023	3,000,000	1.49%	The same as above
102-1	A	February 2013 to February 2018	6,200,000	1.23%	The same as above
	B	February 2013 to February 2020	11,600,000	1.38%	The same as above
	C	February 2013 to February 2023	3,600,000	1.50%	The same as above
102-2	A	July 2013 to July 2020	10,200,000	1.50%	The same as above
	B	July 2013 to July 2023	3,500,000	1.70%	The same as above
102-3	A	August 2013 to August 2017	4,000,000	1.34%	The same as above
	B	August 2013 to August 2019	8,500,000	1.52%	The same as above

(Continued)

Issuance	Tranche	Issuance Period	Total Amount	Coupon Rate	Repayment and Interest Payment
102-4	B	September 2013 to September 2017	\$ 1,500,000	1.45%	Bullet repayment; interest payable annually
102-4	C	September 2013 to March 2019	1,400,000	1.60%	Bullet repayment; interest payable annually (interest for the six months prior to maturity will accrue on the basis of actual days and be repayable at maturity)
	D	September 2013 to March 2021	2,600,000	1.85%	The same as above
	E	September 2013 to March 2023	5,400,000	2.05%	The same as above
	F	September 2013 to September 2023	2,600,000	2.10%	Bullet repayment; interest payable annually
(Concluded)					

The major terms of overseas unsecured bonds are as follows:

Issuance Period	Total Amount (US\$ in Thousands)	Coupon Rate	Repayment and Interest Payment
April 2013 to April 2018	US\$1,150,000	1.625%	Bullet repayment; interest payable semi-annually

23. RETIREMENT BENEFIT PLANS

a. Defined contribution plans

The plan under the R.O.C. Labor Pension Act (the “Act”) is deemed a defined contribution plan. Pursuant to the Act, TSMC, Mutual-Pak and VisEra Tech have made monthly contributions equal to 6% of each employee’s monthly salary to employees’ pension accounts. Furthermore, TSMC North America, TSMC China, TSMC Nanjing, TSMC Europe, TSMC Canada, TSMC Technology and TSMC Solar Europe GmbH also make monthly contributions at certain percentages of the basic salary of their employees. Accordingly, the Company recognized expenses of NT\$2,568,945 thousand and NT\$2,369,940 thousand for the years ended December 31, 2018 and 2017, respectively.

b. Defined benefit plans

TSMC has defined benefit plans under the R.O.C. Labor Standards Law that provide benefits based on an employee's length of service and average monthly salary for the six-month period prior to retirement. The Company contributes an amount equal to 2% of salaries paid each month to their respective pension funds (the Funds), which are administered by the Labor Pension Fund Supervisory Committee (the Committee) and deposited in the Committee's name in the Bank of Taiwan. Before the end of each year, the Company assesses the balance in the Funds. If the amount of the balance in the Funds is inadequate to pay retirement benefits for employees who conform to retirement requirements in the next year, the Company is required to fund the difference in one appropriation that should be made before the end of March of the next year. The Funds are operated and managed by the government's designated authorities; as such, the Company does not have any right to intervene in the investments of the Funds.

Amounts recognized in respect of these defined benefit plans were as follows:

	Years Ended December 31	
	2018	2017
Current service cost	\$ 137,758	\$ 145,026
Net interest expense	<u>144,108</u>	<u>126,525</u>
Components of defined benefit costs recognized in profit or loss	<u>281,866</u>	<u>271,551</u>
Remeasurement on the net defined benefit liability:		
Return on plan assets (excluding amounts included in net interest expense)	(71,288)	29,290
Actuarial loss arising from experience adjustments	334,630	483,846
Actuarial loss (gain) arising from changes in financial assumptions	<u>597,820</u>	<u>(258,455)</u>
Components of defined benefit costs recognized in other comprehensive income	<u>861,162</u>	<u>254,681</u>
Total	<u>\$ 1,143,028</u>	<u>\$ 526,232</u>

The pension costs of the aforementioned defined benefit plans were recognized in profit or loss by the following categories:

	Years Ended December 31	
	2018	2017
Cost of revenue	\$ 177,772	\$ 175,357
Research and development expenses	79,143	75,340
General and administrative expenses	20,591	16,669
Marketing expenses	<u>4,360</u>	<u>4,185</u>
	<u>\$ 281,866</u>	<u>\$ 271,551</u>

The amounts arising from the defined benefit obligation of the Company were as follows:

	December 31, 2018	December 31, 2017
Present value of defined benefit obligation	\$ 13,662,684	\$ 12,774,593
Fair value of plan assets	<u>(4,011,279)</u>	<u>(3,923,889)</u>
Net defined benefit liability	<u>\$ 9,651,405</u>	<u>\$ 8,850,704</u>

Movements in the present value of the defined benefit obligation were as follows:

	Years Ended December 31	
	2018	2017
Balance, beginning of year	\$ 12,774,593	\$ 12,480,480
Current service cost	137,758	145,026
Interest expense	207,804	185,561
Remeasurement:		
Actuarial loss arising from experience adjustments	334,630	483,846
Actuarial loss (gain) arising from changes in financial assumptions	597,820	(258,455)
Benefits paid from plan assets	(274,326)	(261,865)
Benefits paid directly by the Company	<u>(115,595)</u>	<u>-</u>
Balance, end of year	<u>\$ 13,662,684</u>	<u>\$ 12,774,593</u>

Movements in the fair value of the plan assets were as follows:

	Years Ended December 31	
	2018	2017
Balance, beginning of year	\$ 3,923,889	\$ 3,929,072
Interest income	63,696	59,036
Remeasurement:		
Return on plan assets (excluding amounts included in net interest expense)	71,288	(29,290)
Contributions from employer	226,732	226,936
Benefits paid from plan assets	<u>(274,326)</u>	<u>(261,865)</u>
Balance, end of year	<u>\$ 4,011,279</u>	<u>\$ 3,923,889</u>

The fair value of the plan assets by major categories at the end of reporting period was as follows:

	December 31, 2018	December 31, 2017
Cash	\$ 756,126	\$ 707,477
Equity instruments	2,148,040	1,993,336
Debt instruments	<u>1,107,113</u>	<u>1,223,076</u>
	<u>\$ 4,011,279</u>	<u>\$ 3,923,889</u>

The actuarial valuations of the present value of the defined benefit obligation were carried out by qualified actuaries. The principal assumptions of the actuarial valuation were as follows:

	Measurement Date	
	December 31, 2018	December 31, 2017
Discount rate	1.30%	1.65%
Future salary increase rate	3.00%	3.00%

Through the defined benefit plans under the R.O.C. Labor Standards Law, the Company is exposed to the following risks:

- 1) Investment risk: The pension funds are invested in equity and debt securities, bank deposits, etc. The investment is conducted at the discretion of the government's designated authorities or under the mandated management. However, under the R.O.C. Labor Standards Law, the rate of return on assets shall not be less than the average interest rate on a two-year time deposit published by the local banks and the government is responsible for any shortfall in the event that the rate of return is less than the required rate of return.
- 2) Interest risk: A decrease in the government bond interest rate will increase the present value of the defined benefit obligation; however, this will be partially offset by an increase in the return on the debt investments of the plan assets.

Assuming a hypothetical decrease in interest rate at the end of the reporting period contributed to a decrease of 0.5% in the discount rate and all other assumptions were held constant, the present value of the defined benefit obligation would increase by NT\$921,750 thousand and NT\$890,116 thousand as of December 31, 2018 and 2017, respectively.

- 3) Salary risk: The present value of the defined benefit obligation is calculated by reference to the future salaries of plan participants. As such, an increase in the salary of the plan participants will increase the present value of the defined benefit obligation.

Assuming the expected salary rate increases by 0.5% at the end of the reporting period and all other assumptions were held constant, the present value of the defined benefit obligation would increase by NT\$901,629 thousand and NT\$873,801 thousand as of December 31, 2018 and 2017, respectively.

The sensitivity analysis presented above may not be representative of the actual change in the defined benefit obligation as it is unlikely that the change in assumptions would occur in isolation of one another as some of the assumptions may be correlated.

Furthermore, in presenting the above sensitivity analysis, the present value of the defined benefit obligation has been calculated using the projected unit credit method at the end of the reporting period, which is the same as that applied in calculating the defined benefit obligation liability.

The Company expects to make contributions of NT\$233,534 thousand to the defined benefit plans in the next year starting from December 31, 2018. The weighted average duration of the defined benefit obligation is 13 years.

24. GUARANTEE DEPOSITS

	December 31, 2018	December 31, 2017
Capacity guarantee	\$ 9,289,628	\$ 13,346,550
Receivables guarantee	653,686	2,427,548
Others	<u>245,731</u>	<u>306,521</u>
	<u>\$ 10,189,045</u>	<u>\$ 16,080,619</u>
Current portion (classified under accrued expenses and other current liabilities)	\$ 6,835,667	\$ 8,493,829
Noncurrent portion	<u>3,353,378</u>	<u>7,586,790</u>
	<u>\$ 10,189,045</u>	<u>\$ 16,080,619</u>

Some of guarantee deposits were refunded to customers by offsetting related accounts receivable.

25. EQUITY

a. Capital stock

	December 31, 2018	December 31, 2017
Authorized shares (in thousands)	<u>28,050,000</u>	<u>28,050,000</u>
Authorized capital	<u>\$ 280,500,000</u>	<u>\$ 280,500,000</u>
Issued and paid shares (in thousands)	<u>25,930,380</u>	<u>25,930,380</u>
Issued capital	<u>\$ 259,303,805</u>	<u>\$ 259,303,805</u>

A holder of issued common shares with par value of NT\$10 per share is entitled to vote and to receive dividends.

The authorized shares include 500,000 thousand shares allocated for the exercise of employee stock options.

As of December 31, 2018, 1,068,157 thousand ADSs of TSMC were traded on the NYSE. The number of common shares represented by the ADSs was 5,340,787 thousand shares (one ADS represents five common shares).

b. Capital surplus

	December 31, 2018	December 31, 2017
Additional paid-in capital	\$ 24,184,939	\$ 24,184,939
From merger	22,804,510	22,804,510
From convertible bonds	8,892,847	8,892,847
From share of changes in equities of subsidiaries	121,473	118,792
From share of changes in equities of associates	282,820	289,240
Donations	<u>29,343</u>	<u>19,208</u>
	<u>\$ 56,315,932</u>	<u>\$ 56,309,536</u>

Under the relevant laws, the capital surplus generated from donations and the excess of the issuance price over the par value of capital stock (including the stock issued for new capital, mergers and convertible bonds) may be used to offset a deficit; in addition, when the Company has no deficit, such capital surplus may be distributed as cash dividends or stock dividends up to a certain percentage of TSMC's paid-in capital. The capital surplus from share of changes in equities of subsidiaries and associates and dividend of a claim extinguished by a prescription may be used to offset a deficit; however, when generated from issuance of restricted shares for employees, such capital surplus may not be used for any purpose.

c. Retained earnings and dividend policy

TSMC's Articles of Incorporation provide that, when allocating the net profits for each fiscal year, TSMC shall first offset its losses in previous years and then set aside the following items accordingly:

- 1) Legal capital reserve at 10% of the profits left over, until the accumulated legal capital reserve equals TSMC's paid-in capital;
- 2) Special capital reserve in accordance with relevant laws or regulations or as requested by the authorities in charge;
- 3) Any balance left over shall be allocated according to the resolution of the shareholders' meeting.

TSMC's Articles of Incorporation provide the policy about the profit sharing bonus to employees, please refer to Note 33.

TSMC's Articles of Incorporation also provide that profits of TSMC may be distributed by way of cash dividend and/or stock dividend. However, distribution of earnings shall be made preferably by way of cash dividend. Distribution of earnings may also be made by way of stock dividend, provided that the ratio for stock dividend shall not exceed 50% of the total distribution.

Any appropriations of the profits are subject to shareholders' approval in the following year.

The appropriation for legal capital reserve shall be made until the reserve equals the Company's paid-in capital. The reserve may be used to offset a deficit, or be distributed as dividends in cash or stocks for the portion in excess of 25% of the paid-in capital if the Company incurs no loss.

Pursuant to existing regulations, the Company is required to set aside additional special capital reserve equivalent to the net debit balance of the other components of stockholders' equity, such as the accumulated balance of foreign currency translation reserve, unrealized valuation gain or loss from fair value through other comprehensive income financial assets, unrealized valuation gain or loss from available-for-sale financial assets, gain or loss from changes in fair value of hedging instruments in cash flow hedges, etc. For the subsequent decrease in the deduction amount to stockholders' equity, any special reserve appropriated may be reversed to the extent that the net debit balance reverses.

The appropriations of 2017 and 2016 earnings had been approved by TSMC's shareholders in its meetings held on June 5, 2018 and June 8, 2017, respectively. The appropriations and dividends per share were as follows:

	Appropriation of Earnings		Dividends Per Share (NT\$)	
	For Fiscal Year 2017	For Fiscal Year 2016	For Fiscal Year 2017	For Fiscal Year 2016
Legal capital reserve	\$ 34,311,148	\$ 33,424,718		
Special capital reserve	26,907,527	-		
Cash dividends to shareholders	<u>207,443,044</u>	<u>181,512,663</u>	\$8	\$7
	<u>\$268,661,719</u>	<u>\$214,937,381</u>		

TSMC's appropriation of earnings for 2018 had been approved in the meeting of the Board of Directors held on February 19, 2019. The appropriation and dividends per share were as follows:

	Appropriation of Earnings For Fiscal Year 2018	Dividends Per Share (NT\$) For Fiscal Year 2018
Legal capital reserve	\$ 35,113,088	
Special capital reserve	(11,459,458)	
Cash dividends to shareholders	<u>207,443,044</u>	\$ 8
	<u>\$ 231,096,674</u>	

The appropriation of earnings for 2018 is to be presented for approval in the TSMC's shareholders' meeting to be held on June 5, 2019 (expected).

d. Others

Changes in others were as follows:

	Year Ended December 31, 2018				
	Foreign Currency Translation Reserve	Unrealized Gain (Loss) on Financial Assets at FVTOCI	Gain (Loss) on Hedging Instruments	Unearned Stock-Based Compensation	Total
Balance, beginning of year (IFRS 9)	\$ (26,697,680)	\$ (524,915)	\$ 4,226	\$ (10,290)	\$ (27,228,659)
Exchange differences arising on translation of foreign operations	14,562,073	-	-	-	14,562,073
Unrealized gain (loss) on financial assets at FVTOCI					
Equity instruments	-	(3,311,621)	-	-	(3,311,621)
Debt instruments	-	(1,858,054)	-	-	(1,858,054)
Cumulative unrealized gain (loss) of equity instruments transferred to retained earnings due to disposal	-	1,193,056	-	-	1,193,056
Cumulative unrealized gain (loss) of debt instruments transferred to profit or loss due to disposal	-	989,138	-	-	989,138
Loss allowance adjustments from debt instruments	-	(1,990)	-	-	(1,990)
Gain (loss) arising on changes in the fair value of hedging instruments	-	-	40,975	-	40,975
Transferred to initial carrying amount of hedged items	-	-	(22,162)	-	(22,162)
Share of other comprehensive income (loss) of associates	93,260	(6,766)	-	-	86,494
Share of unearned stock-based employee compensation of associates	-	-	-	8,447	8,447
Income tax effect	-	91,828	562	-	92,390
Balance, end of year	<u>\$ (12,042,347)</u>	<u>\$ (3,429,324)</u>	<u>\$ 23,601</u>	<u>\$ (1,843)</u>	<u>\$ (15,449,913)</u>

	Year Ended December 31, 2017				
	Foreign Currency Translation Reserve	Unrealized Gain/Loss from Available-for- sale Financial Assets	Cash Flow Hedges Reserve	Unearned Stock-Based Employee Compensation	Total
Balance, beginning of year	\$ 1,661,237	\$ 2,641	\$ 105	\$ -	\$ 1,663,983
Exchange differences arising on translation of foreign operations	(28,257,449)	-	-	-	(28,257,449)
Changes in fair value of available-for-sale financial assets	-	(154,680)	-	-	(154,680)
Cumulative (gain)/loss reclassified to profit or loss upon disposal of available-for-sale financial assets	-	(61,182)	-	-	(61,182)
Gain/(loss) arising on changes in the fair value of hedging instruments	-	-	99,534	-	99,534
Transferred to initial carrying amount of hedged items	-	-	(94,851)	-	(94,851)
Share of other comprehensive income (loss) of associates	(101,468)	2,121	-	-	(99,347)
Share of unearned stock-based employee compensation of associates	-	-	-	(10,290)	(10,290)
Income tax effect	-	(2,974)	(562)	-	(3,536)
Balance, end of year	<u>\$ (26,697,680)</u>	<u>\$ (214,074)</u>	<u>\$ 4,226</u>	<u>\$ (10,290)</u>	<u>\$ (26,917,818)</u>

The aforementioned other equity includes the changes in other equities of TSMC and TSMC's share of its subsidiaries and associates.

26. NET REVENUE

a. Disaggregation of revenue from contracts with customers

Product	Year Ended December 31, 2018
Wafer	\$ 911,296,364
Others	<u>120,177,193</u>
	<u>\$1,031,473,557</u>
Geography	Year Ended December 31, 2018
Taiwan	\$ 78,260,773
United States	632,821,464
China	175,794,228
Europe, the Middle East and Africa	71,068,438
Japan	58,125,879
Others	<u>15,402,775</u>
	<u>\$1,031,473,557</u>

The Company categorized the net revenue mainly based on the countries where the customers are headquartered.

Application Type	Year Ended December 31, 2018
Communication	\$ 578,923,664
Industrial/Standard	234,153,360
Computer	144,614,153
Consumer	<u>73,782,380</u>
	<u>\$1,031,473,557</u>

Resolution	Year Ended December 31, 2018
7-nanometer	\$ 81,680,746
10-nanometer	96,989,486
16/20-nanometer	210,989,033
28-nanometer	178,440,396
40/45-nanometer	101,801,017
65-nanometer	76,122,259
90-nanometer	36,652,061
0.11/0.13 micron	20,677,658
0.15/0.18 micron	81,182,646
0.25 micron and above	<u>26,761,062</u>
Wafer revenue	<u>\$ 911,296,364</u>

b. Contract balances

	December 31, 2018	January 1, 2018
Contract liabilities (classified under accrued expenses and other current liabilities)	<u>\$ 4,684,024</u>	<u>\$ 32,434,829</u>

The changes in the contract liability balances primarily result from the timing difference between the satisfaction of performance obligation and the customer's payment.

For the year ended December 31, 2018, the Company recognized NT\$31,769,970 thousand as revenue from the beginning balance of contract liability.

c. Refund liabilities

Estimated sales returns and other allowances is made and adjusted based on historical experience and the consideration of varying contractual terms, which amounted to NT\$55,405,973 thousand for the year ended December 31, 2018. As of December 31, 2018, the aforementioned refund liabilities amounted to NT\$22,672,634 thousand (classified under accrued expenses and other current liabilities).

27. OTHER OPERATING INCOME AND EXPENSES, NET

	Years Ended December 31	
	2018	2017
Gain (loss) on disposal or retirement of property, plant and equipment, net	\$ (1,005,644)	\$ (1,097,908)
Impairment loss on property, plant and equipment	(423,468)	-
Others	<u>(672,337)</u>	<u>(267,603)</u>
	<u>\$ (2,101,449)</u>	<u>\$ (1,365,511)</u>

28. OTHER INCOME

	Years Ended December 31	
	2018	2017
Interest income		
Bank deposits	\$ 10,310,738	\$ 6,412,823
Financial assets at FVTPL	382,673	-
Financial assets at FVTOCI	3,078,604	-
Financial assets at amortized cost	922,441	-
Available-for-sale financial assets	-	2,091,435
Held-to-maturity financial assets	-	568,552
Structured product	<u>-</u>	<u>391,896</u>
	14,694,456	9,464,706
Dividend income	<u>158,358</u>	<u>145,588</u>
	<u>\$ 14,852,814</u>	<u>\$ 9,610,294</u>

29. FINANCE COSTS

	Years Ended December 31	
	2018	2017
Interest expense		
Corporate bonds	\$ 1,633,775	\$ 2,563,544
Bank loans	1,417,287	766,625
Others	<u>161</u>	<u>144</u>
	<u>\$ 3,051,223</u>	<u>\$ 3,330,313</u>

30. OTHER GAINS AND LOSSES, NET

	Years Ended December 31	
	2018	2017
Gain (loss) on disposal of financial assets, net		
Investments in debt instruments at FVTOCI	\$ (989,138)	\$ -
Available-for-sale financial assets	-	76,986
Financial assets carried at cost	-	12,809
Gain from disposal of subsidiaries	-	17,343
Net gain (loss) on financial instruments at FVTPL		
Held for trading	-	2,253,651
Mandatorily measured at FVTPL	(2,293,895)	-
Designated as at FVTPL	-	131,037
Loss arising from fair value hedges, net	(2,386)	(30,293)
Impairment loss on financial assets		
Financial assets carried at cost	-	(29,603)
The reversal of expected credit loss of financial assets		
Investments in debt instruments at FVTOCI	1,990	-
Financial assets at amortized cost	393	-
Other gains (losses), net	<u>(127,768)</u>	<u>385,428</u>
	<u>\$ (3,410,804)</u>	<u>\$ 2,817,358</u>

31. INCOME TAX

a. Income tax expense recognized in profit or loss

Income tax expense consisted of the following:

	Years Ended December 31	
	2018	2017
Current income tax expense		
Current tax expense recognized in the current year	\$ 51,710,319	\$ 57,503,831
Income tax adjustments on prior years	(989,984)	(896,147)
Other income tax adjustments	<u>152,884</u>	<u>152,790</u>
	<u>50,873,219</u>	<u>56,760,474</u>
Deferred income tax expense (benefit)		
Effect of tax rate changes	(1,474,808)	561,818
The origination and reversal of temporary differences	<u>(3,072,554)</u>	<u>(4,336,110)</u>
	<u>(4,547,362)</u>	<u>(3,774,292)</u>
Income tax expense recognized in profit or loss	<u>\$ 46,325,857</u>	<u>\$ 52,986,182</u>

A reconciliation of income before income tax and income tax expense recognized in profit or loss was as follows:

	Years Ended December 31	
	2018	2017
Income before tax	<u>\$ 397,510,263</u>	<u>\$ 396,133,030</u>
Income tax expense at the statutory rate	\$ 80,865,915	\$ 69,608,602
Tax effect of adjusting items:		
Nondeductible (deductible) items in determining taxable income	2,539,966	(1,410,955)
Tax-exempt income	(54,543,521)	(16,901,134)
Additional income tax under the Alternative Minimum Tax Act	21,455,854	-
Additional income tax on unappropriated earnings	7,420,479	11,835,948
Effect of tax rate changes on deferred income tax	(1,474,808)	561,818
The origination and reversal of temporary differences	(3,072,554)	(4,336,110)
Income tax credits	<u>(6,028,374)</u>	<u>(5,628,630)</u>
	47,162,957	53,729,539
Income tax adjustments on prior years	(989,984)	(896,147)
Other income tax adjustments	<u>152,884</u>	<u>152,790</u>
Income tax expense recognized in profit or loss	<u>\$ 46,325,857</u>	<u>\$ 52,986,182</u>

For the year ended December 31, 2017, the Company applied a tax rate of 17% for entities subject to the R.O.C. Income Tax Law. In February 2018, the Income Tax Law in the R.O.C. was amended and, starting from 2018, the corporate income tax rate was adjusted from 17% to 20%. In addition, the tax rate for 2018 unappropriated earnings was reduced from 10% to 5%.

For other jurisdictions, taxes are calculated using the applicable tax rate for each individual jurisdiction.

b. Income tax expense recognized in other comprehensive income

	Years Ended December 31	
	2018	2017
Deferred income tax benefit (expense)		
Related to remeasurement of defined benefit obligation	\$ 103,339	\$ 30,562
Related to unrealized gain/loss on investments in equity instruments at FVTOCI	91,828	-
Related to gain/loss on cash flow hedges	562	(562)
Related to unrealized gain/loss on available-for-sale financial assets	<u>-</u>	<u>(2,974)</u>
	<u>\$ 195,729</u>	<u>\$ 27,026</u>

c. Deferred income tax balance

The analysis of deferred income tax assets and liabilities was as follows:

	December 31, 2018	December 31, 2017
<u>Deferred income tax assets</u>		
Temporary differences		
Depreciation	\$ 11,839,221	\$ 8,401,266
Refund liability	2,594,003	-
Net defined benefit liability	1,084,874	975,324
Unrealized loss on inventories	750,995	629,442
Deferred compensation cost	271,711	266,521
Provision for sales returns and allowance	-	1,637,713
Investments in equity instruments at FVTOCI	56,191	-
Others	<u>209,392</u>	<u>195,197</u>
	<u>\$ 16,806,387</u>	<u>\$ 12,105,463</u>

Deferred income tax liabilities

Temporary differences		
Unrealized exchange gains	\$ (61,677)	\$ (169,480)
Available-for-sale financial assets	-	(95,421)
Others	<u>(171,607)</u>	<u>(37,304)</u>
	<u>\$ (233,284)</u>	<u>\$ (302,205)</u>

	Year Ended December 31, 2018				
	Balance, Beginning of Year	Recognized in		Effect of Exchange Rate Changes	Balance, End of Year
		Profit or Loss	Other Comprehensive Income		
<u>Deferred income tax assets</u>					
Temporary differences					
Depreciation	\$ 8,401,266	\$ 3,430,421	\$ -	\$ 7,534	\$ 11,839,221
Refund liability	1,637,713	954,976	-	1,314	2,594,003
Net defined benefit liability	975,324	6,211	103,339	-	1,084,874
Unrealized loss on inventories	629,442	120,644	-	909	750,995
Deferred compensation cost	266,521	(4,718)	-	9,908	271,711
Investments in equity instruments at FVTOCI	-	-	56,191	-	56,191
Others	<u>195,197</u>	<u>7,106</u>	<u>-</u>	<u>7,089</u>	<u>209,392</u>
	<u>\$ 12,105,463</u>	<u>\$ 4,514,640</u>	<u>\$ 159,530</u>	<u>\$ 26,754</u>	<u>\$ 16,806,387</u>
<u>Deferred income tax liabilities</u>					
Temporary differences					
Unrealized exchange gains	\$ (169,480)	\$ 107,803	\$ -	\$ -	\$ (61,677)
Investments in equity instruments at FVTOCI	(95,421)	-	95,421	-	-
Others	<u>(37,304)</u>	<u>(75,081)</u>	<u>(59,222)</u>	<u>-</u>	<u>(171,607)</u>
	<u>\$ (302,205)</u>	<u>\$ 32,722</u>	<u>\$ 36,199</u>	<u>\$ -</u>	<u>\$ (233,284)</u>

	Year Ended December 31, 2017					
	Balance, Beginning of Year	Recognized in		Effect of Disposal of Subsidiary	Effect of Exchange Rate Changes	Balance, End of Year
		Profit or Loss	Other Comprehensive Income			
<u>Deferred income tax assets</u>						
Temporary differences						
Depreciation	\$ 4,244,214	\$ 4,207,209	\$ -	\$ -	\$ (50,157)	\$ 8,401,266
Provision for sales returns and allowance	1,512,061	129,971	-	-	(4,319)	1,637,713
Net defined benefit liability	939,543	5,219	30,562	-	-	975,324
Unrealized loss on inventories	737,247	(105,068)	-	-	(2,737)	629,442
Deferred compensation cost	378,740	(83,124)	-	-	(29,095)	266,521
Others	445,133	(222,429)	-	-	(27,507)	195,197
Operating loss carryforward	<u>14,483</u>	<u>-</u>	<u>-</u>	<u>(14,483)</u>	<u>-</u>	<u>-</u>
	<u>\$ 8,271,421</u>	<u>\$ 3,931,778</u>	<u>\$ 30,562</u>	<u>\$ (14,483)</u>	<u>\$ (113,815)</u>	<u>\$ 12,105,463</u>
<u>Deferred income tax liabilities</u>						
Temporary differences						
Unrealized exchange gains	\$ (48,736)	\$ (120,744)	\$ -	\$ -	\$ -	\$ (169,480)
Available-for-sale financial assets	(92,447)	-	(2,974)	-	-	(95,421)
Others	<u>-</u>	<u>(36,742)</u>	<u>(562)</u>	<u>-</u>	<u>-</u>	<u>(37,304)</u>
	<u>\$ (141,183)</u>	<u>\$ (157,486)</u>	<u>\$ (3,536)</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ (302,205)</u>

- d. The investment operating loss carryforward and deductible temporary differences for which no deferred income tax assets have been recognized

As of December 31, 2018 and 2017, the aggregate deductible temporary differences for which no deferred income tax assets have been recognized amounted to NT\$20,060,918 thousand and NT\$26,536,307 thousand, respectively.

- e. Unused tax-exemption information

As of December 31, 2018, the profits generated from the following projects of TSMC are exempt from income tax for a five-year period:

Tax-exemption Period

Construction and expansion of 2008 by TSMC	2015 to 2019
Construction and expansion of 2009 by TSMC	2018 to 2022

- f. The information of unrecognized deferred income tax liabilities associated with investments

As of December 31, 2018 and 2017, the aggregate taxable temporary differences associated with investments in subsidiaries not recognized as deferred income tax liabilities amounted to NT\$112,893,001 thousand and NT\$95,003,344 thousand, respectively.

- g. Income tax examination

The tax authorities have examined income tax returns of TSMC through 2015. All investment tax credit adjustments assessed by the tax authorities have been recognized accordingly.

32. EARNINGS PER SHARE

	Years Ended December 31	
	2018	2017
Basic EPS	<u>\$ 13.54</u>	<u>\$ 13.23</u>
Diluted EPS	<u>\$ 13.54</u>	<u>\$ 13.23</u>

EPS is computed as follows:

	Amounts (Numerator)	Number of Shares (Denominator) (In Thousands)	EPS (NT\$)
<u>Year Ended December 31, 2018</u>			
Basic/Diluted EPS			
Net income available to common shareholders of the parent	<u>\$ 351,130,884</u>	<u>25,930,380</u>	<u>\$ 13.54</u>
<u>Year Ended December 31, 2017</u>			
Basic/Diluted EPS			
Net income available to common shareholders of the parent	<u>\$ 343,111,476</u>	<u>25,930,380</u>	<u>\$ 13.23</u>

33. ADDITIONAL INFORMATION OF EXPENSES BY NATURE

	Years Ended December 31	
	2018	2017
a. Depreciation of property, plant and equipment		
Recognized in cost of revenue	\$ 264,804,741	\$ 235,985,189
Recognized in operating expenses	23,292,299	19,746,263
Recognized in other operating income and expenses	<u>27,857</u>	<u>64,510</u>
	<u>\$ 288,124,897</u>	<u>\$ 255,795,962</u>
b. Amortization of intangible assets		
Recognized in cost of revenue	\$ 2,073,480	\$ 2,135,521
Recognized in operating expenses	<u>2,347,925</u>	<u>2,211,215</u>
	<u>\$ 4,421,405</u>	<u>\$ 4,346,736</u>
c. Research and development costs expensed as incurred	<u>\$ 85,895,569</u>	<u>\$ 80,732,463</u>

	Years Ended December 31	
	2018	2017
d. Employee benefits expenses		
Post-employment benefits		
Defined contribution plans	\$ 2,568,945	\$ 2,369,940
Defined benefit plans	<u>281,866</u>	<u>271,551</u>
	2,850,811	2,641,491
Other employee benefits	<u>105,364,132</u>	<u>101,488,608</u>
	<u>\$ 108,214,943</u>	<u>\$ 104,130,099</u>
Employee benefits expense summarized by function		
Recognized in cost of revenue	\$ 63,597,704	\$ 61,026,107
Recognized in operating expenses	<u>44,617,239</u>	<u>43,103,992</u>
	<u>\$ 108,214,943</u>	<u>\$ 104,130,099</u>

According to TSMC's Articles of Incorporation, TSMC shall allocate compensation to directors and profit sharing bonus to employees of TSMC not more than 0.3% and not less than 1% of annual profits during the period, respectively.

TSMC accrued profit sharing bonus to employees based on a percentage of net income before income tax, profit sharing bonus to employees and compensation to directors during the period, which amounted to NT\$23,570,040 thousand and NT\$23,019,082 thousand for the years ended December 31, 2018 and 2017, respectively; compensation to directors was expensed based on estimated amount payable. If there is a change in the proposed amounts after the annual consolidated financial statements are authorized for issue, the differences are recorded as a change in accounting estimate.

TSMC's profit sharing bonus to employees and compensation to directors in the amounts of NT\$23,570,040 thousand and NT\$349,272 thousand in cash for 2018, respectively, profit sharing bonus to employees and compensation to directors in the amounts of NT\$23,019,082 thousand and NT\$368,919 thousand in cash for 2017, respectively, and profit sharing bonus to employees and compensation to directors in the amounts of NT\$22,418,339 thousand and NT\$376,432 thousand in cash for 2016, respectively, had been approved by the Board of Directors of TSMC held on February 19, 2019, February 13, 2018 and February 14, 2017, respectively. There is no significant difference between the aforementioned approved amounts and the amounts charged against earnings of 2018, 2017 and 2016, respectively.

The information about the appropriations of TSMC's profit sharing bonus to employees and compensation to directors is available at the Market Observation Post System website.

34. CASH FLOW INFORMATION

Reconciliation of liabilities arising from financing activities

			Non-cash changes		
	Balance as of January 1, 2018	Financing Cash Flow	Foreign Exchange Movement	Other Changes (Note)	Balance as of December 31, 2018
Short-term loans	\$ 63,766,850	\$ 23,922,975	\$ 1,064,815	\$ -	\$ 88,754,640
Guarantee deposits	16,080,619	(279,219)	423,545	(6,035,900)	10,189,045
Bonds payable	<u>150,201,122</u>	<u>(58,024,900)</u>	<u>(382,878)</u>	<u>6,656</u>	<u>91,800,000</u>
Total	<u>\$ 230,048,591</u>	<u>\$ (34,381,144)</u>	<u>\$ 1,105,482</u>	<u>\$ (6,029,244)</u>	<u>\$ 190,743,685</u>

Note: Other changes include amortization of bonds payable and guarantee deposits refunded to customers by offsetting related accounts receivable.

35. CAPITAL MANAGEMENT

The Company requires significant amounts of capital to build and expand its production facilities and acquire additional equipment. In consideration of the industry dynamics, the Company manages its capital in a manner to ensure that it has sufficient and necessary financial resources to fund its working capital needs, capital asset purchases, research and development activities, dividend payments, debt service requirements and other business requirements associated with its existing operations over the next 12 months.

36. FINANCIAL INSTRUMENTS

a. Categories of financial instruments

	December 31, 2018
Financial assets	
FVTPL (Note 1)	\$ 3,504,590
FVTOCI (Note 2)	107,067,490
Hedging financial assets	23,497
Amortized cost (Note 3)	<u>745,585,774</u>
	<u>\$ 856,181,351</u>
Financial liabilities	
FVTPL (Note 4)	\$ 40,825
Hedging financial liabilities	155,832
Amortized cost (Note 5)	<u>318,475,704</u>
	<u>\$ 318,672,361</u>

Note 1: Financial assets mandatorily measured at FVTPL.

Note 2: Including notes and accounts receivable, net, debt and equity investments.

Note 3: Including cash and cash equivalents, financial assets at amortized cost, notes and accounts receivable (including related parties), other receivables and refundable deposits.

Note 4: Held for trading.

Note 5: Including short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable, and guarantee deposits.

	December 31, 2017
Financial assets	
FVTPL (Note 6)	\$ 569,751
Available-for-sale financial assets (Note 7)	98,248,410
Held-to-maturity financial assets	20,821,714
Hedging derivative financial assets	34,394
Loans and receivables (Note 8)	<u>684,416,654</u>
	<u>\$ 804,090,923</u>
Financial liabilities	
FVTPL (Note 6)	\$ 26,709
Hedging derivative financial liabilities	15,562
Amortized cost (Note 9)	<u>340,501,266</u>
	<u>\$ 340,543,537</u>

Note 6: Including held for trading and designated as at FVTPL.

Note 7: Including financial assets carried at cost.

Note 8: Including cash and cash equivalents, notes and accounts receivable (including related parties), other receivables and refundable deposits.

Note 9: Including short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable and guarantee deposits.

b. Financial risk management objectives

The Company seeks to ensure sufficient cost-efficient funding readily available when needed. The Company manages its exposure to foreign currency risk, interest rate risk, equity price risk, credit risk and liquidity risk with the objective to reduce the potentially adverse effects the market uncertainties may have on its financial performance.

The plans for material treasury activities are reviewed by Audit Committees and/or Board of Directors in accordance with procedures required by relevant regulations or internal controls. During the implementation of such plans, Corporate Treasury function must comply with certain treasury procedures that provide guiding principles for overall financial risk management and segregation of duties.

c. Market risk

The Company is exposed to the financial market risks, primarily changes in foreign currency exchange rates, interest rates and equity investment prices. A portion of these risks is hedged.

Foreign currency risk

Most of the Company's revenues and expenditures are denominated in foreign currencies. Consequently, the Company is exposed to foreign currency risk. To protect against reductions in value and the volatility of future cash flows caused by changes in foreign exchange rates, the Company uses derivative financial instruments, such as forward exchange contracts and cross currency swaps, and non-derivative financial instruments, such as foreign currency-denominated debt, to partially hedge the Company's existing and certain forecasted currency exposure. These hedges will offset only a portion of, but do not eliminate, the financial impact from movements in foreign currency exchange rates.

The Company's sensitivity analysis of foreign currency risk mainly focuses on the foreign currency monetary items and the derivatives financial instruments at the end of the reporting period. Assuming an unfavorable 10% movement in the levels of foreign exchanges relative to the New Taiwan dollar, the net income for the years ended December 31, 2018 and 2017 would have decreased by NT\$506,369 thousand and NT\$867,910 thousand, respectively, and the other comprehensive income for the years ended December 31, 2018 and 2017 would have decreased by NT\$315,571 thousand and NT\$265,875 thousand, respectively.

Interest rate risk

The Company is exposed to interest rate risk primarily related to its outstanding debt and investments in fixed income securities. All of the Company's bonds payable have fixed interest rates and are measured at amortized cost. As such, changes in interest rates would not affect the future cash flows.

The Company classified its investments in fixed income securities as financial assets at FVTPL, financial assets at FVTOCI and financial assets at amortized costs starting from 2018; as available-for-sale and held-to-maturity financial assets in 2017. Because financial assets at amortized costs and held-to-maturity fixed income securities are measured at amortized cost, changes in interest rates would not affect the fair value. On the other hand, financial assets at FVTPL, financial assets at FVTOCI and available-for-sale fixed income securities are exposed to fair value fluctuations caused by changes in interest rates. The Company utilized interest rate futures to partially hedge the interest rate risk on its financial assets at FVTPL and financial assets at FVTOCI and available-for-sale fixed income investments. These hedges may offset only a small portion of the financial impact from movements in interest rates.

Based on a sensitivity analysis performed at the end of the reporting period, an unfavorable movement of hypothetical 1.00% increase in interest rates across all maturities would have resulted in a decrease in net income by NT\$247,761 thousand for the year ended December 31, 2018, and in a decrease in other comprehensive income by NT\$2,449,954 thousand and NT\$2,119,713 thousand for the years ended December 31, 2018 and 2017, respectively.

Other price risk

The Company is exposed to equity price risk for 2018 and 2017 arising from financial assets at FVTOCI and available-for-sale equity investments, respectively.

Assuming a hypothetical decrease of 5% in prices of the equity investments at the end of the reporting period for the years ended December 31, 2018 and 2017, the other comprehensive income would have decreased by NT\$213,550 thousand and NT\$351,520 thousand, respectively.

d. Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial losses to the Company. The Company is exposed to credit risks from operating activities, primarily trade receivables, and from investing activities, primarily deposits, fixed-income investments and other financial instruments with banks. Credit risk is managed separately for business related and

financial related exposures. As of the end of the reporting period, the Company's maximum credit risk exposure is equal to the carrying amount of financial assets.

Business related credit risk

The Company's trade receivables are from its customers worldwide. The majority of the Company's outstanding trade receivables are not covered by collaterals or guarantees. While the Company has procedures to monitor and manage credit risk exposure on trade receivables, there is no assurance such procedures will effectively eliminate losses resulting from its credit risk. This risk is heightened during periods when economic conditions worsen.

As of December 31, 2018 and 2017, the Company's ten largest customers accounted for 79% and 70% of accounts receivable, respectively. The Company believes the concentration of credit risk is not material for the remaining accounts receivable.

Financial credit risk

The Company mitigates its financial credit risk by selecting counterparties with investment-grade credit ratings and by limiting the exposure to any individual counterparty. The Company regularly monitors and reviews the limit applied to counterparties and adjusts the limit according to market conditions and the credit standing of the counterparties.

The risk management of expected credit loss for financial assets at amortized cost and investments in debt instruments at FVTOCI is as follows:

The Company only invests in debt instruments that are rated as investment grade or higher. The credit rating information is supplied by external rating agencies. The Company assesses whether there has been a significant increase in credit risk since initial recognition by reviewing changes in external credit ratings, financial market conditions and material information of the bond-issuers.

The Company assesses the 12-month expected credit loss and lifetime expected credit loss based on the probability of default and loss given default provided by external credit rating agencies. The current credit risk assessment policies are as follows:

Category	Description	Basis for Recognizing Expected Credit Loss	Expected Credit Loss Ratio
Performing	Credit rating on trade date and valuation date: (1) Within investment grade (2) Between BB+ and BB-	12 months expected credit loss	0-0.1%
Doubtful	Credit rating on trade date and valuation date: (1) From investment grade to non-investment grade (2) From BB+~BB- to B+~CCC-	Lifetime expected credit loss-not credit impaired	-
In default	Credit rating CC or below	Lifetime expected credit loss-credit impaired	-
Write-off	There is evidence indicating that the debtor is in severe financial difficulty and the Company has no realistic prospect of recovery	Amount is written off	-

For the year ended December 31, 2018, the expected credit loss decreases NT\$1,040 thousand, mainly attributed to asset allocation adjustment to debt investments of higher credit rating.

e. Liquidity risk management

The objective of liquidity risk management is to ensure the Company has sufficient liquidity to fund its business operations over the next 12 months. The Company manages its liquidity risk by maintaining adequate cash and cash equivalent, debt investment at FVTPL, financial assets at FVTOCI-current, and financial assets amortized at cost-current.

The table below summarizes the maturity profile of the Company's financial liabilities based on contractual undiscounted payments, including principal and interest.

	Less Than 1 Year	2-3 Years	4-5 Years	5+ Years	Total
<u>December 31, 2018</u>					
<u>Non-derivative financial liabilities</u>					
Short-term loans	\$ 88,810,737	\$ -	\$ -	\$ -	\$ 88,810,737
Accounts payable (including related parties)	34,357,432	-	-	-	34,357,432
Payables to contractors and equipment suppliers	43,133,659	-	-	-	43,133,659
Accrued expenses and other current liabilities	50,240,928	-	-	-	50,240,928
Bonds payable	36,039,935	35,340,742	22,979,426	-	94,360,103
Guarantee deposits (including those classified under accrued expenses and other current liabilities)	6,835,667	2,891,663	461,715	-	10,189,045
	<u>259,418,358</u>	<u>38,232,405</u>	<u>23,441,141</u>	<u>-</u>	<u>321,091,904</u>
<u>Derivative financial instruments</u>					
Forward exchange contracts					
Outflows	49,302,325	-	-	-	49,302,325
Inflows	(49,393,679)	-	-	-	(49,393,679)
	<u>(91,354)</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>(91,354)</u>
	<u>\$ 259,327,004</u>	<u>\$ 38,232,405</u>	<u>\$ 23,441,141</u>	<u>\$ -</u>	<u>\$ 321,000,550</u>
<u>December 31, 2017</u>					
<u>Non-derivative financial liabilities</u>					
Short-term loans	\$ 63,801,977	\$ -	\$ -	\$ -	\$ 63,801,977
Accounts payable (including related parties)	30,069,163	-	-	-	30,069,163
Payables to contractors and equipment suppliers	55,723,774	-	-	-	55,723,774
Accrued expenses and other current liabilities	24,659,738	-	-	-	24,659,738
Bonds payable	60,176,818	68,378,787	7,777,715	18,203,601	154,536,921
Guarantee deposits (including those classified under accrued expenses and other current liabilities)	8,493,829	7,503,151	83,639	-	16,080,619
	<u>242,925,299</u>	<u>75,881,938</u>	<u>7,861,354</u>	<u>18,203,601</u>	<u>344,872,192</u>
<u>Derivative financial instruments</u>					
Forward exchange contracts					
Outflows	67,393,539	-	-	-	67,393,539
Inflows	(67,957,919)	-	-	-	(67,957,919)
	<u>(564,380)</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>(564,380)</u>
	<u>\$ 242,360,919</u>	<u>\$ 75,881,938</u>	<u>\$ 7,861,354</u>	<u>\$ 18,203,601</u>	<u>\$ 344,307,812</u>

f. Fair value of financial instruments

1) Fair value measurements recognized in the consolidated balance sheets

Fair value measurements are grouped into Levels 1 to 3 based on the degree to which the fair value is observable:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2 fair value measurements are those derived from inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data (unobservable inputs).

2) Fair value of financial instruments that are measured at fair value on a recurring basis

Fair value hierarchy

The following table presents the Company's financial assets and liabilities measured at fair value on a recurring basis:

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
<u>Financial assets at FVTPL</u>				
Mandatorily measured at FVTPL				
Agency mortgage-backed securities	\$ -	\$ 3,419,287	\$ -	\$ 3,419,287
Forward exchange contracts	-	85,303	-	85,303
	<u>\$ -</u>	<u>\$ 3,504,590</u>	<u>\$ -</u>	<u>\$ 3,504,590</u>
<u>Financial assets at FVTOCI</u>				
Investments in debt instruments				
Corporate bonds	\$ -	\$ 40,753,582	\$ -	\$ 40,753,582
Agency bonds/Agency mortgage-backed securities	-	31,288,762	-	31,288,762
Asset-backed securities	-	15,670,295	-	15,670,295
Government bonds	11,006,167	145,192	-	11,151,359
Commercial paper	-	107,590	-	107,590
Investments in equity instruments				
Non-publicly traded equity investments	-	-	3,910,681	3,910,681
Publicly traded stocks	590,152	-	-	590,152
Notes and accounts receivable, net	-	3,595,069	-	3,595,069
	<u>\$ 11,596,319</u>	<u>\$ 91,560,490</u>	<u>\$ 3,910,681</u>	<u>\$ 107,067,490</u>
<u>Hedging financial assets</u>				
Cash flow hedges				
Forward exchange contracts	<u>\$ -</u>	<u>\$ 23,497</u>	<u>\$ -</u>	<u>\$ 23,497</u>

(Continued)

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
<u>Financial liabilities at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 40,825	\$ -	\$ 40,825
<u>Hedging financial liabilities</u>				
Fair value hedges				
Interest rate futures contracts	\$ 153,891	\$ -	\$ -	\$ 153,891
Cash flow hedges				
Forward exchange contracts	-	1,941	-	1,941
	<u>\$ 153,891</u>	<u>\$ 1,941</u>	<u>\$ -</u>	<u>\$ 155,832</u>
				(Concluded)

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
<u>Financial assets at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 569,751	\$ -	\$ 569,751
<u>Available-for-sale financial assets</u>				
Corporate bonds	\$ -	\$ 40,165,148	\$ -	\$ 40,165,148
Agency bonds/Agency mortgage-backed securities	-	29,235,388	-	29,235,388
Asset-backed securities	-	13,459,545	-	13,459,545
Government bonds	7,715,980	101,743	-	7,817,723
Publicly traded stocks	2,548,054	-	-	2,548,054
Commercial paper	-	148,295	-	148,295
	<u>\$ 10,264,034</u>	<u>\$ 83,110,119</u>	<u>\$ -</u>	<u>\$ 93,374,153</u>
<u>Hedging derivative financial assets</u>				
Fair value hedges				
Interest rate futures contracts	\$ 27,016	\$ -	\$ -	\$ 27,016
Cash flow hedges				
Forward exchange contracts	-	7,378	-	7,378
	<u>\$ 27,016</u>	<u>\$ 7,378</u>	<u>\$ -</u>	<u>\$ 34,394</u>
<u>Financial liabilities at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 26,709	\$ -	\$ 26,709
<u>Hedging derivative financial liabilities</u>				
Cash flow hedges				
Forward exchange contracts	\$ -	\$ 15,562	\$ -	\$ 15,562

Reconciliation of Level 3 fair value measurements of financial assets

The financial assets measured at Level 3 fair value were equity investments classified as financial assets at FVTOCI. Reconciliations for the year ended December 31, 2018 were as follows:

Balance at January 1, 2018	\$ 5,841,384
Additions	212,488
Recognized in other comprehensive income	(2,141,421)
Disposals and proceeds from return of capital of investments	(175,731)
Effect of exchange rate changes	<u>173,961</u>
Balance at December 31, 2018	<u>\$ 3,910,681</u>

Valuation techniques and assumptions used in Level 2 fair value measurement

The fair values of financial assets and financial liabilities are determined as follows:

- The fair values of corporate bonds, agency bonds, agency mortgage-backed securities, asset-backed securities, and government bonds are determined by quoted market prices provided by third party pricing services.
- Forward exchange contracts are measured using forward exchange rates and the discounted yield curves that are derived from quoted market prices. For investments in commercial paper, the fair values are determined by the present value of future cash flows based on the discounted yield curves that are derived from the quoted market prices.
- The fair value of accounts receivables classified as at FVTOCI are determined by the present value of future cash flows based on the discount rate that reflects the credit risk of counterparties.

Valuation techniques and assumptions used in Level 3 fair value measurement

The fair values of non-publicly traded equity investments are mainly determined by using the asset approach, income approach and market approach.

To determine the fair value, the Company utilizes the asset approach and takes into account the net asset value measured at the fair value by independent parties. On December 31, 2018, the Company uses unobservable inputs derived from discount for lack of marketability by 10%. When other inputs remain equal, the fair value will decrease by NT\$31,420 thousand if discounts for lack of marketability increase by 1%.

The income approach utilizes discounted cash flows to determine the present value of the expected future economic benefits that will be derived from the investment. On December 31, 2018, the Company uses significant unobservable inputs, which include expected returns, discount rate of 10%, discounts for lack of marketability of 10% and discounts for lack of control of 10%.

For the remaining few investments, the market approach is used to arrive at their fair value, for which the recent financing activities of investees, the market transaction prices of the similar companies and market conditions are considered.

3) Fair value of financial instruments that are not measured at fair value

Except as detailed in the following table, the Company considers that the carrying amounts of financial instruments in the consolidated financial statements that are not measured at fair value approximate their fair values.

Fair value hierarchy

The table below sets out the fair value hierarchy for the Company's assets and liabilities which are not required to measure at fair value:

December 31, 2018					
	Carrying Amount	Fair Value			
		Level 1	Level 2	Level 3	Total
<u>Financial assets</u>					
Financial assets at amortized costs					
Corporate bonds	\$ 19,511,794	\$ -	\$ 19,554,553	\$ -	\$ 19,554,553
Commercial paper	<u>2,294,098</u>	<u>-</u>	<u>2,296,188</u>	<u>-</u>	<u>2,296,188</u>
	<u>\$ 21,805,892</u>	<u>\$ -</u>	<u>\$ 21,850,741</u>	<u>\$ -</u>	<u>\$ 21,850,741</u>
<u>Financial liabilities</u>					
Financial liabilities at amortized costs					
Bonds payable	<u>\$ 91,800,000</u>	<u>\$ -</u>	<u>\$ 93,171,255</u>	<u>\$ -</u>	<u>\$ 93,171,255</u>
December 31, 2017					
	Carrying Amount	Fair Value			
		Level 1	Level 2	Level 3	Total
<u>Financial assets</u>					
Held-to-maturity securities					
Corporate bonds	\$ 19,338,764	\$ -	\$ 19,541,419	\$ -	\$ 19,541,419
Structured product	<u>1,482,950</u>	<u>-</u>	<u>1,475,350</u>	<u>-</u>	<u>1,475,350</u>
	<u>\$ 20,821,714</u>	<u>\$ -</u>	<u>\$ 21,016,769</u>	<u>\$ -</u>	<u>\$ 21,016,769</u>
<u>Financial liabilities</u>					
Measured at amortized cost					
Bonds payable	<u>\$ 150,201,122</u>	<u>\$ -</u>	<u>\$ 152,077,728</u>	<u>\$ -</u>	<u>\$ 152,077,728</u>

Valuation techniques and assumptions used in Level 2 fair value measurement

The fair value of corporate bonds is determined by quoted market prices provided by third party pricing services. The fair value of structured product is determined by quoted market prices provided by the counterparty.

The fair value of commercial paper is determined by the present value of future cash flows based on the discounted curves that are derived from the quoted market prices.

The fair value of the Company's bonds payable is determined by quoted market prices provided by third party pricing services.

37. RELATED PARTY TRANSACTIONS

Intercompany balances and transactions between TSMC and its subsidiaries, which are related parties of TSMC, have been eliminated upon consolidation; therefore those items are not disclosed in this note. The following is a summary of significant transactions between the Company and other related parties:

a. Related party name and categories

<u>Related Party Name</u>	<u>Related Party Categories</u>
GUC	Associates
VIS	Associates
SSMC	Associates
Xintec	Associates
Mutual-Pak	Associates
TSMC Education and Culture Foundation	Other related parties
TSMC Charity Foundation	Other related parties

b. Net revenue

		<u>Years Ended December 31</u>	
		<u>2018</u>	<u>2017</u>
<u>Item</u>	<u>Related Party Categories</u>		
Net revenue from sale of goods	Associates	\$ 8,980,079	\$ 8,495,937
	Other related parties	<u>330</u>	<u>133</u>
		<u>\$ 8,980,409</u>	<u>\$ 8,496,070</u>
Net revenue from royalties	Associates	<u>\$ 362,259</u>	<u>\$ 482,537</u>

c. Purchases

		<u>Years Ended December 31</u>	
		<u>2018</u>	<u>2017</u>
<u>Related Party Categories</u>			
Associates		<u>\$ 8,809,533</u>	<u>\$ 9,904,637</u>

d. Receivables from related parties

		<u>December 31,</u>	<u>December 31,</u>
		<u>2018</u>	<u>2017</u>
<u>Item</u>	<u>Related Party Name/Categories</u>		
Receivables from related parties	GUC	\$ 481,934	\$ 1,022,892
	Xintec	<u>102,478</u>	<u>161,232</u>
		<u>\$ 584,412</u>	<u>\$ 1,184,124</u>

(Continued)

		December 31, 2018	December 31, 2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Other receivables from related parties	SSMC	\$ 53,780	\$ 83,099
	VIS	10,423	78,141
	Other Associates	<u>825</u>	<u>9,818</u>
		<u>\$ 65,028</u>	<u>\$ 171,058</u> (Concluded)

e. Payables to related parties

		December 31, 2018	December 31, 2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Payables to related parties	Xintec	\$ 649,812	\$ 817,930
	SSMC	362,564	406,959
	VIS	357,080	409,950
	Other Associates	<u>7,043</u>	<u>21,517</u>
		<u>\$ 1,376,499</u>	<u>\$ 1,656,356</u>

f. Others

		Years Ended December 31	
		2018	2017
<u>Item</u>	<u>Related Party Categories</u>		
Manufacturing expenses	Associates	<u>\$ 2,974,581</u>	<u>\$ 2,196,141</u>
General and administrative expenses	Other related parties	<u>\$ 120,756</u>	<u>\$ 101,500</u>

The sales prices and payment terms to related parties were not significantly different from those of sales to third parties. For other related party transactions, price and terms were determined in accordance with mutual agreements.

The Company leased factory and office from associates. The lease terms and prices were both determined in accordance with mutual agreements. The rental expenses were paid to associates monthly; the related expenses were both classified under manufacturing expenses.

The Company deferred the disposal gain or loss derived from sales of property, plant and equipment to related parties (transactions with associates), and then recognized such gain or loss over the depreciable lives of the disposed assets.

g. Compensation of key management personnel

The compensation to directors and other key management personnel for the years ended December 31, 2018 and 2017 were as follows:

	Years Ended December 31	
	2018	2017
Short-term employee benefits	\$ 2,004,881	\$ 2,170,280
Post-employment benefits	<u>3,383</u>	<u>3,727</u>
	<u>\$ 2,008,264</u>	<u>\$ 2,174,007</u>

The compensation to directors and other key management personnel were determined by the Compensation Committee of TSMC in accordance with the individual performance and the market trends.

38. PLEDGED ASSETS

The Company provided certificate of deposits recorded in other financial assets as collateral mainly for building lease agreements. As of December 31, 2018 and 2017, the aforementioned other financial assets amounted to NT\$124,244 thousand and NT\$165,618 thousand, respectively.

39. SIGNIFICANT OPERATING LEASE ARRANGEMENTS

The Company's major significant operating leases are arrangements on several parcels of land, machinery and equipment and office premises.

The Company expensed the lease payments as follows:

	Years Ended December 31	
	2018	2017
Minimum lease payments	<u>\$ 4,243,091</u>	<u>\$ 2,178,054</u>

Future minimum lease payments under the above non-cancellable operating leases are as follows:

	December 31, 2018	December 31, 2017
Not later than 1 year	\$ 5,824,119	\$ 3,116,209
Later than 1 year and not later than 5 years	5,834,884	5,174,729
Later than 5 years	<u>9,190,582</u>	<u>8,905,848</u>
	<u>\$ 20,849,585</u>	<u>\$ 17,196,786</u>

40. SIGNIFICANT CONTINGENT LIABILITIES AND UNRECOGNIZED COMMITMENTS

Significant contingent liabilities and unrecognized commitments of the Company as of the end of the reporting period, excluding those disclosed in other notes, were as follows:

- a. Under a technical cooperation agreement with Industrial Technology Research Institute, the R.O.C. Government or its designee approved by TSMC can use up to 35% of TSMC's capacity provided TSMC's outstanding commitments to its customers are not prejudiced. The term of this agreement is for five years beginning from January 1, 1987 and is automatically renewed for successive periods of five years unless otherwise terminated by either party with one year prior notice. As of December 31, 2018, the R.O.C. Government did not invoke such right.
- b. Under a Shareholders Agreement entered into with Philips and EDB Investments Pte Ltd. on March 30, 1999, the parties formed a joint venture company, SSMC, which is an integrated circuit foundry in Singapore. TSMC's equity interest in SSMC was 32%. Nevertheless, in September 2006, Philips spun-off its semiconductor subsidiary which was renamed as NXP B.V. Further, TSMC and NXP B.V. purchased all the SSMC shares owned by EDB Investments Pte Ltd. pro rata according to the Shareholders Agreement on November 15, 2006. After the purchase, TSMC and NXP B.V. currently own approximately 39% and 61% of the SSMC shares, respectively. TSMC and NXP B.V. are required, in the aggregate, to purchase at least 70% of SSMC's capacity, but TSMC alone is not required to purchase more than 28% of the capacity. If any party defaults on the commitment and the capacity utilization of SSMC falls below a specific percentage of its capacity, the defaulting party is required to compensate SSMC for all related unavoidable costs. There was no default from the aforementioned commitment as of December 31, 2018.
- c. In May 2017, Uri Cohen filed a complaint in the U.S. District Court for the Eastern District of Texas alleging that TSMC, TSMC North America and other companies infringe four U.S. patents. Cohen's case was transferred to and consolidated with the responsive declaratory judgment case for non-infringement of Cohen's asserted patents filed by TSMC and TSMC North America in the U.S. District Court for the Northern District of California. In July 2018, all pending litigations between the parties in the U.S. District Court for the Northern District of California were dismissed.
- d. On September 28, 2017, TSMC was contacted by the European Commission (the "Commission"), which has asked us for information and documents concerning alleged anti-competitive practices in relation to semiconductor sales. We are cooperating with the Commission to provide the requested information and documents. In light of the fact that this proceeding is still in its preliminary stage, it is premature to predict how the case will proceed, the outcome of the proceeding or its impact.
- e. TSMC entered into long-term purchase agreements of material with multiple suppliers. The relative minimum purchase quantity and price are specified in the agreements.
- f. TSMC entered into a long-term purchase agreement of equipment. The relative purchase quantity and price are specified in the agreement.
- g. TSMC entered into long-term energy purchase agreements with multiple suppliers. The relative purchase period, quantity and price are specified in the agreements.
- h. Amounts available under unused letters of credit as of December 31, 2018 and 2017 were NT\$70,702 thousand and NT\$94,909 thousand, respectively.

41. SIGNIFICANT LOSSES FROM DISASTERS

The Company experienced a computer virus outbreak on August 3, 2018, which affected a number of computer systems and fab tools, and consequently impacted wafer production in Taiwan. All the impacted tools have been recovered by August 6, 2018. The Company recognized a loss of NT\$2,596,046 thousand related to this incident for the three months ended September 30, 2018, which was included in cost of revenue.

42. SIGNIFICANT SUBSEQUENT EVENTS

On January 19, 2019, the Company discovered a wafer contamination issue in a fab in Taiwan caused by a batch of unqualified photoresist materials. After investigation, the Company immediately stopped using the unqualified materials. As of the date the accompanying consolidated financial statements were issued, a preliminary estimated loss of NT\$6,100,000 thousand will be recognized in cost of revenue for the three months ended March 31, 2019.

43. EXCHANGE RATE INFORMATION OF FOREIGN-CURRENCY FINANCIAL ASSETS AND LIABILITIES

The following information was summarized according to the foreign currencies other than the functional currency of the Company. The exchange rates disclosed were used to translate the foreign currencies into the functional currency. The significant financial assets and liabilities denominated in foreign currencies were as follows:

	Foreign Currencies (In Thousands)	Exchange Rate (Note 1)	Carrying Amount (In Thousands)
<u>December 31, 2018</u>			
<u>Financial assets</u>			
Monetary items			
USD	\$ 4,618,566	30.740	\$ 141,974,734
USD	343,132	6.866 (Note 2)	10,547,875
EUR	7,561	35.22	266,307
JPY	490,635	0.2783	136,544
Non-monetary items			
HKD	144,567	3.93	568,150
<u>Financial liabilities</u>			
Monetary items			
USD	4,323,763	30.740	132,912,486
EUR	477,776	35.22	16,827,260
JPY	35,084,436	0.2783	9,763,999

(Continued)

	Foreign Currencies (In Thousands)	Exchange Rate (Note 1)	Carrying Amount (In Thousands)
<u>December 31, 2017</u>			
<u>Financial assets</u>			
Monetary items			
USD	\$ 5,668,611	29.659	\$ 168,125,342
USD	580,555	6.512 (Note 2)	17,218,674
EUR	236,474	35.45	8,383,015
JPY	34,335,661	0.2629	9,026,845
<u>Financial assets</u>			
Non-monetary items			
HKD	285,336	3.80	1,084,276
<u>Financial liabilities</u>			
Monetary items			
USD	4,048,384	29.659	120,071,030
EUR	415,819	35.45	14,740,766
JPY	43,205,838	0.2629	11,358,815
			(Concluded)

Note 1: Except as otherwise noted, exchange rate represents the number of N.T. dollars for which one foreign currency could be exchanged.

Note 2: The exchange rate represents the number of RMB for which one USD dollars could be exchanged.

Please refer to the consolidated statements of comprehensive income for the total of realized and unrealized foreign exchange gain and loss for the years ended December 31, 2018 and 2017, respectively. Since there were varieties of foreign currency transactions and functional currencies within the subsidiaries of the Company, the Company was unable to disclose foreign exchange gain (loss) towards each foreign currency with significant impact.

44. ADDITIONAL DISCLOSURES

Following are the additional disclosures required by the Securities and Futures Bureau for TSMC:

- Financings provided: Please see Table 1 attached;
- Endorsement/guarantee provided: Please see Table 2 attached;
- Marketable securities held (excluding investments in subsidiaries and associates): Please see Table 3 attached;

- d. Marketable securities acquired and disposed of at costs or prices of at least NT\$300 million or 20% of the paid-in capital: Please see Table 4 attached;
- e. Acquisition of individual real estate properties at costs of at least NT\$300 million or 20% of the paid-in capital: Please see Table 5 attached;
- f. Disposal of individual real estate properties at prices of at least NT\$300 million or 20% of the paid-in capital: None;
- g. Total purchases from or sales to related parties of at least NT\$100 million or 20% of the paid-in capital: Please see Table 6 attached;
- h. Receivables from related parties amounting to at least NT\$100 million or 20% of the paid-in capital: Please see Table 7 attached;
- i. Information about the derivative financial instruments transaction: Please see Notes 7 and 13;
- j. Others: The business relationship between the parent and the subsidiaries and significant transactions between them: Please see Table 8 attached;
- k. Names, locations, and related information of investees over which TSMC exercises significant influence (excluding information on investment in mainland China): Please see Table 9 attached;
- l. Information on investment in mainland China
 - 1) The name of the investee in mainland China, the main businesses and products, its issued capital, method of investment, information on inflow or outflow of capital, percentage of ownership, income (losses) of the investee, share of profits/losses of investee, ending balance, amount received as dividends from the investee, and the limitation on investee: Please see Table 10 attached.
 - 2) Significant direct or indirect transactions with the investee, its prices and terms of payment, unrealized gain or loss, and other related information which is helpful to understand the impact of investment in mainland China on financial reports: Please see Table 8 attached.

45. OPERATING SEGMENTS INFORMATION

- a. Operating segments, segment revenue and operating results

The Company has only one operating segment, the foundry segment. The foundry segment engages mainly in the manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing of masks.

The Company uses the income from operations as the measurement for the basis of performance assessment. The basis for such measurement is the same as that for the preparation of financial statements. Please refer to the consolidated statements of comprehensive income for the related segment revenue and operating results.

b. Geographic, product and major customers information were as follows:

1) Geographic information

	Net Revenue from External Customers	Noncurrent Assets	
	Year Ended December 31 2017	December 31, 2018	December 31, 2017
Taiwan	\$ 88,046,147	\$ 1,039,471,321	\$ 1,027,963,202
United States	635,851,720	7,569,797	7,515,835
China	110,201,389	43,574,538	44,204,888
Europe, the Middle East and Africa	69,046,797	8,269	8,123
Japan	60,628,029	13,138	8,534
Others	<u>13,673,159</u>	<u>-</u>	<u>-</u>
	<u>\$ 977,447,241</u>	<u>\$ 1,090,637,063</u>	<u>\$ 1,079,700,582</u>

The Company categorized the net revenue mainly based on the countries where the customers are headquartered. For geographic information in 2018, please refer to Note 26. Noncurrent assets include property, plant and equipment, intangible assets and other noncurrent assets.

2) Product information

Product	Year Ended December 31 2017
Wafer	\$ 875,461,445
Others	<u>101,985,796</u>
	<u>\$ 977,447,241</u>

For product information in 2018, please refer to Note 26.

3) Major customers representing at least 10% of net revenue

	Years Ended December 31			
	2018		2017	
	Amount	%	Amount	%
Customer A	\$ 224,690,695	22	\$ 220,463,127	23

Commencing in 2018, the Company began to break down the net revenue by geography, by product and by customer based on a new method which associates most estimated sales returns and allowances with individual sales transactions, as opposed to the previous method which allocated sales returns and allowances based on the aforementioned gross revenue. The Company believes the new method provides a more relevant breakdown than the previous one. On a comparable basis, the classifications of 2017 have been revised accordingly.

TABLE 1

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

FINANCINGS PROVIDED

FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

No.	Financing Company	Counter-party	Financial Statement Account	Related Party	Maximum Balance for the Period (foreign currencies in Thousands) (Note 3)	Ending Balance (foreign currencies in Thousands) (Note 3)	Amount Actually Drawn (foreign currencies in Thousands)	Interest Rate	Nature for Financing (Note 4)	Transaction Amounts	Reason for Financing (Note 4)	Allowance for Bad Debt	Collateral		Financing Limits for Each Borrowing Company (Note 1 and 2)	Financing Company's Total Financing Amount Limits (Note 1 and 2)
													Item	Value		
1	TSMC China	TSMC Nanjing	Other receivables from related parties	Yes	\$ 52,859,100 (RMB 7,000,000)& (US\$ 700,000)	\$ 46,065,560 (RMB 7,000,000)& (US\$ 479,000)	\$ 30,829,260 (RMB 6,000,000)& (US\$ 129,000)	1.30%-1.96%	The need for short-term and long-term financing	\$ -	Operating capital	\$ -	-	\$ -	\$ 55,586,818	\$ 55,586,818
2	TSMC Global	TSMC	Other receivables from related parties	Yes	\$ 46,110,000 (US\$ 1,500,000)	\$ 46,110,000 (US\$ 1,500,000)	\$ 3,227,700 (US\$ 105,000)	2.53%	The need for short-term financing	-	Operating capital	-	-	-	393,577,931	393,577,931

Note 1: The total amount available for lending purposes shall not exceed the net worth of TSMC China. The total amount for lending to a company for funding for a short-term period shall not exceed ten percent (10%) of the net worth of TSMC China. In addition, the total amount lendable to any one borrower shall be no more than thirty percent (30%) of the borrower's net worth. The above restriction does not apply to the subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC. However, the total amount lendable to any such subsidiary of TSMC shall not exceed forty percent (40%) of the net worth of TSMC China. When there is a lending for funding needs by TSMC China to TSMC, or to the subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC, which are not located in Taiwan, the lending will not be subject to the restriction set forth in the above paragraph of this Article. Notwithstanding the foregoing, the aggregate amount available for lending to such borrowers and the total amount lendable to each of such borrowers still shall not exceed the net worth of TSMC China.

Note 2: The total amount available for lending purpose shall not exceed the net worth of TSMC Global. The total amount for lending to a company for funding for a short-term period shall not exceed ten percent (10%) of the net worth of TSMC Global. In addition, the total amount lendable to any one borrower shall be no more than thirty percent (30%) of the borrower's net worth. While TSMC, or foreign subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC will not be subject to this restriction, their total borrowing amount still shall not exceed the net worth of TSMC Global. Notwithstanding the foregoing, the aggregate amount for lending to Taiwan companies other than TSMC shall not exceed forty percent (40%) of the net worth of TSMC Global.

Note 3: The maximum balance for the period and ending balance represent the amounts approved by the Board of Directors.

Note 4: The restriction of the term of each loan for funding not exceeding one year shall not apply to inter-company loans for funding between offshore subsidiaries in which the Company holds, directly or indirectly, 100% of the voting shares.

TABLE 2

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

ENDORSEMENTS/GUARANTEES PROVIDED
FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

No.	Endorsee/Provider	Guaranteed Party		Limits on Endorsement/ Guarantee Amount Provided to Each Party (Notes 1 and 2)	Maximum Balance for the Period (US\$ in Thousands) (Note 3)	Ending Balance (US\$ in Thousands) (Note 3)	Amount Actually Drawn (US\$ in Thousands)	Amount of Endorsement/ Guarantee Collateralized by Properties	Ratio of Accumulated Endorsement/ Guarantee to Net Equity per Latest Financial Statements	Maximum Endorsement/ Guarantee Amount Allowable (Note 2)	Guarantee Provided by Parent Company	Guarantee Provided by A Subsidiary	Guarantee Provided to Subsidiaries in Mainland China
		Name	Nature of Relationship										
0	TSMC	TSMC Global	Subsidiary	\$ 419,204,416	\$ 35,351,000 (US\$ 1,150,000)	\$ -	\$ -	\$ -	-	\$ 419,204,416	Yes	No	No
		TSMC North America	Subsidiary	419,204,416	2,557,977 (US\$ 83,213)	2,557,977 (US\$ 83,213)	2,557,977 (US\$ 83,213)	-	0.15%	419,204,416	Yes	No	No

Note 1: The total amount of the guarantee provided by TSMC to any individual entity shall not exceed ten percent (10%) of TSMC's net worth, or the net worth of such entity. However, subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC are not subject to the above restrictions after the approval of the Board of Directors.

Note 2: The total amount of guarantee shall not exceed twenty-five percent (25%) of TSMC's net worth.

Note 3: The maximum balance for the period and ending balance represent the amounts approved by the Board of Directors.

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

MARKETABLE SECURITIES HELD

DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC	Commercial paper Taiwan Power Company CPC Corporation, Taiwan	- -	Financial assets at amortized cost "	180 50	\$ 1,795,261 498,837	N/A N/A	\$ 1,797,107 499,080	
	Non-publicly traded equity investments United Industrial Gases Co., Ltd.	-	Financial assets at fair value through other comprehensive income	21,230	493,225	10	493,225	
	Shin-Etsu Handotai Taiwan Co., Ltd.	-	"	10,500	379,176	7	379,176	
	Global Investment Holding Inc.	-	"	11,124	78,430	6	78,430	
	W.K. Technology Fund IV	-	"	806	5,747	2	5,747	
	Crimson Asia Capital	-	"	-	4,554	1	4,554	
	Horizon Ventures Fund	-	"	-	2,477	12	2,477	
	Publicly traded stocks Semiconductor Manufacturing International Corporation	-	Financial assets at fair value through other comprehensive income	21,105	568,150	-	568,150	
	Non-publicly traded equity investments Shanghai Walden Venture Capital Enterprise	-	Financial assets at fair value through other comprehensive income	-	8,904	6	8,904	
	China Walden Venture Investments II, L.P. China Walden Venture Investments III, L.P.	- -	" "	- -	US\$ 8,175 US\$ 1,486	9 4	US\$ 8,175 US\$ 1,486	
TSMC Partners	Tela Innovations	-	"	10,440	-	25	-	
	Mcube Inc.	-	"	6,333	-	12	-	
	Sonics, Inc.	-	"	637	-	9	-	
	Corporate bond Bank of America Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 44,755	N/A	US\$ 44,755	
	JPMorgan Chase & Co	-	"	-	US\$ 44,291	N/A	US\$ 44,291	
	Morgan Stanley	-	"	-	US\$ 40,237	N/A	US\$ 40,237	
	Goldman Sachs Group Inc/The Citigroup Inc	- -	" "	- -	US\$ 32,464 US\$ 28,602	N/A N/A	US\$ 32,464 US\$ 28,602	
	CVS Health Corp	-	"	-	US\$ 27,238	N/A	US\$ 27,238	
	AT&T Inc	-	"	-	US\$ 23,123	N/A	US\$ 23,123	
	Comcast Corp	-	"	-	US\$ 18,894	N/A	US\$ 18,894	
TSMC Global	Verizon Communications Inc	-	"	-	US\$ 15,927	N/A	US\$ 15,927	
	HSBC Holdings PLC	-	"	-	US\$ 15,571	N/A	US\$ 15,571	
	BAT Capital Corp	-	"	-	US\$ 12,594	N/A	US\$ 12,594	
	Apple Inc	-	"	-	US\$ 12,585	N/A	US\$ 12,585	
	Daimler Finance North America LLC	-	"	-	US\$ 12,578	N/A	US\$ 12,578	
	PNC Bank NA	-	"	-	US\$ 12,203	N/A	US\$ 12,203	
	Nordea Bank Abp	-	"	-	US\$ 11,704	N/A	US\$ 11,704	
	AbbVie Inc	-	"	-	US\$ 11,504	N/A	US\$ 11,504	
		-		-				
		-		-				

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	United Technologies Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 11,159	N/A	US\$ 11,159	
	American International Group Inc	-	"	-	US\$ 10,737	N/A	US\$ 10,737	
	Ford Motor Credit Co LLC	-	"	-	US\$ 10,153	N/A	US\$ 10,153	
	Credit Suisse AG/New York NY	-	"	-	US\$ 10,096	N/A	US\$ 10,096	
	Sumitomo Mitsui Financial Group Inc	-	"	-	US\$ 10,008	N/A	US\$ 10,008	
	Mitsubishi UFJ Financial Group Inc	-	"	-	US\$ 9,547	N/A	US\$ 9,547	
	Duke Energy Corp	-	"	-	US\$ 9,228	N/A	US\$ 9,228	
	Macquarie Group Ltd	-	"	-	US\$ 8,970	N/A	US\$ 8,970	
	Analog Devices Inc	-	"	-	US\$ 8,841	N/A	US\$ 8,841	
	ABN AMRO Bank NV	-	"	-	US\$ 8,652	N/A	US\$ 8,652	
	ERAC USA Finance LLC	-	"	-	US\$ 8,601	N/A	US\$ 8,601	
	Wells Fargo & Co	-	"	-	US\$ 8,495	N/A	US\$ 8,495	
	Tencent Holdings Ltd	-	"	-	US\$ 8,089	N/A	US\$ 8,089	
	Intercontinental Exchange Inc	-	"	-	US\$ 7,850	N/A	US\$ 7,850	
	Celgene Corp	-	"	-	US\$ 7,726	N/A	US\$ 7,726	
	American Express Credit Corp	-	"	-	US\$ 7,718	N/A	US\$ 7,718	
	Huntington National Bank/The	-	"	-	US\$ 7,717	N/A	US\$ 7,717	
	Wells Fargo Bank NA	-	"	-	US\$ 7,621	N/A	US\$ 7,621	
	Siemens Financieringsmaatschappij NV	-	"	-	US\$ 7,517	N/A	US\$ 7,517	
	Cardinal Health Inc	-	"	-	US\$ 7,484	N/A	US\$ 7,484	
	Citizens Bank NA/Providence RI	-	"	-	US\$ 7,469	N/A	US\$ 7,469	
	Cooperative Rabobank U/ANY	-	"	-	US\$ 7,462	N/A	US\$ 7,462	
	QUALCOMM Inc	-	"	-	US\$ 7,432	N/A	US\$ 7,432	
	Reliance Standard Life Global Funding II	-	"	-	US\$ 7,387	N/A	US\$ 7,387	
	UBS Group Funding Switzerland AG	-	"	-	US\$ 7,367	N/A	US\$ 7,367	
	Hewlett Packard Enterprise Co	-	"	-	US\$ 7,327	N/A	US\$ 7,327	
	ANZ New Zealand Int'l Ltd/London	-	"	-	US\$ 7,270	N/A	US\$ 7,270	
	Microsoft Corp	-	"	-	US\$ 7,152	N/A	US\$ 7,152	
	Deutsche Telekom International Finance BV	-	"	-	US\$ 7,110	N/A	US\$ 7,110	
	African Development Bank	-	"	-	US\$ 7,097	N/A	US\$ 7,097	
	Svenska Handelsbanken AB	-	"	-	US\$ 7,081	N/A	US\$ 7,081	
	General Dynamics Corp	-	"	-	US\$ 7,039	N/A	US\$ 7,039	
	Welltower Inc	-	"	-	US\$ 6,995	N/A	US\$ 6,995	
	Banco Santander SA	-	"	-	US\$ 6,907	N/A	US\$ 6,907	
	Bank of New York Mellon Corp/The	-	"	-	US\$ 6,907	N/A	US\$ 6,907	
	Toyota Motor Credit Corp	-	"	-	US\$ 6,902	N/A	US\$ 6,902	
	Mizuho Financial Group Inc	-	"	-	US\$ 6,783	N/A	US\$ 6,783	
	BB&T Corp	-	"	-	US\$ 6,703	N/A	US\$ 6,703	
	Hyundai Capital America	-	"	-	US\$ 6,644	N/A	US\$ 6,644	
	Anheuser-Busch InBev Finance Inc	-	"	-	US\$ 6,637	N/A	US\$ 6,637	
	BP Capital Markets PLC	-	"	-	US\$ 6,589	N/A	US\$ 6,589	
	Southern Co/The	-	"	-	US\$ 6,477	N/A	US\$ 6,477	
	Westpac Banking Corp	-	"	-	US\$ 6,474	N/A	US\$ 6,474	
	Sun Trust Bank/Atlanta GA	-	"	-	US\$ 6,467	N/A	US\$ 6,467	
	Tyson Foods Inc	-	"	-	US\$ 6,213	N/A	US\$ 6,213	
	Dominion Energy Inc	-	"	-	US\$ 6,187	N/A	US\$ 6,187	
	Air Lease Corp	-	"	-	US\$ 6,161	N/A	US\$ 6,161	
	21st Century Fox America Inc	-	"	-	US\$ 6,152	N/A	US\$ 6,152	
	KeyBank NA/Cleveland OH	-	"	-	US\$ 6,049	N/A	US\$ 6,049	
	Fifth Third Bancorp	-	"	-	US\$ 6,045	N/A	US\$ 6,045	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Northrop Grumman Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 6,036	N/A	US\$ 6,036	
	KeyCorp	-	"	-	US\$ 5,806	N/A	US\$ 5,806	
	SMBC Aviation Capital Finance DAC	-	"	-	US\$ 5,806	N/A	US\$ 5,806	
	Santander UK Group Holdings PLC	-	"	-	US\$ 5,782	N/A	US\$ 5,782	
	UBS AG/London	-	"	-	US\$ 5,772	N/A	US\$ 5,772	
	DowDuPont Inc	-	"	-	US\$ 5,757	N/A	US\$ 5,757	
	BPCE SA	-	"	-	US\$ 5,709	N/A	US\$ 5,709	
	AXA Equitable Holdings Inc	-	"	-	US\$ 5,662	N/A	US\$ 5,662	
	Aviation Capital Group LLC	-	"	-	US\$ 5,657	N/A	US\$ 5,657	
	BP Capital Markets America Inc	-	"	-	US\$ 5,616	N/A	US\$ 5,616	
	Reckitt Benckiser Treasury Services PLC	-	"	-	US\$ 5,611	N/A	US\$ 5,611	
	Enterprise Products Operating LLC	-	"	-	US\$ 5,589	N/A	US\$ 5,589	
	Santander UK PLC	-	"	-	US\$ 5,568	N/A	US\$ 5,568	
	Oracle Corp	-	"	-	US\$ 5,521	N/A	US\$ 5,521	
	Penske Truck Leasing Co Lp / PTL Finance Corp	-	"	-	US\$ 5,399	N/A	US\$ 5,399	
	ITC Holdings Corp	-	"	-	US\$ 5,350	N/A	US\$ 5,350	
	Capital One N/A	-	"	-	US\$ 5,305	N/A	US\$ 5,305	
	Western Union Co/The	-	"	-	US\$ 5,218	N/A	US\$ 5,218	
	International Bank for Reconstruction & Development	-	"	-	US\$ 5,186	N/A	US\$ 5,186	
	Sompo International Holdings Ltd	-	"	-	US\$ 5,092	N/A	US\$ 5,092	
	Jackson National Life Global Funding	-	"	-	US\$ 5,069	N/A	US\$ 5,069	
	Manufacturers & Traders Trust Co	-	"	-	US\$ 5,049	N/A	US\$ 5,049	
	Sun Trust Banks Inc	-	"	-	US\$ 5,044	N/A	US\$ 5,044	
	Toronto-Dominion Bank/The	-	"	-	US\$ 5,000	N/A	US\$ 5,000	
	UBS AG/Stamford CT	-	"	-	US\$ 4,972	N/A	US\$ 4,972	
	Cigna Holding Co	-	"	-	US\$ 4,917	N/A	US\$ 4,917	
	Marriott International Inc/MD	-	"	-	US\$ 4,799	N/A	US\$ 4,799	
	Cox Communications Inc	-	"	-	US\$ 4,791	N/A	US\$ 4,791	
	Ryder System Inc	-	"	-	US\$ 4,778	N/A	US\$ 4,778	
	NextEra Energy Capital Holdings Inc	-	"	-	US\$ 4,706	N/A	US\$ 4,706	
	US Bank NA/Cincinnati OH	-	"	-	US\$ 4,644	N/A	US\$ 4,644	
	Five Corners Funding Trust	-	"	-	US\$ 4,624	N/A	US\$ 4,624	
	Credit Suisse Group Funding Guernsey Ltd	-	"	-	US\$ 4,564	N/A	US\$ 4,564	
	American Express Co	-	"	-	US\$ 4,547	N/A	US\$ 4,547	
	BNP Paribas SA	-	"	-	US\$ 4,530	N/A	US\$ 4,530	
	Angen Inc	-	"	-	US\$ 4,526	N/A	US\$ 4,526	
	AEP Texas Inc	-	"	-	US\$ 4,502	N/A	US\$ 4,502	
	New York Life Global Funding	-	"	-	US\$ 4,448	N/A	US\$ 4,448	
	Barclays PLC	-	"	-	US\$ 4,216	N/A	US\$ 4,216	
	Credit Agricole SA/London	-	"	-	US\$ 4,118	N/A	US\$ 4,118	
	Vodafone Group PLC	-	"	-	US\$ 4,040	N/A	US\$ 4,040	
	Fifth Third Bank/Cincinnati OH	-	"	-	US\$ 4,031	N/A	US\$ 4,031	
	Banque Federative du Credit Mutuel SA	-	"	-	US\$ 4,028	N/A	US\$ 4,028	
	Exelon Generation Co LLC	-	"	-	US\$ 3,969	N/A	US\$ 3,969	
	European Investment Bank	-	"	-	US\$ 3,903	N/A	US\$ 3,903	
	Bank of Nova Scotia/The	-	"	-	US\$ 3,862	N/A	US\$ 3,862	
	Air Liquide Finance SA	-	"	-	US\$ 3,827	N/A	US\$ 3,827	
	Edison International	-	"	-	US\$ 3,762	N/A	US\$ 3,762	
	Alimentation Couche-Tard Inc	-	"	-	US\$ 3,656	N/A	US\$ 3,656	
	Macquarie Bank Ltd	-	"	-	US\$ 3,643	N/A	US\$ 3,643	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Bayer US Finance II LLC	-	Financial assets at fair value through other comprehensive income	-	US\$ 3,638	N/A	US\$ 3,638	
	Barelays Bank PLC	-	"	-	US\$ 3,621	N/A	US\$ 3,621	
	Asian Development Bank	-	"	-	US\$ 3,594	N/A	US\$ 3,594	
	Canadian Imperial Bank of Commerce	-	"	-	US\$ 3,586	N/A	US\$ 3,586	
	Branch Banking & Trust Co	-	"	-	US\$ 3,489	N/A	US\$ 3,489	
	Royal Bank of Canada	-	"	-	US\$ 3,484	N/A	US\$ 3,484	
	Keurig Dr Pepper Inc	-	"	-	US\$ 3,480	N/A	US\$ 3,480	
	Capital One Financial Corp	-	"	-	US\$ 3,426	N/A	US\$ 3,426	
	BMW US Capital LLC	-	"	-	US\$ 3,406	N/A	US\$ 3,406	
	Enel Finance International NV	-	"	-	US\$ 3,385	N/A	US\$ 3,385	
	Mondelez International Holdings Netherlands BV	-	"	-	US\$ 3,382	N/A	US\$ 3,382	
	LyondellBasell Industries NV	-	"	-	US\$ 3,366	N/A	US\$ 3,366	
	Lloyds Banking Group PLC	-	"	-	US\$ 3,222	N/A	US\$ 3,222	
	Inter-American Development Bank	-	"	-	US\$ 3,118	N/A	US\$ 3,118	
	Digital Realty Trust LP	-	"	-	US\$ 3,102	N/A	US\$ 3,102	
	Bank of Montreal	-	"	-	US\$ 3,086	N/A	US\$ 3,086	
	Walgreens Boots Alliance Inc	-	"	-	US\$ 3,075	N/A	US\$ 3,075	
	Skandinaviska Enskilda Banken AB	-	"	-	US\$ 3,058	N/A	US\$ 3,058	
	Schlumberger Holdings Corp	-	"	-	US\$ 3,019	N/A	US\$ 3,019	
	State Street Corp	-	"	-	US\$ 3,007	N/A	US\$ 3,007	
	Eversource Energy	-	"	-	US\$ 2,915	N/A	US\$ 2,915	
	Anthem Inc	-	"	-	US\$ 2,843	N/A	US\$ 2,843	
	Charles Schwab Corp/The	-	"	-	US\$ 2,793	N/A	US\$ 2,793	
	National Australia Bank Ltd/New York	-	"	-	US\$ 2,741	N/A	US\$ 2,741	
	Express Scripts Holding Co	-	"	-	US\$ 2,727	N/A	US\$ 2,727	
	Shell International Finance BV	-	"	-	US\$ 2,718	N/A	US\$ 2,718	
	ING Groep NV	-	"	-	US\$ 2,664	N/A	US\$ 2,664	
	Nestle Holdings Inc	-	"	-	US\$ 2,611	N/A	US\$ 2,611	
	McCormick & Co Inc/MD	-	"	-	US\$ 2,595	N/A	US\$ 2,595	
	PartnerRe Finance B LLC	-	"	-	US\$ 2,568	N/A	US\$ 2,568	
	Sprint Spectrum Co LLC / Sprint Spectrum Co II LLC / Sprint Spectrum Co III LLC	-	"	-	US\$ 2,502	N/A	US\$ 2,502	
	Berkshire Hathaway Energy Co	-	"	-	US\$ 2,501	N/A	US\$ 2,501	
	WR Berkley Corp	-	"	-	US\$ 2,484	N/A	US\$ 2,484	
	Delta Air Lines 2007-1 Class A Pass Through Trust	-	"	-	US\$ 2,483	N/A	US\$ 2,483	
	Lam Research Corp	-	"	-	US\$ 2,482	N/A	US\$ 2,482	
	Ventas Realty LP / Ventas Capital Corp	-	"	-	US\$ 2,416	N/A	US\$ 2,416	
	NiSource Inc	-	"	-	US\$ 2,377	N/A	US\$ 2,377	
	DXC Technology Co	-	"	-	US\$ 2,345	N/A	US\$ 2,345	
	El du Pont de Nemours & Co	-	"	-	US\$ 2,326	N/A	US\$ 2,326	
	Xylem Inc/NY	-	"	-	US\$ 2,319	N/A	US\$ 2,319	
	MUFG Bank Ltd	-	"	-	US\$ 2,296	N/A	US\$ 2,296	
	NBCUniversal Media LLC	-	"	-	US\$ 2,252	N/A	US\$ 2,252	
	Lloyds Bank PLC	-	"	-	US\$ 2,219	N/A	US\$ 2,219	
	Cintas Corp No 2	-	"	-	US\$ 2,165	N/A	US\$ 2,165	
	Sumitomo Mitsui Banking Corp	-	"	-	US\$ 2,164	N/A	US\$ 2,164	
	Gilead Sciences Inc	-	"	-	US\$ 2,101	N/A	US\$ 2,101	
	ProAssurance Corp	-	"	-	US\$ 2,094	N/A	US\$ 2,094	
	HCP Inc	-	"	-	US\$ 2,039	N/A	US\$ 2,039	
	Volkswagen Group of America Finance LLC	-	"	-	US\$ 2,024	N/A	US\$ 2,024	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	EOG Resources Inc	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,003	N/A	US\$ 2,003	
	Roche Holdings Inc	-	"	-	US\$ 1,999	N/A	US\$ 1,999	
	British Telecommunications PLC	-	"	-	US\$ 1,997	N/A	US\$ 1,997	
	Aetna Inc	-	"	-	US\$ 1,997	N/A	US\$ 1,997	
	Realty Income Corp	-	"	-	US\$ 1,959	N/A	US\$ 1,959	
	Caterpillar Financial Services Corp	-	"	-	US\$ 1,938	N/A	US\$ 1,938	
	American Airlines 2013-2 Class A Pass Through Trust	-	"	-	US\$ 1,925	N/A	US\$ 1,925	
	Huntington Bancshares Inc/OH	-	"	-	US\$ 1,912	N/A	US\$ 1,912	
	Duke Realty LP	-	"	-	US\$ 1,895	N/A	US\$ 1,895	
	Dow Chemical Co/The	-	"	-	US\$ 1,881	N/A	US\$ 1,881	
	Societe Generale SA	-	"	-	US\$ 1,819	N/A	US\$ 1,819	
	General Mills Inc	-	"	-	US\$ 1,818	N/A	US\$ 1,818	
	Simon Property Group LP	-	"	-	US\$ 1,781	N/A	US\$ 1,781	
	Visa Inc	-	"	-	US\$ 1,755	N/A	US\$ 1,755	
	UnitedHealth Group Inc	-	"	-	US\$ 1,752	N/A	US\$ 1,752	
	WestRock RKT Co	-	"	-	US\$ 1,746	N/A	US\$ 1,746	
	Brambles USA Inc	-	"	-	US\$ 1,740	N/A	US\$ 1,740	
	PSEG Power LLC	-	"	-	US\$ 1,730	N/A	US\$ 1,730	
	Dominion Energy Gas Holdings LLC	-	"	-	US\$ 1,726	N/A	US\$ 1,726	
	McKesson Corp	-	"	-	US\$ 1,707	N/A	US\$ 1,707	
	Danske Bank A/S	-	"	-	US\$ 1,687	N/A	US\$ 1,687	
	Standard Chartered PLC	-	"	-	US\$ 1,680	N/A	US\$ 1,680	
	Wisconsin Public Service Corp	-	"	-	US\$ 1,678	N/A	US\$ 1,678	
	Regions Financial Corp	-	"	-	US\$ 1,658	N/A	US\$ 1,658	
	Amazon.com Inc	-	"	-	US\$ 1,581	N/A	US\$ 1,581	
	Principal Life Global Funding II	-	"	-	US\$ 1,564	N/A	US\$ 1,564	
	Husky Energy Inc	-	"	-	US\$ 1,557	N/A	US\$ 1,557	
	General Electric Co	-	"	-	US\$ 1,552	N/A	US\$ 1,552	
	American Electric Power Co Inc	-	"	-	US\$ 1,546	N/A	US\$ 1,546	
	Weyerhaeuser Co	-	"	-	US\$ 1,537	N/A	US\$ 1,537	
	Lincoln National Corp	-	"	-	US\$ 1,536	N/A	US\$ 1,536	
	AIG Global Funding	-	"	-	US\$ 1,491	N/A	US\$ 1,491	
	Harley-Davidson Financial Services Inc	-	"	-	US\$ 1,490	N/A	US\$ 1,490	
	Compass Bank	-	"	-	US\$ 1,483	N/A	US\$ 1,483	
	O'Reilly Automotive Inc	-	"	-	US\$ 1,470	N/A	US\$ 1,470	
	John Deere Capital Corp	-	"	-	US\$ 1,470	N/A	US\$ 1,470	
	Nissan Motor Acceptance Corp	-	"	-	US\$ 1,466	N/A	US\$ 1,466	
	Guardian Life Global Funding	-	"	-	US\$ 1,459	N/A	US\$ 1,459	
	Public Service Electric & Gas Co	-	"	-	US\$ 1,457	N/A	US\$ 1,457	
	Fiserv Inc	-	"	-	US\$ 1,455	N/A	US\$ 1,455	
	Oesterreichische Kontrollbank AG	-	"	-	US\$ 1,441	N/A	US\$ 1,441	
	TransCanada PipeLines Ltd	-	"	-	US\$ 1,436	N/A	US\$ 1,436	
	HSBC Bank PLC	-	"	-	US\$ 1,434	N/A	US\$ 1,434	
	Eastman Chemical Co	-	"	-	US\$ 1,433	N/A	US\$ 1,433	
	CBS Corp	-	"	-	US\$ 1,420	N/A	US\$ 1,420	
	Takeda Pharmaceutical Co Ltd	-	"	-	US\$ 1,412	N/A	US\$ 1,412	
	IBM Credit LLC	-	"	-	US\$ 1,407	N/A	US\$ 1,407	
	Monongahela Power Co	-	"	-	US\$ 1,387	N/A	US\$ 1,387	
	Choe Global Markets Inc	-	"	-	US\$ 1,368	N/A	US\$ 1,368	
	Texas Eastern Transmission LP	-	"	-	US\$ 1,363	N/A	US\$ 1,363	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	Georgia-Pacific LLC	-	Financial assets at fair value through other comprehensive income	-	US\$ 1,346	N/A	US\$ 1,346
	Kreditanstalt fuer Wiederaufbau	-	"	-	US\$ 1,331	N/A	US\$ 1,331
	Rockwell Collins Inc	-	"	-	US\$ 1,321	N/A	US\$ 1,321
	GATX Corp	-	"	-	US\$ 1,265	N/A	US\$ 1,265
	Energy Arkansas LLC	-	"	-	US\$ 1,262	N/A	US\$ 1,262
	CNA Financial Corp	-	"	-	US\$ 1,249	N/A	US\$ 1,249
	Energy Corp	-	"	-	US\$ 1,226	N/A	US\$ 1,226
	CenterPoint Energy Inc	-	"	-	US\$ 1,224	N/A	US\$ 1,224
	Consolidated Edison Inc	-	"	-	US\$ 1,203	N/A	US\$ 1,203
	Glencore Funding LLC	-	"	-	US\$ 1,190	N/A	US\$ 1,190
	GlaxoSmithKline Capital PLC	-	"	-	US\$ 1,182	N/A	US\$ 1,182
	Regions Bank/Birmingham AL	-	"	-	US\$ 1,157	N/A	US\$ 1,157
	Magellan Midstream Partners LP	-	"	-	US\$ 1,149	N/A	US\$ 1,149
	Woolworths Group Ltd	-	"	-	US\$ 1,099	N/A	US\$ 1,099
	Commonwealth Bank of Australia/New York NY	-	"	-	US\$ 1,094	N/A	US\$ 1,094
	Interpublic Group of Cos Inc/The	-	"	-	US\$ 1,086	N/A	US\$ 1,086
	Swedbank AB	-	"	-	US\$ 1,061	N/A	US\$ 1,061
	Reinsurance Group of America Inc	-	"	-	US\$ 1,037	N/A	US\$ 1,037
	Quest Diagnostics Inc	-	"	-	US\$ 1,026	N/A	US\$ 1,026
	Prudential Financial Inc	-	"	-	US\$ 1,026	N/A	US\$ 1,026
	Glencore Finance Canada Ltd	-	"	-	US\$ 1,022	N/A	US\$ 1,022
	Athene Global Funding	-	"	-	US\$ 1,020	N/A	US\$ 1,020
	Commonwealth Edison Co	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	DNB Bank ASA	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	Scentre Group Trust 1 / Scentre Group Trust 2	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	Mitsubishi UFJ Trust & Banking Corp	-	"	-	US\$ 1,013	N/A	US\$ 1,013
	DTE Energy Co	-	"	-	US\$ 1,010	N/A	US\$ 1,010
	Union Pacific Corp	-	"	-	US\$ 1,008	N/A	US\$ 1,008
	Commonwealth Bank of Australia	-	"	-	US\$ 1,003	N/A	US\$ 1,003
	Philip Morris International Inc	-	"	-	US\$ 1,001	N/A	US\$ 1,001
	Equinor ASA	-	"	-	US\$ 995	N/A	US\$ 995
	Southern California Edison Co	-	"	-	US\$ 994	N/A	US\$ 994
	Laboratory Corp of America Holdings	-	"	-	US\$ 993	N/A	US\$ 993
	Biogen Inc	-	"	-	US\$ 992	N/A	US\$ 992
	Halliburton Co	-	"	-	US\$ 989	N/A	US\$ 989
	Sysco Corp	-	"	-	US\$ 988	N/A	US\$ 988
	Unum Group	-	"	-	US\$ 987	N/A	US\$ 987
	Orange SA	-	"	-	US\$ 986	N/A	US\$ 986
	BOC Aviation Ltd	-	"	-	US\$ 985	N/A	US\$ 985
	Priscoa Global Funding I	-	"	-	US\$ 985	N/A	US\$ 985
	Energy Texas Inc	-	"	-	US\$ 982	N/A	US\$ 982
	Protective Life Global Funding	-	"	-	US\$ 979	N/A	US\$ 979
	Moody's Corp	-	"	-	US\$ 978	N/A	US\$ 978
	Holcim US Finance Sarl & Cie SCS	-	"	-	US\$ 973	N/A	US\$ 973
	Healthcare Trust of America Holdings LP	-	"	-	US\$ 970	N/A	US\$ 970
	State Grid Overseas Investment 2016 Ltd	-	"	-	US\$ 968	N/A	US\$ 968
	Loews Corp	-	"	-	US\$ 965	N/A	US\$ 965
	Citibank NA	-	"	-	US\$ 954	N/A	US\$ 954
	Bunge Ltd Finance Corp	-	"	-	US\$ 953	N/A	US\$ 953
	Anheuser-Busch InBev Worldwide Inc	-	"	-	US\$ 921	N/A	US\$ 921

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Coca-Cola Femsa SAB de CV	-	Financial assets at fair value through other comprehensive income	-	US\$ 892	N/A	US\$ 892	
	Lockheed Martin Corp	-	"	-	US\$ 889	N/A	US\$ 889	
	CNOOC Finance 2011 Ltd	-	"	-	US\$ 860	N/A	US\$ 860	
	CA Inc	-	"	-	US\$ 857	N/A	US\$ 857	
	Marsh & McLennan Cos Inc	-	"	-	US\$ 853	N/A	US\$ 853	
	Viterra Inc	-	"	-	US\$ 850	N/A	US\$ 850	
	Baker Hughes a GE Co LLC / Baker Hughes Co-Obligor Inc	-	"	-	US\$ 823	N/A	US\$ 823	
	Intesa Sanpaolo SpA	-	"	-	US\$ 804	N/A	US\$ 804	
	Aon PLC	-	"	-	US\$ 800	N/A	US\$ 800	
	Alterra Finance LLC	-	"	-	US\$ 787	N/A	US\$ 787	
	ONEOK Partners LP	-	"	-	US\$ 783	N/A	US\$ 783	
	Activision Blizzard Inc	-	"	-	US\$ 774	N/A	US\$ 774	
	Suncorp-Metway Ltd	-	"	-	US\$ 774	N/A	US\$ 774	
	AXIS Specialty Finance LLC	-	"	-	US\$ 771	N/A	US\$ 771	
	Sinopec Capital 2013 Ltd	-	"	-	US\$ 771	N/A	US\$ 771	
	Nomura Holdings Inc	-	"	-	US\$ 769	N/A	US\$ 769	
	Manulife Financial Corp	-	"	-	US\$ 769	N/A	US\$ 769	
	Incitec Pivot Finance LLC	-	"	-	US\$ 767	N/A	US\$ 767	
	Warner Media LLC	-	"	-	US\$ 758	N/A	US\$ 758	
	AutoZone Inc	-	"	-	US\$ 753	N/A	US\$ 753	
	Baidu Inc	-	"	-	US\$ 745	N/A	US\$ 745	
	Walmart Inc	-	"	-	US\$ 744	N/A	US\$ 744	
	Metropolitan Life Global Funding I	-	"	-	US\$ 738	N/A	US\$ 738	
	Pinnacle West Capital Corp	-	"	-	US\$ 734	N/A	US\$ 734	
	WEC Energy Group Inc	-	"	-	US\$ 733	N/A	US\$ 733	
	Phillips 66	-	"	-	US\$ 701	N/A	US\$ 701	
	Thermo Fisher Scientific Inc	-	"	-	US\$ 701	N/A	US\$ 701	
	Australia & New Zealand Banking Group Ltd/New York NY	-	"	-	US\$ 695	N/A	US\$ 695	
	eBay Inc	-	"	-	US\$ 695	N/A	US\$ 695	
	APT Pipelines Ltd	-	"	-	US\$ 695	N/A	US\$ 695	
	Baker Hughes a GE Co LLC	-	"	-	US\$ 691	N/A	US\$ 691	
	Textron Inc	-	"	-	US\$ 685	N/A	US\$ 685	
	Reynolds American Inc	-	"	-	US\$ 670	N/A	US\$ 670	
	Vornado Realty LP	-	"	-	US\$ 669	N/A	US\$ 669	
	Rochester Gas & Electric Corp	-	"	-	US\$ 660	N/A	US\$ 660	
	National Oilwell Varco Inc	-	"	-	US\$ 659	N/A	US\$ 659	
	Norfolk Southern Railway Co	-	"	-	US\$ 656	N/A	US\$ 656	
	Ohio Power Co	-	"	-	US\$ 635	N/A	US\$ 635	
	Toledo Edison Co/The	-	"	-	US\$ 630	N/A	US\$ 630	
	Wm Wrigley Jr Co	-	"	-	US\$ 624	N/A	US\$ 624	
	ERP Operating LP	-	"	-	US\$ 623	N/A	US\$ 623	
	Alexandria Real Estate Equities Inc	-	"	-	US\$ 618	N/A	US\$ 618	
	RBC USA Holdco Corp	-	"	-	US\$ 618	N/A	US\$ 618	
	Citizens Financial Group Inc	-	"	-	US\$ 613	N/A	US\$ 613	
	Grupo Bimbo SAB de CV	-	"	-	US\$ 612	N/A	US\$ 612	
	Liberty Property LP	-	"	-	US\$ 612	N/A	US\$ 612	
	Nutrien Ltd	-	"	-	US\$ 610	N/A	US\$ 610	
	Continental Airlines 2000-1 Class A-1 Pass Through Trust	-	"	-	US\$ 605	N/A	US\$ 605	
	Continental Airlines 2007-1 Class A Pass Through Trust	-	"	-	US\$ 600	N/A	US\$ 600	
	Daiwa Securities Group Inc	-	"	-	US\$ 599	N/A	US\$ 599	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	MUFG Union Bank NA	-	Financial assets at fair value through other comprehensive income	-	US\$ 598	N/A	US\$ 598	
	OneBeacon US Holdings Inc	-	"	-	US\$ 597	N/A	US\$ 597	
	US Bancorp	-	"	-	US\$ 595	N/A	US\$ 595	
	Ontario Teachers' Cadillac Fairview Properties Trust	-	"	-	US\$ 594	N/A	US\$ 594	
	BAT International Finance PLC	-	"	-	US\$ 591	N/A	US\$ 591	
	Kimco Realty Corp	-	"	-	US\$ 589	N/A	US\$ 589	
	Life Technologies Corp	-	"	-	US\$ 585	N/A	US\$ 585	
	AXIS Specialty Finance PLC	-	"	-	US\$ 574	N/A	US\$ 574	
	Nationwide Financial Services Inc	-	"	-	US\$ 569	N/A	US\$ 569	
	ABC Inc	-	"	-	US\$ 568	N/A	US\$ 568	
	Host Hotels & Resorts LP	-	"	-	US\$ 564	N/A	US\$ 564	
	AvalonBay Communities Inc	-	"	-	US\$ 563	N/A	US\$ 563	
	Duke Energy Progress LLC	-	"	-	US\$ 551	N/A	US\$ 551	
	Church & Dwight Co Inc	-	"	-	US\$ 525	N/A	US\$ 525	
	Sempra Energy	-	"	-	US\$ 518	N/A	US\$ 518	
	Fulton Financial Corp	-	"	-	US\$ 510	N/A	US\$ 510	
	ASB Bank Ltd	-	"	-	US\$ 501	N/A	US\$ 501	
	Regency Centers Corp	-	"	-	US\$ 498	N/A	US\$ 498	
	TD Ameritrade Holding Corp	-	"	-	US\$ 497	N/A	US\$ 497	
	Sumitomo Mitsui Trust Bank Ltd	-	"	-	US\$ 496	N/A	US\$ 496	
	Highwoods Realty LP	-	"	-	US\$ 493	N/A	US\$ 493	
	ORIX Corp	-	"	-	US\$ 490	N/A	US\$ 490	
	International Paper Co	-	"	-	US\$ 478	N/A	US\$ 478	
	MassMutual Global Funding II	-	"	-	US\$ 477	N/A	US\$ 477	
	Diageo Capital PLC	-	"	-	US\$ 475	N/A	US\$ 475	
	Comerica Inc	-	"	-	US\$ 472	N/A	US\$ 472	
	Ent SpA	-	"	-	US\$ 459	N/A	US\$ 459	
	Spire Inc	-	"	-	US\$ 456	N/A	US\$ 456	
	Narragansett Electric Co/The	-	"	-	US\$ 454	N/A	US\$ 454	
	United Overseas Bank Ltd	-	"	-	US\$ 453	N/A	US\$ 453	
	Duke Energy Carolinas LLC	-	"	-	US\$ 451	N/A	US\$ 451	
	Eaton Corp	-	"	-	US\$ 449	N/A	US\$ 449	
	Public Service Enterprise Group Inc	-	"	-	US\$ 446	N/A	US\$ 446	
	Total Capital International SA	-	"	-	US\$ 429	N/A	US\$ 429	
	Burlington Northern Santa Fe LLC	-	"	-	US\$ 424	N/A	US\$ 424	
	Columbia Pipeline Group Inc	-	"	-	US\$ 412	N/A	US\$ 412	
	Canadian Pacific Railway Co	-	"	-	US\$ 412	N/A	US\$ 412	
	Marathon Petroleum Corp	-	"	-	US\$ 412	N/A	US\$ 412	
	Valero Energy Corp	-	"	-	US\$ 412	N/A	US\$ 412	
	Texas-New Mexico Power Co	-	"	-	US\$ 406	N/A	US\$ 406	
	Eaton Electric Holdings LLC	-	"	-	US\$ 403	N/A	US\$ 403	
	Markel Corp	-	"	-	US\$ 400	N/A	US\$ 400	
	Tanger Properties LP	-	"	-	US\$ 393	N/A	US\$ 393	
	Southern Power Co	-	"	-	US\$ 388	N/A	US\$ 388	
	Continental Airlines 2012-1 Class A Pass Through Trust	-	"	-	US\$ 385	N/A	US\$ 385	
	StanCorp Financial Group Inc	-	"	-	US\$ 379	N/A	US\$ 379	
	Aon Corp	-	"	-	US\$ 377	N/A	US\$ 377	
	First Niagara Financial Group Inc	-	"	-	US\$ 364	N/A	US\$ 364	
	CenterPoint Energy Resources Corp	-	"	-	US\$ 355	N/A	US\$ 355	
	American Honda Finance Corp	-	"	-	US\$ 354	N/A	US\$ 354	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Deutsche Bank AG	-	Financial assets at fair value through other comprehensive income	-	US\$ 348	N/A	US\$ 348	
	Cooperative Rabobank UA	-	"	-	US\$ 340	N/A	US\$ 340	
	Schlumberger Finance Canada Ltd	-	"	-	US\$ 293	N/A	US\$ 293	
	Elit Lilly & Co	-	"	-	US\$ 289	N/A	US\$ 289	
	Amphenol Corp	-	"	-	US\$ 286	N/A	US\$ 286	
	BAE Systems Holdings Inc	-	"	-	US\$ 282	N/A	US\$ 282	
	Home Depot Inc/The	-	"	-	US\$ 277	N/A	US\$ 277	
	EMD Finance LLC	-	"	-	US\$ 277	N/A	US\$ 277	
	Archer-Daniels-Midland Co	-	"	-	US\$ 250	N/A	US\$ 250	
	Hartford Financial Services Group Inc/The	-	"	-	US\$ 228	N/A	US\$ 228	
	Rolls-Royce PLC	-	"	-	US\$ 221	N/A	US\$ 221	
	Protective Life Corp	-	"	-	US\$ 216	N/A	US\$ 216	
	WestRock MWV LLC	-	"	-	US\$ 210	N/A	US\$ 210	
	ING Bank NV	-	"	-	US\$ 207	N/A	US\$ 207	
	Fidelity National Information Services Inc	-	"	-	US\$ 202	N/A	US\$ 202	
	Equifax Inc	-	"	-	US\$ 174	N/A	US\$ 174	
	Packaging Corp of America	-	"	-	US\$ 157	N/A	US\$ 157	
	Schneider Electric SE	-	"	-	US\$ 157	N/A	US\$ 157	
	Wells Fargo & Co	-	Financial assets at amortized cost	-	US\$ 149,941	N/A	US\$ 150,065	
	JPMorgan Chase & Co.	-	"	-	US\$ 124,948	N/A	US\$ 125,726	
	Westpac Banking Corp.	-	"	-	US\$ 99,987	N/A	US\$ 100,111	
	Goldman Sachs Group, Inc.	-	"	-	US\$ 99,900	N/A	US\$ 100,103	
	Commonwealth Bank of Australia	-	"	-	US\$ 49,994	N/A	US\$ 50,037	
	National Australia Bank	-	"	-	US\$ 49,994	N/A	US\$ 50,010	
	Bank of Nova Scotia	-	"	-	US\$ 49,976	N/A	US\$ 50,077	
	Industrial and Commercial Bank of China	-	"	-	US\$ 9,996	N/A	US\$ 10,000	
	Government bond	-	Financial assets at fair value through other comprehensive income	-	US\$ 287,628	N/A	US\$ 287,628	
	United States Treasury Note/Bond	-	"	-	US\$ 68,164	N/A	US\$ 68,164	
	United States Treasury Floating Rate Note	-	"	-	US\$ 3,408	N/A	US\$ 3,408	
	Abu Dhabi Government International Bond	-	"	-	US\$ 2,248	N/A	US\$ 2,248	
	United States Treasury Bill	-	"	-	US\$ 1,315	N/A	US\$ 1,315	
	Qatar Government International Bond	-	"	-	US\$ 47,996	N/A	US\$ 47,996	
	Agency bonds/Agency mortgage-backed securities	-	Financial assets at fair value through Profit or Loss	-	US\$ 33,767	N/A	US\$ 33,767	
	Freddie Mac REMICS	-	"	-	US\$ 24,518	N/A	US\$ 24,518	
	Fannie Mae REMICS	-	"	-	US\$ 1,859	N/A	US\$ 1,859	
	Government National Mortgage Association	-	"	-	US\$ 1,713	N/A	US\$ 1,713	
	Fannie Mae Interest Strip	-	"	-	US\$ 1,380	N/A	US\$ 1,380	
	Freddie Mac Multifamily Structured Pass Through Certificates	-	"	-	US\$ 398,735	N/A	US\$ 398,735	
	Freddie Mac Strips	-	Financial assets at fair value through other comprehensive income	-	US\$ 133,948	N/A	US\$ 133,948	
	Fannie Mae Pool	-	"	-	US\$ 131,341	N/A	US\$ 131,341	
	Freddie Mac Gold Pool	-	"	-	US\$ 128,236	N/A	US\$ 128,236	
	Fannie Mae REMICS	-	"	-	US\$ 112,050	N/A	US\$ 112,050	
	Government National Mortgage Association	-	"	-	US\$ 51,015	N/A	US\$ 51,015	
	Freddie Mac REMICS	-	"	-	US\$ 27,141	N/A	US\$ 27,141	
	Ginnie Mae II Pool	-	"	-				
	Fannie Mae	-	"	-				

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Ginnie Mae	-	Financial assets at fair value through other comprehensive income	-	US\$ 16,081	N/A	US\$ 16,081	
	Fannie Mae-Aces	-	"	-	US\$ 5,796	N/A	US\$ 5,796	
	Freddie Mac Non Gold Pool	-	"	-	US\$ 2,684	N/A	US\$ 2,684	
	Freddie Mac Multifamily Structured Pass Through Certificates	-	"	-	US\$ 2,554	N/A	US\$ 2,554	
	Province of Quebec Canada	-	"	-	US\$ 2,514	N/A	US\$ 2,514	
	FHLMC-GNMA	-	"	-	US\$ 1,486	N/A	US\$ 1,486	
	Federal Farm Credit Banks	-	"	-	US\$ 891	N/A	US\$ 891	
	NCUA Guaranteed Notes Trust 2010-R2	-	"	-	US\$ 842	N/A	US\$ 842	
	Ginnie Mae I Pool	-	"	-	US\$ 632	N/A	US\$ 632	
	Kowloon-Canton Railway Corp	-	"	-	US\$ 554	N/A	US\$ 554	
	Federal Home Loan Mortgage Corp	-	"	-	US\$ 500	N/A	US\$ 500	
	Federal National Mortgage Association	-	"	-	US\$ 370	N/A	US\$ 370	
	NCUA Guaranteed Notes Trust 2010-R1	-	"	-	US\$ 335	N/A	US\$ 335	
	Fannie Mae Benchmark REMIC	-	"	-	US\$ 132	N/A	US\$ 132	
	Freddie Mac	-	"	-	US\$ 15	N/A	US\$ 15	
	Asset-backed securities							
	Citibank Credit Card Issuance Trust	-	Financial assets at fair value through other comprehensive income	-	US\$ 68,487	N/A	US\$ 68,487	
	Chase Issuance Trust	-	"	-	US\$ 43,604	N/A	US\$ 43,604	
	American Express Credit Account Master Trust	-	"	-	US\$ 42,144	N/A	US\$ 42,144	
	Discover Card Execution Note Trust	-	"	-	US\$ 37,495	N/A	US\$ 37,495	
	Ford Credit Floorman Master Owner Trust A	-	"	-	US\$ 26,702	N/A	US\$ 26,702	
	Hyundai Auto Receivables Trust 2018-B	-	"	-	US\$ 8,122	N/A	US\$ 8,122	
	BA Credit Card Trust	-	"	-	US\$ 8,092	N/A	US\$ 8,092	
	Nissan Master Owner Trust Receivables	-	"	-	US\$ 7,989	N/A	US\$ 7,989	
	CGDBB Commercial Mortgage Trust 2017-BIOC	-	"	-	US\$ 7,430	N/A	US\$ 7,430	
	Capital One Multi-Asset Execution Trust	-	"	-	US\$ 7,304	N/A	US\$ 7,304	
	BX Commercial Mortgage Trust 2018-IND	-	"	-	US\$ 6,946	N/A	US\$ 6,946	
	UBS-Barclays Commercial Mortgage Trust 2012-C2	-	"	-	US\$ 6,313	N/A	US\$ 6,313	
	Mercedes-Benz Master Owner Trust 2016-B	-	"	-	US\$ 6,012	N/A	US\$ 6,012	
	Ford Credit Auto Owner Trust 2016-REV1	-	"	-	US\$ 5,917	N/A	US\$ 5,917	
	BBCMS 2018-TALL Mortgage Trust	-	"	-	US\$ 5,403	N/A	US\$ 5,403	
	Chesapeake Funding II LLC	-	"	-	US\$ 5,328	N/A	US\$ 5,328	
	Morgan Stanley Bank of America Merrill Lynch Trust 2013-C10	-	"	-	US\$ 4,879	N/A	US\$ 4,879	
	Ford Credit Auto Owner Trust 2015-REV1	-	"	-	US\$ 4,871	N/A	US\$ 4,871	
	Volvo Financial Equipment Master Owner Trust	-	"	-	US\$ 4,510	N/A	US\$ 4,510	
	UBS Commercial Mortgage Trust 2018-C10	-	"	-	US\$ 4,047	N/A	US\$ 4,047	
	JPMCC Commercial Mortgage Securities Trust 2017-JP7	-	"	-	US\$ 3,960	N/A	US\$ 3,960	
	J.P. Morgan Chase Commercial Mortgage Securities Trust 2016-WIK1	-	"	-	US\$ 3,932	N/A	US\$ 3,932	
	BANK 2017-BNK5	-	"	-	US\$ 3,902	N/A	US\$ 3,902	
	BANK 2017-BNK6	-	"	-	US\$ 3,899	N/A	US\$ 3,899	
	Nissan Auto Lease Trust 2016-B	-	"	-	US\$ 3,886	N/A	US\$ 3,886	
	Cold Storage Trust 2017-ICE3	-	"	-	US\$ 3,732	N/A	US\$ 3,732	
	GS Mortgage Securities Corp II	-	"	-	US\$ 3,247	N/A	US\$ 3,247	
	COMM 2015-CCRE25 Mortgage Trust	-	"	-	US\$ 2,998	N/A	US\$ 2,998	
	GS Mortgage Securities Corp Trust 2018-RVR	-	"	-	US\$ 2,989	N/A	US\$ 2,989	
	Honda Auto Receivables 2017-2 Owner Trust	-	"	-	US\$ 2,947	N/A	US\$ 2,947	
	GM Financial Consumer Automobile Receivables Trust 2017-2	-	"	-	US\$ 2,945	N/A	US\$ 2,945	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	BMW Floorplan Master Owner Trust	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,800	N/A	US\$ 2,800
	GS Mortgage Securities Trust 2011-GC3	-	"	-	US\$ 2,750	N/A	US\$ 2,750
	Hertz Fleet Lease Funding LP	-	"	-	US\$ 2,672	N/A	US\$ 2,672
	Morgan Stanley Capital I Trust 2018-H3	-	"	-	US\$ 2,596	N/A	US\$ 2,596
	GS Mortgage Securities Trust 2013-GC112	-	"	-	US\$ 2,576	N/A	US\$ 2,576
	Toyota Auto Receivables 2018-C Owner Trust	-	"	-	US\$ 2,554	N/A	US\$ 2,554
	JPMDB Commercial Mortgage Securities Trust 2016-C2	-	"	-	US\$ 2,512	N/A	US\$ 2,512
	Nissan Auto Lease Trust 2017-A	-	"	-	US\$ 2,386	N/A	US\$ 2,386
	Toyota Auto Receivables 2018-A Owner Trust	-	"	-	US\$ 2,306	N/A	US\$ 2,306
	Hyundai Auto Lease Securitization Trust 2017-B	-	"	-	US\$ 2,252	N/A	US\$ 2,252
	Wells Fargo Commercial Mortgage Trust 2015-LC20	-	"	-	US\$ 2,127	N/A	US\$ 2,127
	UBS Commercial Mortgage Trust 2018-C11	-	"	-	US\$ 2,083	N/A	US\$ 2,083
	COMM 2013-CCRE12 Mortgage Trust	-	"	-	US\$ 2,061	N/A	US\$ 2,061
	Ford Credit Auto Owner Trust 2017-C	-	"	-	US\$ 2,046	N/A	US\$ 2,046
	BENCHMARK 2018-B4	-	"	-	US\$ 2,034	N/A	US\$ 2,034
	JPMBB Commercial Mortgage Securities Trust 2014-C19	-	"	-	US\$ 2,017	N/A	US\$ 2,017
	COMM 2015-CCRE22 Mortgage Trust	-	"	-	US\$ 2,010	N/A	US\$ 2,010
	Wells Fargo Commercial Mortgage Trust 2015-C30	-	"	-	US\$ 2,006	N/A	US\$ 2,006
	UBS-Barclays Commercial Mortgage Trust 2013-C6	-	"	-	US\$ 1,979	N/A	US\$ 1,979
	Toyota Auto Receivables 2016-B Owner Trust	-	"	-	US\$ 1,977	N/A	US\$ 1,977
	Citigroup Commercial Mortgage Trust 2017-P8	-	"	-	US\$ 1,974	N/A	US\$ 1,974
	Toyota Auto Receivables 2017-C Owner Trust	-	"	-	US\$ 1,960	N/A	US\$ 1,960
	Mercedes-Benz Auto Lease Trust 2018-B	-	"	-	US\$ 1,953	N/A	US\$ 1,953
	JPMDB Commercial Mortgage Securities Trust 2017-C7	-	"	-	US\$ 1,944	N/A	US\$ 1,944
	Morgan Stanley Bank of America Merrill Lynch Trust 2016-C31	-	"	-	US\$ 1,940	N/A	US\$ 1,940
	GM Financial Automobile Leasing Trust 2016-3	-	"	-	US\$ 1,931	N/A	US\$ 1,931
	Morgan Stanley Capital I Trust 2016-UB11	-	"	-	US\$ 1,868	N/A	US\$ 1,868
	Ford Credit Auto Lease Trust 2017-B	-	"	-	US\$ 1,863	N/A	US\$ 1,863
	BANK 2018-BNK14	-	"	-	US\$ 1,811	N/A	US\$ 1,811
	BMW Vehicle Lease Trust	-	"	-	US\$ 1,801	N/A	US\$ 1,801
	Ford Credit Auto Lease Trust	-	"	-	US\$ 1,799	N/A	US\$ 1,799
	Wheels SPV 2 LLC	-	"	-	US\$ 1,788	N/A	US\$ 1,788
	Citigroup Commercial Mortgage Trust 2015-GC35	-	"	-	US\$ 1,783	N/A	US\$ 1,783
	Morgan Stanley Bank of America Merrill Lynch Trust 2013-C8	-	"	-	US\$ 1,771	N/A	US\$ 1,771
	BENCHMARK 2018-B6 Mortgage Trust	-	"	-	US\$ 1,766	N/A	US\$ 1,766
	CarMax Auto Owner Trust	-	"	-	US\$ 1,756	N/A	US\$ 1,756
	Nelnet Student Loan Trust 2010-4	-	"	-	US\$ 1,742	N/A	US\$ 1,742
	SLM Student Loan Trust 2005-4	-	"	-	US\$ 1,722	N/A	US\$ 1,722
	UBS-Barclays Commercial Mortgage Trust 2013-C5	-	"	-	US\$ 1,707	N/A	US\$ 1,707
	Hyundai Auto Lease Securitization Trust 2016-C	-	"	-	US\$ 1,670	N/A	US\$ 1,670
	Ford Credit Auto Lease Trust 2017-A	-	"	-	US\$ 1,603	N/A	US\$ 1,603
	Edsouth Indenture No 10 LLC	-	"	-	US\$ 1,598	N/A	US\$ 1,598
	Ford Credit Auto Owner Trust 2015-A	-	"	-	US\$ 1,541	N/A	US\$ 1,541
	Navient Student Loan Trust 2017-1	-	"	-	US\$ 1,540	N/A	US\$ 1,540
	Nelnet Student Loan Trust 2018-3	-	"	-	US\$ 1,538	N/A	US\$ 1,538
	COMM 2015-PC1 Mortgage Trust	-	"	-	US\$ 1,500	N/A	US\$ 1,500
	Ford Credit Auto Lease Trust 2018-A	-	"	-	US\$ 1,497	N/A	US\$ 1,497
	Morgan Stanley Capital I Trust 2017-H1	-	"	-	US\$ 1,481	N/A	US\$ 1,481
	SLM Student Loan Trust 2013-6	-	"	-	US\$ 1,465	N/A	US\$ 1,465
	JPMCC Commercial Mortgage Securities Trust 2017-JP5	-	"	-	US\$ 1,460	N/A	US\$ 1,460

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	ECMC Group Student Loan Trust 2018-2	-	Financial assets at fair value through other comprehensive income	-	US\$ 1,448	N/A	US\$ 1,448
	Nelnet Student Loan Trust 2012-1	-	"	-	US\$ 1,446	N/A	US\$ 1,446
	Pheaa Student Loan Trust 2018-1	-	"	-	US\$ 1,443	N/A	US\$ 1,443
	Toyota Auto Receivables 2018-B Owner Trust	-	"	-	US\$ 1,432	N/A	US\$ 1,432
	Mercedes-Benz Master Owner Trust 2018-BA	-	"	-	US\$ 1,396	N/A	US\$ 1,396
	Ford Credit Auto Owner Trust 2014-REV2	-	"	-	US\$ 1,390	N/A	US\$ 1,390
	Nelnet Student Loan Trust 2006-2	-	"	-	US\$ 1,388	N/A	US\$ 1,388
	COMM 2013-CCRE6 Mortgage Trust	-	"	-	US\$ 1,360	N/A	US\$ 1,360
	GM Financial Automobile Leasing Trust 2017-1	-	"	-	US\$ 1,299	N/A	US\$ 1,299
	COMM 2015-DC1 Mortgage Trust	-	"	-	US\$ 1,253	N/A	US\$ 1,253
	Enterprise Fleet Financing LLC	-	"	-	US\$ 1,251	N/A	US\$ 1,251
	Hyundai Auto Lease Securitization Trust 2018-A	-	"	-	US\$ 1,246	N/A	US\$ 1,246
	JPMBB Commercial Mortgage Securities Trust 2016-C1	-	"	-	US\$ 1,243	N/A	US\$ 1,243
	Morgan Stanley Bank of America Merrill Lynch Trust 2015-C20	-	"	-	US\$ 1,196	N/A	US\$ 1,196
	Hyundai Auto Lease Securitization Trust 2017-C	-	"	-	US\$ 1,049	N/A	US\$ 1,049
	Nissan Auto Receivables 2016-B Owner Trust	-	"	-	US\$ 1,043	N/A	US\$ 1,043
	WFRBS Commercial Mortgage Trust 2011-C4	-	"	-	US\$ 1,036	N/A	US\$ 1,036
	GM Financial Consumer Automobile Receivables Trust 2018-4	-	"	-	US\$ 1,023	N/A	US\$ 1,023
	COMM 2014-CCRE20 Mortgage Trust	-	"	-	US\$ 1,009	N/A	US\$ 1,009
	Nissan Auto Receivables 2017-B Owner Trust	-	"	-	US\$ 1,008	N/A	US\$ 1,008
	Morgan Stanley Bank of America Merrill Lynch Trust 2014 C19	-	"	-	US\$ 1,006	N/A	US\$ 1,006
	Nissan Auto Receivables 2018-B Owner Trust	-	"	-	US\$ 1,004	N/A	US\$ 1,004
	JPMBB Commercial Mortgage Securities Trust 2014-C21	-	"	-	US\$ 1,002	N/A	US\$ 1,002
	Navient Student Loan Trust 2017-3	-	"	-	US\$ 1,000	N/A	US\$ 1,000
	GM Financial Consumer Automobile 2017-1	-	"	-	US\$ 986	N/A	US\$ 986
	Ford Credit Auto Owner Trust 2017-REV1	-	"	-	US\$ 985	N/A	US\$ 985
	Citigroup Commercial Mortgage Trust 2013-GC11	-	"	-	US\$ 969	N/A	US\$ 969
	JPMBB Commercial Mortgage Securities Trust 2015-C31	-	"	-	US\$ 945	N/A	US\$ 945
	Honda Auto Receivables 2018-2 Owner Trust	-	"	-	US\$ 911	N/A	US\$ 911
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-1C9	-	"	-	US\$ 897	N/A	US\$ 897
	CarMax Auto Owner Trust 2018-1	-	"	-	US\$ 873	N/A	US\$ 873
	Morgan Stanley Bank of America Merrill Lynch Trust 2012-C6	-	"	-	US\$ 853	N/A	US\$ 853
	Mercedes-Benz Auto Receivables Trust 2018-1	-	"	-	US\$ 841	N/A	US\$ 841
	280 Park Avenue 2017-280P Mortgage Trust	-	"	-	US\$ 822	N/A	US\$ 822
	SLM Student Loan Trust 2012-3	-	"	-	US\$ 816	N/A	US\$ 816
	Ford Credit Auto Owner Trust 2015-REV2	-	"	-	US\$ 803	N/A	US\$ 803
	Navient Student Loan Trust 2018-1	-	"	-	US\$ 799	N/A	US\$ 799
	Ford Credit Auto Owner Trust/Ford Credit 2014-REV1	-	"	-	US\$ 798	N/A	US\$ 798
	Honda Auto Receivables 2018-3 Owner Trust	-	"	-	US\$ 792	N/A	US\$ 792
	SLM Student Loan Trust 2013-1	-	"	-	US\$ 786	N/A	US\$ 786
	CFCRE Commercial Mortgage Trust 2011-C1	-	"	-	US\$ 776	N/A	US\$ 776
	Mercedes-Benz Auto Lease Trust 2018-A	-	"	-	US\$ 770	N/A	US\$ 770
	GM Financial Automobile Leasing Trust 2018-1	-	"	-	US\$ 753	N/A	US\$ 753
	COMM 2015-LC19 Mortgage Trust	-	"	-	US\$ 716	N/A	US\$ 716
	Toyota Auto Receivables 2018-D Owner Trust	-	"	-	US\$ 706	N/A	US\$ 706
	Ally Auto Receivables Trust 2018-3	-	"	-	US\$ 699	N/A	US\$ 699
	SLM Student Loan Trust 2013-4	-	"	-	US\$ 688	N/A	US\$ 688
	Wells Fargo Commercial Mortgage Trust 2015-C28	-	"	-	US\$ 670	N/A	US\$ 670
	Mercedes-Benz Auto Lease Trust 2016-B	-	"	-	US\$ 649	N/A	US\$ 649

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Ford Credit Auto Owner Trust 2018-A	-	Financial assets at fair value through other comprehensive income	-	US\$ 640	N/A	US\$ 640	
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-C6	-	"	-	US\$ 636	N/A	US\$ 636	
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-WLDN	-	"	-	US\$ 607	N/A	US\$ 607	
	DBGS 2018-BIOD Mortgage Trust	-	"	-	US\$ 585	N/A	US\$ 585	
	Hyundai Auto Receivables Trust 2015-A	-	"	-	US\$ 573	N/A	US\$ 573	
	COMM 2016-SAVA Mortgage Trust	-	"	-	US\$ 571	N/A	US\$ 571	
	DBUBS 2011-LC2 Mortgage Trust	-	"	-	US\$ 555	N/A	US\$ 555	
	ARI Fleet Lease Trust 2018-A	-	"	-	US\$ 514	N/A	US\$ 514	
	GS Mortgage Securities Trust 2014-GC18	-	"	-	US\$ 508	N/A	US\$ 508	
	CD 2016-CD2 Mortgage Trust	-	"	-	US\$ 505	N/A	US\$ 505	
	COMM 2014-CCRE19 Mortgage Trust	-	"	-	US\$ 500	N/A	US\$ 500	
	Ford Credit Auto Owner Trust 2016-A	-	"	-	US\$ 499	N/A	US\$ 499	
	Hyundai Auto Lease Securitization Trust 2017-A	-	"	-	US\$ 485	N/A	US\$ 485	
	WFRBS Commercial Mortgage Trust 2014-C25	-	"	-	US\$ 433	N/A	US\$ 433	
	GM Financial Automobile Leasing Trust 2018-2	-	"	-	US\$ 404	N/A	US\$ 404	
	Morgan Stanley Bank of America Merrill Lynch Trust 2014-C18	-	"	-	US\$ 390	N/A	US\$ 390	
	Honda Auto Receivables 2017-4 Owner Trust	-	"	-	US\$ 377	N/A	US\$ 377	
	Wells Fargo Commercial Mortgage Trust 2016-LC24	-	"	-	US\$ 366	N/A	US\$ 366	
	Morgan Stanley Bank of America Merrill Lynch Trust 2014-C16	-	"	-	US\$ 357	N/A	US\$ 357	
	ARI Fleet Lease Trust 2018-B	-	"	-	US\$ 337	N/A	US\$ 337	
	BMW Vehicle Lease Trust 2018-1	-	"	-	US\$ 331	N/A	US\$ 331	
	JPMBB Commercial Mortgage Securities Trust 2013-C14	-	"	-	US\$ 317	N/A	US\$ 317	
	GM Financial Automobile Leasing Trust 2017-2	-	"	-	US\$ 300	N/A	US\$ 300	
	Wells Fargo Commercial Mortgage Trust 2015-NXS1	-	"	-	US\$ 269	N/A	US\$ 269	
	BMW Vehicle Lease Trust 2016-2	-	"	-	US\$ 264	N/A	US\$ 264	
	Honda Auto Receivables 2016-2 Owner Trust	-	"	-	US\$ 259	N/A	US\$ 259	
	Wells Fargo Commercial Mortgage Trust 2015-SG1	-	"	-	US\$ 248	N/A	US\$ 248	
	Citigroup Commercial Mortgage Trust 2014-GC23	-	"	-	US\$ 214	N/A	US\$ 214	
	BMW Vehicle Lease Trust 2017-2	-	"	-	US\$ 199	N/A	US\$ 199	
	GS Mortgage Securities Trust 2010-C1	-	"	-	US\$ 187	N/A	US\$ 187	
	WFRBS Commercial Mortgage Trust 2011-C5	-	"	-	US\$ 141	N/A	US\$ 141	
	COMM 2014-CCRE15 Mortgage Trust	-	"	-	US\$ 123	N/A	US\$ 123	
	GS Mortgage Securities Trust 2014-GC24	-	"	-	US\$ 96	N/A	US\$ 96	
	GS Mortgage Securities Trust 2010-C2	-	"	-	US\$ 82	N/A	US\$ 82	
	Honda Auto Receivables 2015-4 Owner Trust	-	"	-	US\$ 45	N/A	US\$ 45	
	Commercial paper	-	"	-	US\$ 32	N/A	US\$ 32	
	Royal Bank of Canada/New York NY	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,000	N/A	US\$ 2,000	
	Toronto-Dominion Bank/NY	-	"	-	US\$ 1,500	N/A	US\$ 1,500	
	Non-publicly traded equity investments Primavera Capital Fund II L.P.	-	Financial assets at fair value through other comprehensive income	-	US\$ 70,460	4	US\$ 70,460	
VTAF II	Non-publicly traded equity investments Sentelic	-	Financial assets at fair value through other comprehensive income	1,019	US\$ 2,039	4	US\$ 2,039	
	Aether Systems, Inc.	-	"	1,085	US\$ 353	20	US\$ 353	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
VTAF II	5V Technologies, Inc.	-	Financial assets at fair value through other comprehensive income	364	US\$ 313	2	US\$ 313	
	Publicly traded stocks Aquantia	-	Financial assets at fair value through other comprehensive income	83	US\$ 730	-	US\$ 730	
VTAF III	Non-publicly traded equity investments Liquid LEDs Lighting Corp.	-	Financial assets at fair value through other comprehensive income	1,952	US\$ 800	14	US\$ 800	
	Neoconix, Inc.	-	"	4,147	US\$ 174	-	US\$ 174	
Growth Fund	Non-publicly traded equity investments Innovium, Inc.	-	Financial assets at fair value through other comprehensive income	451	US\$ 2,393	-	US\$ 2,393	
	CNEX Labs, Inc.	-	"	237	US\$ 775	-	US\$ 775	

(Concluded)

TABLE 4

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

MARKETABLE SECURITIES ACQUIRED AND DISPOSED OF AT COSTS OR PRICES OF AT LEAST NT\$300 MILLION OR 20% OF THE PAID-IN CAPITAL

FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Company Name	Marketable Securities Type and Name	Financial Statement Account	Counter-party	Nature of Relationship	Beginning Balance		Acquisition		Disposal		Gain/Loss on Disposal	Ending Balance (Note 1)	
					Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount		Shares/Units (In Thousands)	Amount
TSMC	Commercial paper CPC Corporation, Taiwan	Financial assets at amortized cost	-	-	-	\$ -	50	\$ 498,837	-	\$ -	\$ -	50	\$ 498,837
	Non-publicly traded equity investments TSMC Global	Investments accounted for using equity method (Note 2)	-	Subsidiary	9	309,211,877	2	62,272,080	-	-	-	11	393,577,931
	TSMC Nanjing	"	-	Subsidiary	-	26,493,740	-	2,361,320	-	-	-	-	20,601,413
	Publicly traded stocks Motech	Financial assets at fair value through other comprehensive income	-	-	58,320	1,309,279	-	-	58,320	651,973	(1,179,268)	-	-
	Corporate bond Bank of America Corp	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 40,876	-	US\$ 10,852	-	US\$ 5,990	US\$ 6,027	-	US\$ 44,755
TSMC Global	Citigroup Inc	"	-	-	-	US\$ 29,911	-	US\$ 11,293	-	US\$ 12,000	US\$ 12,128	-	US\$ 28,602
	CVS Health Corp	"	-	-	-	US\$ 10,018	-	US\$ 18,102	-	US\$ 684	US\$ 692	-	US\$ 27,238
	AT&T Inc	"	-	-	-	US\$ 26,867	-	US\$ 9,299	-	US\$ 12,438	US\$ 12,482	-	US\$ 23,123
	Comcast Corp	"	-	-	-	US\$ 1,256	-	US\$ 18,768	-	US\$ 1,210	US\$ 1,212	-	US\$ 18,894
	BAT Capital Corp	"	-	-	-	US\$ 17,024	-	US\$ 13,719	-	US\$ 17,590	US\$ 17,732	-	US\$ 12,594
	United Technologies Corp	"	-	-	-	US\$ 1,761	-	US\$ 10,490	-	US\$ 984	US\$ 1,000	-	US\$ 11,159
	Morgan Stanley	"	-	-	-	US\$ 12,722	-	US\$ 8,573	-	US\$ 12,105	US\$ 12,257	-	US\$ 8,928
	Celgene Corp	"	-	-	-	US\$ 6,181	-	US\$ 10,575	-	US\$ 8,673	US\$ 8,860	-	US\$ 7,726
	Cooperative Rabobank U/A/NY	"	-	-	-	US\$ 1,450	-	US\$ 13,474	-	US\$ 7,326	US\$ 7,453	-	US\$ 7,462
	Asian Development Bank	"	-	-	-	US\$ 11,073	-	US\$ 3,576	-	US\$ 11,075	US\$ 11,075	-	US\$ 3,594
	Inter American	"	-	-	-	US\$ -	-	US\$ 21,168	-	US\$ 21,166	US\$ 21,166	-	US\$ -
	Development Bank JPMorgan Chase & Co.	Financial assets at amortized cost	-	-	-	US\$ 10,013	-	US\$ -	-	US\$ 10,000	US\$ 10,000	-	US\$ -
	Government bond United States Treasury Note/Bond	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 202,689	-	US\$ 483,976	-	US\$ 401,246	US\$ 403,883	-	US\$ 283,314
	United States Treasury Floating Rate Note	"	-	-	-	US\$ 49,901	-	US\$ 124,504	-	US\$ 106,171	US\$ 106,123	-	US\$ 68,164
	United States Treasury Bill	"	-	-	-	US\$ 2,997	-	US\$ 175,861	-	US\$ 176,725	US\$ 176,682	-	US\$ 2,248

(Continued)

Company Name	Marketable Securities Type and Name	Financial Statement Account	Counter-party	Nature of Relationship	Beginning Balance		Acquisition		Disposal		Ending Balance (Note 1)				
					Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount	Carrying Value	Gain/Loss on Disposal	Shares/Units (In Thousands)	Amount	
TSMC Global	Agency bonds/Agency mortgage-backed securities	Financial assets at fair value through other comprehensive income	-	-	-	US\$ -	-	US\$ 35,947	-	US\$ 4,026	US\$ 4,089	US\$	(63)	-	US\$ 31,784
	FNMA Pool BM44681				-	US\$ -	-	US\$ 29,035	-	US\$ 1,249	US\$ 1,361	US\$ (112)	-	US\$ 27,324	
	FNMA Pool BM4495				-	US\$ -	-	US\$ 5,534	-	US\$ 18,653	US\$ 19,922	US\$ (1,269)	-	US\$ 26,046	
	FNMA Pool BM1948				-	US\$ 41,275	-	US\$ 27,059	-	US\$ 1,256	US\$ 1,387	US\$ (131)	-	US\$ 25,515	
	FED HM LN PC Pool G61603				-	US\$ -	-	US\$ 25,688	-	US\$ 492	US\$ 517	US\$ (25)	-	US\$ 25,130	
	FNMA Pool CA2352				-	US\$ -	-	US\$ 186,999	-	US\$ 162,191	US\$ 162,197	US\$ (6)	-	US\$ 24,761	
	FNMA TBA 30 Yr 5				-	US\$ -	-	US\$ 45,987	-	US\$ 24,813	US\$ 24,527	US\$ 286	-	US\$ 21,507	
	FED HM LN PC Pool G61592				-	US\$ -	-	US\$ 19,316	-	US\$ 651	US\$ 704	US\$ (53)	-	US\$ 18,555	
	FED HM LN PC Pool G61654				-	US\$ -	-	US\$ 17,751	-	US\$ 112	US\$ 118	US\$ (6)	-	US\$ 17,490	
	GNMA II Pool MA5468				-	US\$ -	-	US\$ 18,362	-	US\$ 1,279	US\$ 1,325	US\$ (46)	-	US\$ 16,915	
	FNMA Pool BM4493				-	US\$ -	-	US\$ 16,433	-	US\$ 39	US\$ 39	US\$ -	-	US\$ 16,485	
	Government National Mortgage Association				-	US\$ -	-	US\$ 15,372	-	US\$ 244	US\$ 255	US\$ (11)	-	US\$ 15,045	
	FED HM LN PC Pool G61553				-	US\$ -	-	US\$ 15,368	-	US\$ 1,406	US\$ 1,429	US\$ (23)	-	US\$ 13,859	
	FNMA Pool CA2169				-	US\$ -	-	US\$ 26,202	-	US\$ 13,285	US\$ 13,279	US\$ 6	-	US\$ 12,772	
	GNMA II Pool MA5332				-	US\$ -	-	US\$ 61,268	-	US\$ 49,012	US\$ 49,046	US\$ (34)	-	US\$ 12,209	
	GNMA II TBA 30 Yr 5				-	US\$ -	-	US\$ 10,494	-	US\$ -	US\$ -	US\$ -	-	US\$ 10,590	
	Government National Mortgage Association				-	US\$ -	-	US\$ 47,507	-	US\$ 47,743	US\$ 47,773	US\$ (30)	-	US\$ 2,129	
	GNMA II TBA 30 Yr 4				-	US\$ 2,378	-	US\$ 42,360	-	US\$ 40,346	US\$ 40,350	US\$ (4)	-	US\$ 2,020	
	FNMA TBA 15 Yr 3.5				-	US\$ -	-	US\$ 47,680	-	US\$ 46,609	US\$ 46,676	US\$ (67)	-	US\$ 1,157	
	GNMA II TBA 30 Yr 3.5				-	US\$ 145	-	US\$ 24,748	-	US\$ 24,846	US\$ 24,782	US\$ 64	-	US\$ -	
	FED HM LN PC Pool G08799				-	US\$ -	-	US\$ 29,498	-	US\$ 29,500	US\$ 29,499	US\$ 1	-	US\$ -	
	Federal Home Loan Bank Discount Notes				-	US\$ -	-	US\$ -	-	US\$ 11,191	US\$ 11,711	US\$ (520)	-	US\$ -	
	FED HM LN PC Pool G60594				-	US\$ 11,599	-	US\$ -	-	US\$ 83,271	US\$ 86,356	US\$ 212	-	US\$ -	
	FNMA TBA 30 Yr 3.5				-	US\$ 2,866	-	US\$ -	-	US\$ 198,586	US\$ 198,614	US\$ 28	-	US\$ -	
	FNMA TBA 30 Yr 3				-	US\$ -	-	US\$ 65,931	-	US\$ 67,884	US\$ 67,949	US\$ (65)	-	US\$ -	
	FNMA TBA 15 Yr 3				-	US\$ 2,015	-	US\$ 157,210	-	US\$ 172,818	US\$ 173,014	US\$ (196)	-	US\$ -	
	FNMA TBA 30 Yr 4.5				-	US\$ 15,758	-	US\$ -	-	US\$ 10,380	US\$ 10,410	US\$ 30	-	US\$ -	
	FED HM LN PC Pool G08773				-	US\$ -	-	US\$ -	-	US\$ -	US\$ -	US\$ -	-	US\$ -	
TSMC Global	Asset-backed securities	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 48,328	-	US\$ 40,865	-	US\$ 20,343	US\$ 20,346	US\$ (3)	-	US\$ 68,487	
	Citibank Credit Card Issuance Trust				-	US\$ -	-	US\$ 27,720	-	US\$ 23,176	US\$ 23,192	US\$ (16)	-	US\$ 43,604	
	Chase Issuance Trust				-	US\$ 39,211	-	US\$ 16,266	-	US\$ 24,230	US\$ 24,268	US\$ (38)	-	US\$ 37,495	
	Discover Card Execution Note Trust				-	US\$ 45,722	-	US\$ 25,878	-	US\$ 11,239	US\$ 11,233	US\$ 6	-	US\$ 27,285	
	American Express Credit Account Master Trust				-	US\$ 12,805	-	US\$ -	-	US\$ 15,223	US\$ 15,227	US\$ (4)	-	US\$ 7,304	
	Capital One Multi-Asset Execution Trust				-	US\$ 22,544	-	US\$ -	-	US\$ -	US\$ -	US\$ -	-	US\$ -	
	Structure product				-	US\$ 50,000	-	US\$ -	-	US\$ 50,000	US\$ 50,000	US\$ -	-	US\$ -	
Bank of Tokyo-Mitsubishi UFJ	-	US\$ -	-	US\$ -	-	US\$ -	US\$ -	US\$ -	-	US\$ -					
Financial assets at amortized cost	-	US\$ -	-	US\$ -	-	US\$ -	US\$ -	US\$ -	-	US\$ -					

Note 1: The ending balance includes the amortization of premium/discount on bonds investments, share of profits/losses of investees and other related adjustment.

Note 2: To lower the hedging cost, in August 2018, the Board of Directors of TSMC approved to inject US\$2,000,000 thousand of capital into TSMC Global. This project was approved by the Investment Commission, Ministry of Economic Affairs, R.O.C. (MOEA). The prepayment for investment was US\$100,000 thousand as of December 31, 2018.

(Concluded)

TABLE 5

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

ACQUISITION OF INDIVIDUAL REAL ESTATE PROPERTIES AT COSTS OF AT LEAST NT\$300 MILLION OR 20% OF THE PAID-IN CAPITAL FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	March 10, 2017 to January 25, 2018	\$ 303,592	Monthly settlement by the construction progress and acceptance	HSIEH KUN CO., LTD	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 17, 2017 to March 12, 2018	301,341	Monthly settlement by the construction progress and acceptance	Jer Yih Electrical Eng. Co.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 21, 2017 to August 6, 2018	607,800	Monthly settlement by the construction progress and acceptance	TRUSVAL TECHNOLOGY CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 10, 2017 to March 30, 2018	382,672	Monthly settlement by the construction progress and acceptance	M+W High Tech Project Taiwan Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 18, 2017 to June 4, 2018	1,334,403	Monthly settlement by the construction progress and acceptance	CHEN FULL INTERNATIONAL CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 20, 2017 to April 19, 2018	300,874	Monthly settlement by the construction progress and acceptance	Unique Station International Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 21, 2017 to June 12, 2018	1,841,951	Monthly settlement by the construction progress and acceptance	Organo Technology Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 25, 2017 to July 31, 2018	2,559,574	Monthly settlement by the construction progress and acceptance	YANKEY ENGINEERING CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	May 12, 2017 to May 10, 2018	413,901	Monthly settlement by the construction progress and acceptance	HUAN YU TECHNOLOGIES CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	May 25, 2017 to June 21, 2018	\$2,187,982	Monthly settlement by the construction progress and acceptance	MEGA UNION TECHNOLOGY INCORPORATED	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 11, 2017 to July 31, 2018	1,422,454	Monthly settlement by the construction progress and acceptance	TASA Construction Corporation	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 24, 2017 to June 21, 2018	347,431	Monthly settlement by the construction progress and acceptance	MandarTech Interiors Inc.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 28, 2017 to April 19, 2018	348,757	Monthly settlement by the construction progress and acceptance	J.J. PAN AND PARTNERS, ARCHITECTS AND PLANNERS	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 28, 2017 to May 8, 2018	574,621	Monthly settlement by the construction progress and acceptance	Trane Taiwan Distribution Limited	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 8, 2017 to June 28, 2018	337,069	Monthly settlement by the construction progress and acceptance	Lumax International Corp., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 16, 2017 to July 31, 2018	1,012,550	Monthly settlement by the construction progress and acceptance	Air Liquide Far Eastern	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 16, 2017 to July 31, 2018	617,447	Monthly settlement by the construction progress and acceptance	Kao Hsin Engineering Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	September 5, 2017 to June 1, 2018	1,224,738	Monthly settlement by the construction progress and acceptance	Uangyih-Tech Industrial Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	September 14, 2017 to March 22, 2018	784,003	Monthly settlement by the construction progress and acceptance	Siemens Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 9, 2017 to June 20, 2018	1,773,165	Monthly settlement by the construction progress and acceptance	MARKETECH INTERNATIONAL CORP.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	November 10, 2017 to May 24, 2018	\$ 305,783	Monthly settlement by the construction progress and acceptance	DESICCANT TECHNOLOGY CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 13, 2017 to August 13, 2018	948,048	Monthly settlement by the construction progress and acceptance	Chen Yuan International Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 14, 2017 to April 16, 2018	1,724,550	Monthly settlement by the construction progress and acceptance	PAN ASIA Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 5, 2017 to July 31, 2018	7,219,028	Monthly settlement by the construction progress and acceptance	UNITED INTEGRATED SERVICES CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 13, 2017 to July 23, 2018	2,457,695	Monthly settlement by the construction progress and acceptance	Taiwan Puritie Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 14, 2017 to May 23, 2018	305,566	Monthly settlement by the construction progress and acceptance	WHOLETECH SYSTEM HITECH LIMITED	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 26, 2017 to February 13, 2018	525,172	Monthly settlement by the construction progress and acceptance	ABB Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	January 4, 2018 to April 16, 2018	1,744,533	Monthly settlement by the construction progress and acceptance	KEDGE Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	January 5, 2018 to April 16, 2018	315,886	Monthly settlement by the construction progress and acceptance	Shihlin Electric & Engineering Corp. Tainan Branch	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 5, 2018 to July 31, 2018	2,564,709	Monthly settlement by the construction progress and acceptance	L&K ENGINEERING CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 6, 2018 to August 13, 2018	5,387,421	Monthly settlement by the construction progress and acceptance	Fu Tsu Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	February 12, 2018 to April 16, 2018	\$ 378,445	Monthly settlement by the construction progress and acceptance	AMPOWER INTERNATIONAL ENTERPRISE	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 13, 2018 to June 25, 2018	1,415,232	Monthly settlement by the construction progress and acceptance	Cica-Huntek Chemical Technology Taiwan Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 16, 2018 to August 2, 2018	1,068,243	Monthly settlement by the construction progress and acceptance	Chun Yuan Steel Industry Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 16, 2018 to December 18, 2018	3,098,269	Monthly settlement by the construction progress and acceptance	China Steel Structure Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 13, 2018 to April 16, 2018	410,000	Monthly settlement by the construction progress and acceptance	Lead Fu Industrials Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 16, 2018 to December 24, 2018	5,311,851	Monthly settlement by the construction progress and acceptance	DA CIN Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Concluded)

TABLE 6

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

TOTAL PURCHASES FROM OR SALES TO RELATED PARTIES OF AT LEAST NT\$100 MILLION OR 20% OF THE PAID-IN CAPITAL FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Company Name	Related Party	Nature of Relationships	Transaction Details			Abnormal Transaction		Notes/Accounts Payable or Receivable		Note
			Purchases/ Sales	Amount (Foreign Currencies in Thousands)	% to Total	Payment Terms	Unit Price	Ending Balance (Foreign Currencies in Thousands)	% to Total	
TSMC	TSMC North America	Subsidiary	Sales	\$ 650,432,820	60	Net 30 days from invoice date (Note)	-	\$ 86,057,097	70	
	GUC	Associate	Sales	6,705,439	1	Net 30 days from the end of the month of when invoice is issued	-	375,184	-	
	TSMC China	Subsidiary	Purchases	18,089,003	19	Net 30 days from the end of the month of when invoice is issued	-	(1,299,072)	4	
	TSMC Nanjing	Subsidiary	Purchases	7,738,425	8	Net 30 days from the end of the month of when invoice is issued	-	(414,401)	1	
	WaferTech	Indirect subsidiary	Purchases	8,309,250	9	Net 30 days from the end of the month of when invoice is issued	-	(1,092,785)	3	
	VIS	Associate	Purchases	5,142,749	5	Net 30 days from the end of the month of when invoice is issued	-	(357,080)	1	
	SSMC	Associate	Purchases	3,666,645	4	Net 30 days from the end of the month of when invoice is issued	-	(362,564)	1	
TSMC North America	GUC	Associate of TSMC	Sales	1,664,555 (US\$ 55,492)	-	Net 30 days from invoice date	-	106,750 (US\$ 3,473)	-	
VisEra Tech	Xintec	Associate of TSMC	Sales	542,179	20	Net 30 days from the end of the month of when invoice is issued	-	102,478	20	

Note: The tenor is 30 days from TSMC's invoice date or determined by the payment terms granted to its clients by TSMC North America.

TABLE 7

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

**RECEIVABLES FROM RELATED PARTIES AMOUNTING TO AT LEAST NT\$100 MILLION OR 20% OF THE PAID-IN CAPITAL
DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)**

Company Name	Related Party	Nature of Relationships	Ending Balance (Foreign Currencies in Thousands)	Turnover Days (Note 1)	Overdue		Amounts Received in Subsequent Period	Allowance for Bad Debts
					Amount	Action Taken		
TSMC	TSMC North America GUC	Subsidiary Associate	\$ 87,092,562 375,184	50 31	\$ 2,828,842 182,416	-	\$ 39,357,357 182,416	\$ -
TSMC China	TSMC Nanjing TSMC	The same parent company Parent company	30,986,047 (RMB 6,920,699) 1,299,072 (RMB 290,149)	Note 2 27	-	-	-	-
WaferTech	TSMC	The ultimate parent of the Company	1,092,785 (USD 35,549)	53	661,841 (USD 21,530)	-	661,841 (USD 21,530)	-
TSMC Nanjing	TSMC	Parent company	614,039 (RMB 137,146)	10	-	-	-	-
TSMC Technology	TSMC	The ultimate parent of the Company	218,347 (USD 7,103)	Note 2	-	-	-	-
TSMC North America	GUC	Associate of TSMC	106,750 (USD 3,473)	39	43,023 (USD 1,400)	-	43,023 (USD 1,400)	-
VisEra Tech	Xintec	Associate of TSMC	102,478	44	-	-	-	-

Note 1: The calculation of turnover days excludes other receivables from related parties.

Note 2: The ending balance is primarily consisted of other receivables, which is not applicable for the calculation of turnover days.

TABLE 8

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

**INTERCOMPANY RELATIONSHIPS AND SIGNIFICANT INTERCOMPANY TRANSACTIONS
FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars)**

No.	Company Name	Counter Party	Nature of Relationship (Note 1)	Intercompany Transactions			Percentage of Consolidated Net Revenue or Total Assets
				Financial Statements Item	Amount	Terms (Note 2)	
0	TSMC	TSMC North America	1	Net revenue from sale of goods	\$ 650,432,820	-	63%
				Receivables from related parties	86,057,097	-	4%
				Other receivables from related parties	1,035,465	-	-
		TSMC Japan	1	Marketing expenses - commission	225,013	-	-
		TSMC Europe	1	Marketing expenses - commission	463,093	-	-
		TSMC Global	1	Short-term loans	3,227,700	-	-
		TSMC China	1	Purchases	18,089,003	-	2%
				Marketing expenses - commission	156,017	-	-
				Payables to related parties	1,299,072	-	-
		TSMC Nanjing	1	Purchases	7,738,426	-	1%
1	TSMC China	TSMC Canada	1	Proceeds from disposal of property, plant and equipment	2,839,622	-	-
				Payables to related parties	414,401	-	-
				Accrued expense and other current liabilities	199,638	-	-
		TSMC Canada	1	Research and development expenses	298,050	-	-
		TSMC Technology	1	Research and development expenses	2,044,765	-	-
				Payables to related parties	218,347	-	-
		WaferTech	1	Purchases	8,309,250	-	1%
		TSMC Nanjing	3	Payables to related parties	1,092,785	-	-
				Other receivables from related parties	30,986,047	-	1%

Note 1: No. 1 represents the transactions from parent company to subsidiary.

No. 3 represents the transactions between subsidiaries.

Note 2: The sales prices and payment terms of intercompany sales are not significantly different from those to third parties. For other intercompany transactions, prices and terms are determined in accordance with mutual agreements.

TABLE 9

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

NAMES, LOCATIONS, AND RELATED INFORMATION OF INVESTEEES OVER WHICH THE COMPANY EXERCISES SIGNIFICANT INFLUENCE (EXCLUDING INFORMATION ON INVESTMENT IN MAINLAND CHINA)
FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Investor Company	Investee Company	Location	Main Businesses and Products	Original Investment Amount		Balance as of December 31, 2018		Net Income (Losses) of the Investee (Foreign Currencies in Thousands)	Share of Profits/Losses of Investee (Note 1) (Foreign Currencies in Thousands)	Note
				December 31, 2018 (Foreign Currencies in Thousands)	December 31, 2017 (Foreign Currencies in Thousands)	Shares (In Thousands)	Percentage of Ownership			
TSMC	TSMC Global	Tortola, British Virgin Islands	Investment activities	\$ 355,162,309 (Note 3)	\$ 292,890,229	11	100	\$ 9,271,602	\$ 9,271,602	Subsidiary
	TSMC Partners	Tortola, British Virgin Islands	Investing in companies involved in the design, manufacture, and other related business in the semiconductor industry and other investment activities	31,456,130	31,456,130	988,268	100	2,499,370	2,499,370	Subsidiary
	VIS	Hsin-Chu, Taiwan	Manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing and design service of masks	10,180,677	10,180,677	464,223	28	6,166,269	1,741,394	Associate
	SSMC	Singapore	Manufacturing and selling of integrated circuits and other semiconductor devices	5,120,028	5,120,028	314	39	3,919,068	1,520,207	Associate
	VisEra Tech	Hsin-Chu, Taiwan	Engaged in manufacturing electronic spare parts and in researching, developing, designing, manufacturing, selling, packaging and testing of color filter	5,005,171	5,005,171	253,120	87	412,283	358,421	Subsidiary
	TSMC North America	San Jose, California, U.S.A	Selling and marketing of integrated circuits and other semiconductor devices	333,718	333,718	11,000	100	117,948	117,948	Subsidiary
	Xintee	Taoyuan, Taiwan	Water level chip size packaging and wafer level post passivation interconnection service	1,988,317	1,988,317	111,282	41	(1,351,951)	(547,789)	Associate
	GUC	Hsin-Chu, Taiwan	Researching, developing, manufacturing, testing and marketing of integrated circuits	386,568	386,568	46,688	35	988,156	344,274	Associate
	TSMC Europe	Amsterdam, the Netherlands	Customer service and supporting activities	15,749	15,749	-	100	41,697	41,697	Subsidiary
	VTAF III	Cayman Islands	Investing in new start-up technology companies	1,308,244	1,318,885	-	98	(3,416)	(3,348)	Subsidiary
	TSMC Japan	Yokohama, Japan	Customer service and supporting activities	83,760	83,760	6	100	4,035	4,035	Subsidiary
	VTAF II	Cayman Islands	Investing in new start-up technology companies	278,800	412,831	-	98	(3,726)	(3,652)	Subsidiary
	TSMC Korea	Seoul, Korea	Customer service and supporting activities	13,656	13,656	80	100	2,170	2,170	Subsidiary
TSMC Partners	TSMC Solar Europe GmbH	Hamburg, Germany	Selling of solar related products and providing customer service	25,266	25,266	1	100	(21)	(21)	Subsidiary
	TSMC Development	Delaware, U.S.A	Investing in companies involved in the manufacturing related business in the semiconductor industry	18,042,499 (US\$ 586,939)	18,042,499 (US\$ 586,939)	-	100	1,863,196 (US\$ 61,803)	Note 2	Subsidiary
	TSMC Technology	Delaware, U.S.A	Engineering support activities	439,029	439,029	-	100	47,866 (US\$ 1,610)	Note 2	Subsidiary
	TSMC Canada	Ontario, Canada	Engineering support activities	14,282 (US\$ 70,702)	14,282 (US\$ 70,702)	2,300	100	32,224 (US\$ 1,069)	Note 2	Subsidiary
	ISDF	Cayman Islands	Investing in new start-up technology companies	14,607 (US\$ 475)	14,607 (US\$ 475)	583	97	-	Note 2	Subsidiary
	ISDF II	Cayman Islands	Investing in new start-up technology companies	-	-	9,299	97	(6,781) (US\$ 231)	Note 2	Subsidiary
VTAF III	Growth Fund	Cayman Islands	Investing in new start-up technology companies	66,207 (US\$ 2,154)	66,207 (US\$ 2,154)	-	100	97,782 (US\$ 3,181)	Note 2	Subsidiary
	Mutual-Pak	New Taipei, Taiwan	Manufacturing of electronic parts, wholesaling and retailing of electronic materials, and researching, developing and testing of RFID	48,980 (US\$ 1,593)	48,980 (US\$ 1,593)	4,693	39	(1,846) (US\$ 72)	Note 2	Associate

(Continued)

Investor Company	Investee Company	Location	Main Businesses and Products	Original Investment Amount		Balance as of December 31, 2018			Net Income (Losses) of the Investee (Foreign Currencies in Thousands)	Share of Profits/Losses of Investee (Note 1) (Foreign Currencies in Thousands)	Note
				December 31, 2018 (Foreign Currencies in Thousands)	December 31, 2017 (Foreign Currencies in Thousands)	Shares (In Thousands)	Percentage of Ownership	Carrying Value (Foreign Currencies in Thousands)			
TSMC Development	WaferTech	Washington, U.S.A	Manufacturing, selling and testing of integrated circuits and other semiconductor devices	\$ -	\$ -	293,637	100	\$ 4,595,263 (US\$ 149,488)	\$ 1,473,555 (US\$ 48,918)	Note 2	Subsidiary

Note 1: The share of profits/losses of investee includes the effect of unrealized gross profits/losses on intercompany transactions.

Note 2: The share of profits/losses of the investee company is not reflected herein as such amount is already included in the share of profits/losses of the investor company.

Note 3: To lower the hedging cost, in August 2018, the Board of Directors of TSMC approved to inject US\$2,000,000 thousand of capital into TSMC Global. This project was approved by the Investment Commission, Ministry of Economic Affairs, R.O.C. (MOEA). The prepayment for investment was US\$100,000 thousand as of December 31, 2018.

(Concluded)

TABLE 10

Taiwan Semiconductor Manufacturing Company Limited and Subsidiaries

**INFORMATION ON INVESTMENT IN MAINLAND CHINA
FOR YEAR ENDED DECEMBER 31, 2018**

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Investee Company	Main Businesses and Products	Total Amount of Paid-in Capital (RMB in Thousands)	Method of Investment	Accumulated Outflow of Investment from January 1, 2018 (US\$ in Thousands)	Investment Flows		Accumulated Outflow of Investment from December 31, 2018 (US\$ in Thousands)	Net Income (Losses) of the Investee Company	Percentage of Ownership	Share of Profits/Losses	Carrying Amount as of December 31, 2018	Accumulated Inward Remittance of Earnings as of December 31, 2018
					Outflow (US\$ in Thousands)	Inflow						
TSMC China	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	\$ 18,939,667 (RMB 4,502,080)	Note 1	\$ 18,939,667 (US\$ 596,000)	\$ -	\$ -	\$ 18,939,667 (US\$ 596,000)	\$ 5,397,462	100%	\$ 5,364,578 (Note 2)	\$ 55,466,911	\$ -
TSMC Nanjing	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	30,521,412 (RMB 6,650,119)	Note 1	28,160,092 (US\$ 920,000)	2,361,320 (US\$ 80,000)	-	30,521,412 (US\$ 1,000,000)	(8,215,989)	100%	(8,200,927) (Note 2)	20,601,413	-

Accumulated Investment in Mainland China as of December, 2018 (US\$ in Thousands)	Investment Amounts Authorized by Investment Commission, MOEA (US\$ in Thousands)	Upper Limit on Investment
\$ 49,461,079 (US\$ 1,596,000)	\$ 119,412,667 (US\$ 3,596,000)	Note 3

Note 1: TSMC directly invested US\$596,000 thousand in TSMC China and US\$1,000,000 thousands in TSMC Nanjing.

Note 2: Amount was recognized based on the audited financial statements.

Note 3: As the Company has obtained the certificate of being qualified for operating headquarters issued by Industrial Development Bureau, MOEA on August 2016, the upper limit on investment in mainland China pursuant to "Principle of investment or Technical Cooperation in Mainland China" is not applicable.

**Taiwan Semiconductor Manufacturing
Company Limited**

**Parent Company Only Financial Statements for the
Years Ended December 31, 2018 and 2017 and
Independent Auditors' Report**

INDEPENDENT AUDITORS' REPORT

The Board of Directors and Shareholders
Taiwan Semiconductor Manufacturing Company Limited

Opinion

We have audited the accompanying parent company only financial statements of Taiwan Semiconductor Manufacturing Company Limited (the "Company"), which comprise the parent company only balance sheets as of December 31, 2018 and 2017, and the parent company only statements of comprehensive income, changes in equity and cash flows for the years then ended, and the notes to the parent company only financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying parent company only financial statements present fairly, in all material respects, the parent company only financial position of the Company as of December 31, 2018 and 2017, and its parent company only financial performance and its parent company only cash flows for the years then ended in accordance with the Regulations Governing the Preparation of Financial Reports by Securities Issuers.

Basis for Opinion

We conducted our audits in accordance with the Regulations Governing Auditing and Attestation of Financial Statements by Certified Public Accountants and auditing standards generally accepted in the Republic of China. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Parent Company Only Financial Statements section of our report. We are independent of the Company in accordance with The Norm of Professional Ethics for Certified Public Accountant of the Republic of China, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the parent company only financial statements for the year ended December 31, 2018. These matters were addressed in the context of our audit of the parent company only financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Key audit matters for the Company's parent company only financial statements for the year ended December 31, 2018 are stated as follows:

Estimate for sales returns and allowances

In consideration of business volume and market conditions, the Company provides a variety of business incentives to specific customers or products. The estimate for sales returns and allowance is based on historical experience and the varying contractual terms. Please refer to Notes 4, 5 and 21 to the parent company only financial statements for the details of the information about estimate for sales returns and allowances. Since the estimate for sales returns and allowances is subject to accounting judgment and estimation, and the result could also affect the net revenue in the parent company only financial statements, it has been identified as a key audit matter.

Our key audit procedures performed in respect of the above area included the following:

1. Understood and tested the design and operating effectiveness of the key controls over estimate for sales returns and allowances;
2. Understood and assessed the reasonableness of assumptions made and methodology used in estimating sales returns and allowances;
3. Sampled and inspected the sales contracts of main products by agreeing the contractual terms and performed an analysis to challenge the estimation on possibility that specific products could meet business incentives condition to verify the reasonableness of the accrual of the sales returns and allowances;
4. Performed a retrospective review to comparatively analyze the historical accuracy of judgments with reference to actual sales returns and allowance paid.

Timing to commence depreciation of property, plant and equipment (PP&E)

The Company continues to invest in capital expenditures to develop and build capacity in leading-edge technologies to meet customers' demand. Please refer to Notes 4, 5 and 12 to the parent company only financial statements for the details of the information and accounting policy about the depreciation of PP&E. According to IAS 16, depreciation of PP&E begins when the assets are available for use, and in the condition necessary for the assets to be capable of operating in the intended manner. Due to the significant capital expenditures of the Company, and the criteria to determine whether such assets are available for their intended use vary within categories of assets as well as involve subjective judgments, the validity of the timing to commence depreciation of PP&E could have a material impact on its financial performance. Consequently, the validity of the timing to commence depreciation of PP&E is identified as a key audit matter.

Our key audit procedures performed in respect of the above area included the following:

1. Understood and tested the design and operating effectiveness of the key controls over the timing to commence depreciation of PP&E;
2. Understood the criteria the assets are defined as available for their intended use and the corresponding accounting treatments;
3. Sampled and reviewed the appropriateness of the timing for commencing depreciation after the assets met the criteria of available for use in current year;
4. Performed an observation on the physical count of equipment under installation and construction in progress; sampled and inspected the supporting documentation to verify that the status of equipment under installation and construction in progress are not available for use;
5. Sampled equipment under installation and construction in progress which met the criteria of available for use and were transferred in the subsequent period to evaluate the reasonableness of the timing for commencing depreciation;
6. Sampled and reviewed the appropriateness of the equipment under installation and construction in progress which are not available for their intended use.

Responsibilities of Management and Those Charged with Governance for the Parent Company Only Financial Statements

Management is responsible for the preparation and fair presentation of the parent company only financial statements in accordance with the Regulations Governing the Preparation of Financial Reports by Securities Issuers, and for such internal control as management determines is necessary to enable the preparation of parent company only financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the parent company only financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance (including members of the Audit Committee) are responsible for overseeing the Company's financial reporting process.

Auditors' Responsibilities for the Audit of the Parent Company Only Financial Statements

Our objectives are to obtain reasonable assurance about whether the parent company only financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the auditing standards generally accepted in the Republic of China will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these parent company only financial statements.

As part of an audit in accordance with the auditing standards generally accepted in the Republic of China, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

1. Identify and assess the risks of material misstatement of the parent company only financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
2. Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
3. Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
4. Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the parent company only financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.
5. Evaluate the overall presentation, structure and content of the parent company only financial statements, including the disclosures, and whether the parent company only financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

6. Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Company to express an opinion on the parent company only financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

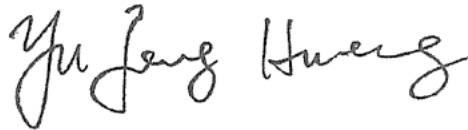
We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the parent company only financial statements for the year ended December 31, 2018 and are therefore the key audit matters. We describe these matters in our auditors' report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partners on the audit resulting in this independent auditors' report are Mei Yen Chiang and Yu Feng Huang.



Deloitte & Touche
Taipei, Taiwan
Republic of China



February 19, 2019

Notice to Readers

The accompanying financial statements are intended only to present the financial position, financial performance and cash flows in accordance with accounting principles and practices generally accepted in the Republic of China and not those of any other jurisdictions. The standards, procedures and practices to audit such financial statements are those generally applied in the Republic of China.

For the convenience of readers, the independent auditors' report and the accompanying financial statements have been translated into English from the original Chinese version prepared and used in the Republic of China. If there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese-language independent auditors' report and financial statements shall prevail.

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY BALANCE SHEETS

(In Thousands of New Taiwan Dollars)

	December 31, 2018		December 31, 2017	
	Amount	%	Amount	%
ASSETS				
CURRENT ASSETS				
Cash and cash equivalents (Note 6)	\$ 240,202,525	12	\$ 239,176,841	12
Financial assets at fair value through profit or loss (Note 7)	54,115	-	373,351	-
Financial assets at fair value through other comprehensive income	568,150	-	-	-
Available-for-sale financial assets	-	-	2,393,555	-
Financial assets at amortized cost	2,294,098	-	-	-
Hedging derivative financial assets (Note 8)	-	-	7,378	-
Hedging financial assets (Note 8)	23,497	-	-	-
Notes and accounts receivable, net (Note 9)	36,685,389	2	26,655,427	2
Receivables from related parties (Note 32)	86,452,584	4	92,141,837	5
Other receivables from related parties (Note 32)	1,234,662	-	3,143,872	-
Inventories (Notes 5, 10 and 35)	98,088,160	5	70,297,445	4
Other financial assets (Notes 33 and 35)	178,008	-	94,839	-
Other current assets (Note 14)	4,184,918	-	2,484,792	-
Total current assets	469,966,106	23	436,769,337	23
NONCURRENT ASSETS				
Financial assets at fair value through other comprehensive income	963,610	-	-	-
Financial assets carried at cost	-	-	415,051	-
Investments accounted for using equity method (Notes 5 and 11)	549,560,884	26	463,986,364	24
Property, plant and equipment (Notes 5 and 12)	1,025,286,941	49	1,016,355,970	52
Intangible assets (Notes 5 and 13)	12,429,930	1	9,870,127	-
Deferred income tax assets (Notes 5 and 26)	15,586,674	1	10,829,473	1
Refundable deposits and others	1,666,863	-	1,163,069	-
Total noncurrent assets	1,605,494,902	77	1,502,620,054	77
TOTAL	\$ 2,075,461,008	100	\$ 1,939,389,391	100
LIABILITIES AND EQUITY				
CURRENT LIABILITIES				
Short-term loans (Notes 15 and 29)	\$ 91,982,340	4	\$ 63,766,850	3
Financial liabilities at fair value through profit or loss (Note 7)	30,232	-	18,764	-
Hedging derivative financial liabilities (Note 8)	-	-	15,562	-
Hedging financial liabilities (Note 8)	1,941	-	-	-
Accounts payable	30,472,292	2	25,605,223	1
Payables to related parties (Note 32)	4,546,752	-	4,829,664	-
Salary and bonus payable	12,442,707	1	12,283,321	1
Accrued profit sharing bonus to employees and compensation to directors (Notes 20 and 28)	23,919,312	1	23,388,002	1
Payables to contractors and equipment suppliers	41,279,910	2	50,363,976	3
Income tax payable (Notes 5 and 26)	38,706,990	2	32,950,667	2
Provisions (Notes 5 and 16)	-	-	13,174,825	1
Long-term liabilities - current portion (Note 17)	34,900,000	2	24,300,000	1
Accrued expenses and other current liabilities (Notes 5, 19, 21, 29 and 32)	49,778,042	2	57,686,386	3
Total current liabilities	328,060,518	16	308,383,240	16
NONCURRENT LIABILITIES				
Bonds payable (Notes 17 and 29)	56,900,000	3	91,800,000	5
Deferred income tax liabilities (Notes 5 and 26)	233,284	-	302,205	-
Net defined benefit liability (Notes 5 and 18)	9,651,405	1	8,850,704	1
Guarantee deposits (Notes 19 and 29)	3,346,648	-	7,582,479	-
Others	451,488	-	413,230	-
Total noncurrent liabilities	70,582,825	4	108,948,618	6
Total liabilities	398,643,343	20	417,331,858	22
EQUITY ATTRIBUTABLE TO SHAREHOLDERS OF THE PARENT				
Capital stock (Note 20)	259,303,805	12	259,303,805	13
Capital surplus (Note 20)	56,315,932	3	56,309,536	3
Retained earnings (Note 20)				
Appropriated as legal capital reserve	276,033,811	13	241,722,663	12
Appropriated as special capital reserve	26,907,527	1	-	-
Unappropriated earnings	1,073,706,503	52	991,639,347	51
	1,376,647,841	66	1,233,362,010	63
Others (Note 20)	(15,449,913)	(1)	(26,917,818)	(1)
Total equity	1,676,817,665	80	1,522,057,533	78
TOTAL	\$ 2,075,461,008	100	\$ 1,939,389,391	100

The accompanying notes are an integral part of the parent company only financial statements.

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY STATEMENTS OF COMPREHENSIVE INCOME (In Thousands of New Taiwan Dollars, Except Earnings Per Share)

	2018		2017	
	Amount	%	Amount	%
NET REVENUE (Notes 5, 21 and 32)	\$1,023,925,713	100	\$ 969,136,109	100
COST OF REVENUE (Notes 5, 10, 28, 32 and 35)	<u>530,861,166</u>	<u>52</u>	<u>490,196,856</u>	<u>51</u>
GROSS PROFIT BEFORE UNREALIZED GROSS PROFIT ON SALES TO SUBSIDIARIES AND ASSOCIATES	493,064,547	48	478,939,253	49
UNREALIZED GROSS PROFIT ON SALES TO SUBSIDIARIES AND ASSOCIATES	<u>(109,046)</u>	<u>-</u>	<u>(1,562)</u>	<u>-</u>
GROSS PROFIT	<u>492,955,501</u>	<u>48</u>	<u>478,937,691</u>	<u>49</u>
OPERATING EXPENSES (Notes 5, 28, and 32)				
Research and development	84,944,461	8	79,887,723	8
General and administrative	19,113,298	2	20,049,405	2
Marketing	<u>3,201,670</u>	<u>-</u>	<u>3,048,781</u>	<u>1</u>
Total operating expenses	<u>107,259,429</u>	<u>10</u>	<u>102,985,909</u>	<u>11</u>
OTHER OPERATING INCOME AND EXPENSES, NET (Notes 12, 22 and 28)	<u>(1,668,234)</u>	<u>-</u>	<u>(1,261,665)</u>	<u>-</u>
INCOME FROM OPERATIONS	<u>384,027,838</u>	<u>38</u>	<u>374,690,117</u>	<u>38</u>
NON-OPERATING INCOME AND EXPENSES				
Share of profits of subsidiaries and associates (Note 11)	12,509,959	1	18,757,236	2
Other income (Note 23)	2,005,107	-	1,696,595	-
Foreign exchange gain, net (Note 37)	1,927,029	-	(670,371)	-
Finance costs (Note 24)	(2,903,454)	-	(2,749,640)	-
Other gains and losses (Note 25)	<u>(1,368,326)</u>	<u>-</u>	<u>1,592,239</u>	<u>-</u>
Total non-operating income and expenses	<u>12,170,315</u>	<u>1</u>	<u>18,626,059</u>	<u>2</u>
INCOME BEFORE INCOME TAX	396,198,153	39	393,316,176	40
INCOME TAX EXPENSE (Notes 5 and 26)	<u>45,067,269</u>	<u>5</u>	<u>50,204,700</u>	<u>5</u>
NET INCOME	<u>351,130,884</u>	<u>34</u>	<u>343,111,476</u>	<u>35</u>

(Continued)

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY STATEMENTS OF COMPREHENSIVE INCOME (In Thousands of New Taiwan Dollars, Except Earnings Per Share)

	2018		2017	
	Amount	%	Amount	%
OTHER COMPREHENSIVE INCOME (LOSS)				
(Notes 5, 11, 18, 20 and 26)				
Items that will not be reclassified subsequently to profit or loss:				
Remeasurement of defined benefit obligation	\$ (861,162)	-	\$ (254,681)	-
Unrealized loss on investments in equity instruments at fair value through other comprehensive income	(1,189,957)	-	-	-
Gain on hedging instruments	40,975	-	-	-
Share of other comprehensive loss of subsidiaries and associates	(2,135,880)	-	(20,853)	-
Income tax benefit related to items that will not be reclassified subsequently	<u>195,729</u>	<u>-</u>	<u>30,562</u>	<u>-</u>
	<u>(3,950,295)</u>	<u>-</u>	<u>(244,972)</u>	<u>-</u>
Items that may be reclassified subsequently to profit or loss:				
Exchange differences arising on translation of foreign operations	14,578,483	1	(28,270,770)	(3)
Changes in fair value of available-for-sale financial assets	-	-	(425,692)	-
Cash flow hedges	-	-	4,683	-
Share of other comprehensive income (loss) of subsidiaries and associates	(794,057)	-	123,804	-
Income tax expense related to items that may be reclassified subsequently	<u>-</u>	<u>-</u>	<u>(3,536)</u>	<u>-</u>
	<u>13,784,426</u>	<u>1</u>	<u>(28,571,511)</u>	<u>(3)</u>
Other comprehensive income (loss) for the year, net of income tax	<u>9,834,131</u>	<u>1</u>	<u>(28,816,483)</u>	<u>(3)</u>
TOTAL COMPREHENSIVE INCOME FOR THE YEAR	<u>\$ 360,965,015</u>	<u>35</u>	<u>\$ 314,294,993</u>	<u>32</u>
EARNINGS PER SHARE (NT\$, Note 27)				
Basic earnings per share	<u>\$ 13.54</u>		<u>\$ 13.23</u>	
Diluted earnings per share	<u>\$ 13.54</u>		<u>\$ 13.23</u>	

The accompanying notes are an integral part of the parent company only financial statements. (Concluded)

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY STATEMENTS OF CHANGES IN EQUITY
(In Thousands of New Taiwan Dollars, Except Dividends Per Share)

	Capital Stock - Common Stock				Retained Earnings		Others								
	Shares (In Thousands)	Amount	Capital Surplus	Legal Capital Reserve	Special Capital Reserve	Unappropriated Earning	Total	Foreign Currency Translation Reserve	Unrealized Gain from Available-for-sale Financial Assets	Unrealized Gain (Loss) on Assets Through Other Comprehensive Income	Cash Flow Hedges Reserve	Gain (Loss) on Hedging Instruments	Unearned Stock-Based Employee Compensation	Total	Total Equity
BALANCE, JANUARY 1, 2017	25,930,380	\$ 259,303,805	\$ 56,272,304	\$ 208,297,945	\$ -	\$ 863,710,224	\$ 1,072,008,169	\$ 1,661,237	\$ 2,641	\$ -	\$ 105	\$ -	\$ -	\$ 1,663,983	\$ 1,389,248,261
Appropriations of prior year's earnings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal capital reserve	-	-	-	33,424,718	-	(33,424,718)	-	-	-	-	-	-	-	-	-
Cash dividends to shareholders - NTS\$ per share	-	-	-	-	-	(181,512,663)	(181,512,663)	-	-	-	-	-	-	-	(181,512,663)
Total	-	-	-	33,424,718	-	(214,937,381)	(181,512,663)	-	-	-	-	-	-	-	(181,512,663)
Net income in 2017	-	-	-	-	-	343,111,476	343,111,476	-	-	-	-	-	-	-	343,111,476
Other comprehensive income (loss) in 2017, net of income tax	-	-	-	-	-	(244,972)	(244,972)	(28,358,917)	(216,715)	-	4,121	-	-	(28,571,511)	(28,816,483)
Total comprehensive income (loss) in 2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adjustments to share of changes in equities of associates	-	-	-	-	-	342,866,504	342,866,504	(28,358,917)	(216,715)	-	4,121	-	-	(28,571,511)	314,294,993
From share of changes in equities of subsidiaries	-	-	7,085	-	-	-	-	-	-	-	-	-	(10,290)	(3,205)	(3,205)
Donation from shareholders	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,994
BALANCE, DECEMBER 31, 2017	25,930,380	\$ 259,303,805	\$ 56,309,536	\$ 241,722,663	\$ -	\$ 991,639,347	\$ 1,233,362,010	\$ (26,697,680)	\$ (214,074)	\$ -	\$ 4,226	\$ -	\$ (10,290)	\$ (26,917,818)	\$ 1,522,067,533
Effect of retrospective application	-	-	-	-	-	1,556,321	1,556,321	-	214,074	(524,915)	(4,226)	4,226	-	(310,841)	1,245,480
ADJUSTED BALANCE, JANUARY 1, 2018	25,930,380	\$ 259,303,805	\$ 56,309,536	\$ 241,722,663	-	\$ 993,195,668	\$ 1,234,918,331	\$ (26,697,680)	-	(524,915)	-	4,226	(10,290)	(27,228,659)	\$ 1,523,303,013
Appropriations of prior year's earnings	-	-	-	34,311,148	-	(34,311,148)	-	-	-	-	-	-	-	-	-
Legal capital reserve	-	-	-	-	26,907,527	(26,907,527)	-	-	-	-	-	-	-	-	-
Special capital reserve	-	-	-	-	-	(207,443,044)	(207,443,044)	-	-	-	-	-	-	-	(207,443,044)
Cash dividends to shareholders - NTS\$ per share	-	-	-	34,311,148	-	(34,311,148)	-	-	-	-	-	-	-	-	(207,443,044)
Total	-	-	-	-	26,907,527	(208,661,119)	-	-	-	-	-	-	-	-	-
Net income in 2018	-	-	-	-	-	351,130,884	351,130,884	-	-	-	-	-	-	-	351,130,884
Other comprehensive income (loss) in 2018, net of income tax	-	-	-	-	-	(765,274)	(765,274)	14,653,333	-	(4,097,465)	105	41,537	-	10,599,405	9,834,131
Total comprehensive income (loss) in 2018	-	-	-	-	-	-	-	14,653,333	-	(4,097,465)	-	41,537	-	10,599,405	360,965,015
Disposal of investments in equity instruments at fair value through other comprehensive income	-	-	-	-	-	(1,193,056)	(1,193,056)	-	-	1,193,056	-	-	-	1,193,056	-
Basis adjustment for loss on hedging instruments	-	-	-	-	-	-	-	-	-	-	-	(22,162)	-	(22,162)	(22,162)
Adjustments to share of changes in equities of associates	-	-	(6,420)	-	-	-	-	-	-	-	-	-	8,447	8,447	2,027
From share of changes in equities of subsidiaries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,681
Donation from shareholders	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,135
BALANCE, DECEMBER 31, 2018	25,930,380	\$ 259,303,805	\$ 56,315,932	\$ 276,033,811	\$ 26,907,527	\$ 1,073,706,303	\$ 1,376,647,841	\$ (12,042,347)	\$ -	\$ (3,429,324)	\$ -	\$ 23,601	\$ (1,843)	\$ (15,449,913)	\$ 1,676,817,665

The accompanying notes are an integral part of the parent company only financial statements.

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY STATEMENTS OF CASH FLOWS

(In Thousands of New Taiwan Dollars)

	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES		
Income before income tax	\$ 396,198,153	\$ 393,316,176
Adjustments for:		
Depreciation expense	274,340,540	250,597,135
Amortization expense	4,352,847	4,325,028
Finance costs	2,903,454	2,749,640
Share of profits of subsidiaries and associates	(12,509,959)	(18,757,236)
Interest income	(1,847,202)	(1,554,792)
Loss on disposal or retirement of property, plant and equipment, net	557,598	1,008,989
Gain on disposal of intangible assets, net	(5,933)	(3,198)
Impairment loss on property, plant and equipment	423,468	-
Impairment loss on financial assets	-	6,137
Gain on financial instruments at fair value through profit or loss, net	(17,729)	-
Gain on disposal of available-for-sale financial assets, net	-	(115,690)
Unrealized gross profit on sales to subsidiaries and associates	109,046	1,562
Loss (gain) on foreign exchange, net	2,732,445	(9,118,776)
Dividend income	(157,905)	(141,803)
Changes in operating assets and liabilities:		
Financial instruments at fair value through profit or loss	301,714	(196,337)
Notes and accounts receivable, net	(15,821,089)	7,253,120
Receivables from related parties	5,689,253	(5,296,267)
Other receivables from related parties	216,794	(733,023)
Inventories	(27,790,715)	(23,793,099)
Other financial assets	(26,762)	2,029,903
Other current assets	(1,685,193)	510,739
Accounts payable	4,839,526	1,275,185
Payables to related parties	(282,912)	(10,337)
Salary and bonus payable	159,386	712,816
Accrued profit sharing bonus to employees and compensation to directors	531,310	593,231
Accrued expenses and other current liabilities	(21,092,059)	29,615,847
Provisions	-	(3,823,540)
Net defined benefit liability	(60,461)	44,615
Cash generated from operations	612,057,615	630,496,025
Income taxes paid	(43,956,272)	(61,695,694)
Net cash generated by operating activities	568,101,343	568,800,331

(Continued)

Taiwan Semiconductor Manufacturing Company Limited

PARENT COMPANY ONLY STATEMENTS OF CASH FLOWS (In Thousands of New Taiwan Dollars)

	2018	2017
CASH FLOWS FROM INVESTING ACTIVITIES		
Acquisitions of:		
Held to maturity financial assets	\$ -	\$ (1,695,771)
Financial assets at amortized cost	(2,294,098)	-
Property, plant and equipment	(298,099,157)	(311,763,999)
Intangible assets	(6,885,163)	(4,351,050)
Proceeds from disposal or redemption of:		
Financial assets at fair value through other comprehensive income	651,971	-
Available-for-sale financial assets	-	140,395
Held-to-maturity financial assets	-	13,160,000
Property, plant and equipment	4,707,118	13,226,816
Intangible assets	15,881	27,409
Proceeds from return of capital of investments in equity instruments at fair value through other comprehensive income	3,456	-
Proceeds from return of capital of financial assets carried at cost	-	14,080
Derecognition of hedging derivative financial instruments	-	38,097
Derecognition of hedging financial instruments	57,954	-
Interest received	1,815,330	1,552,725
Other dividends received	157,905	141,803
Dividends received from investments accounted for using equity method	3,769,150	5,005,132
Refundable deposits paid	(2,218,292)	(1,227,010)
Refundable deposits refunded	<u>1,762,043</u>	<u>416,600</u>
Net cash used in investing activities	<u>(296,555,902)</u>	<u>(285,314,773)</u>
CASH FLOWS FROM FINANCING ACTIVITIES		
Increase in short-term loans	27,154,770	10,394,485
Repayment of bonds	(24,300,000)	(38,100,000)
Interest paid	(2,957,663)	(2,916,969)
Guarantee deposits received	1,625,526	205,075
Guarantee deposits refunded	(120,717)	(89,507)
Cash dividends	(207,443,044)	(181,512,663)
Payment of partial acquisition of interests in subsidiaries	(64,633,400)	(82,433,287)
Proceeds from partial disposal of interests in subsidiaries	144,676	257,648
Donation from shareholders	<u>10,095</u>	<u>7,938</u>
Net cash used in financing activities	<u>(270,519,757)</u>	<u>(294,187,280)</u>
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	1,025,684	(10,701,722)
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR	<u>239,176,841</u>	<u>249,878,563</u>
CASH AND CASH EQUIVALENTS, END OF YEAR	<u>\$ 240,202,525</u>	<u>\$ 239,176,841</u>

The accompanying notes are an integral part of the parent company only financial statements.

(Concluded)

Taiwan Semiconductor Manufacturing Company Limited

NOTES TO PARENT COMPANY ONLY FINANCIAL STATEMENTS FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

1. GENERAL

Taiwan Semiconductor Manufacturing Company Limited (the “Company” or “TSMC”), a Republic of China (R.O.C.) corporation, was incorporated on February 21, 1987. The Company is a dedicated foundry in the semiconductor industry which engages mainly in the manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing of masks.

On September 5, 1994, the Company’s shares were listed on the Taiwan Stock Exchange (TWSE). On October 8, 1997, the Company listed some of its shares of stock on the New York Stock Exchange (NYSE) in the form of American Depositary Shares (ADSs).

The address of its registered office and principal place of business is No. 8, Li-Hsin Rd. 6, Hsinchu Science Park, Taiwan.

2. THE AUTHORIZATION OF FINANCIAL STATEMENTS

The accompanying parent company only financial statements were approved and authorized for issue by the Board of Directors on February 19, 2019.

3. APPLICATION OF NEW AND REVISED INTERNATIONAL FINANCIAL REPORTING STANDARDS

- a. Initial application of the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the International Financial Reporting Standards (IFRS), International Accounting Standards (IAS), IFRIC Interpretations (IFRIC), and SIC Interpretations (SIC) (collectively, “IFRSs”) endorsed and issued into effect by the Financial Supervisory Commission (FSC)

Except for the following, the initial application of the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers and the IFRSs endorsed and issued into effect by the FSC did not have a significant effect on the Company’s accounting policies:

- 1) IFRS 9 “Financial Instruments” and related amendment

IFRS 9 supersedes IAS 39 “Financial Instruments: Recognition and Measurement”, with consequential amendments to IFRS 7 “Financial Instruments: Disclosures” and other standards. IFRS 9 sets out the requirements for classification, measurement and impairment of financial assets and hedge accounting. Please refer to Note 4 for information relating to the relevant accounting policies.

Classification, measurement and impairment of financial assets and financial liabilities

The Company elects not to restate prior reporting period when applying the requirements for the classification, measurement and impairment of financial assets and financial liabilities under IFRS 9 with the cumulative effect of the initial application recognized at the date of initial application.

The impact on measurement categories, carrying amount and related reconciliation for each class of the Company's financial assets and financial liabilities when retrospectively applying IFRS 9 on January 1, 2018 is detailed below:

Financial Assets	Measurement Category		Carrying Amount		Note
	IAS 39	IFRS 9	IAS 39	IFRS 9	
Cash and cash equivalents	Loans and receivables	Amortized cost	\$ 239,176,841	\$ 239,176,841	(1)
Derivatives	Held for trading	Mandatorily at fair value through profit or loss (FVTPL)	373,351	373,351	
Equity securities	Hedging instruments Available-for-sale	Hedging instruments Fair value through other comprehensive income (FVTOCI)	7,378 2,808,606	7,378 3,377,145	(2)
Notes and accounts receivable (including related parties), other receivables and refundable deposits	Loans and receivables	Amortized cost	123,199,044	123,443,817	(1)
Financial Liabilities					
Derivatives	Held for trading	Held for trading	18,764	18,764	
	Hedging instruments	Hedging instruments	15,562	15,562	
Short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable and guarantee deposits	Amortized cost	Amortized cost	294,856,247	294,856,247	

Financial Assets	Carrying Amount as of December 31, 2017 (IAS 39)	Reclassifications	Remeasurements	Carrying Amount as of January 1, 2018 (IFRS 9)	Retained Earnings Effect on January 1, 2018	Other Equity Effect on January 1, 2018	Note
FVTPL	\$ 373,351	\$ -	\$ -	\$ 373,351	\$ -	\$ -	
FVTOCI	-	-	-	-	-	-	
- Equity instruments							
Add: From available for sale	-	2,808,606	568,539	3,377,145	534,270	34,269	(2)
	-	2,808,606	568,539	3,377,145	534,270	34,269	
Amortized cost	-	-	-	-	-	-	
Add: From loans and receivables	-	362,375,885	244,773	362,620,658	244,773	-	(1)
	-	362,375,885	244,773	362,620,658	244,773	-	
Hedging instruments	7,378	-	-	7,378	-	-	
Total	<u>\$ 380,729</u>	<u>\$ 365,184,491</u>	<u>\$ 813,312</u>	<u>\$ 366,378,532</u>	<u>\$ 779,043</u>	<u>\$ 34,269</u>	

	Carrying Amount as of December 31, 2017 (IAS 39)	Adjustments Arising from Initial Application	Carrying Amount as of January 1, 2018 (IFRS 9)	Retained Earnings Effect on January 1, 2018	Other Equity Effect on January 1, 2018	Note
Investments accounted for using equity method	\$ 463,986,364	\$ 400,138	\$ 464,386,508	\$ 745,248	\$ (345,110)	(3)

- (1) Cash and cash equivalents, notes and accounts receivable (including related parties), other receivables and refundable deposits that were classified as loans and receivables under IAS 39 are now classified at amortized cost with assessment of future 12-month or lifetime expected credit loss under IFRS 9. As a result of retrospective application, the adjustments would result in a decrease in loss of allowance for accounts receivable of NT\$244,773 thousand and an increase in retained earnings of NT\$244,773 thousand on January 1, 2018.
- (2) As equity investments that were previously classified as available-for-sale financial assets under IAS 39 are not held for trading, the Company elected to designate all of these investments as at FVTOCI under IFRS 9. As a result, the related other equity-unrealized gain or loss on available-for-sale financial assets of NT\$206,015 thousand is reclassified to increase other equity - unrealized gain or loss on financial assets at FVTOCI.

As equity investments previously measured at cost under IAS 39 are remeasured at fair value under IFRS 9, the adjustments would result in an increase in financial assets at FVTOCI of NT\$568,539 thousand and an increase in other equity-unrealized gain or loss on financial assets at FVTOCI of NT\$568,539 thousand on January 1, 2018.

For those equity investments previously classified as available-for-sale financial assets (including measured at cost financial assets) under IAS 39, the impairment losses that the Company had recognized have been accumulated in retained earnings. Since these investments were designated as at FVTOCI under IFRS 9 and no impairment assessment is required, the adjustments would result in a decrease in other equity - unrealized gain or loss on financial assets at FVTOCI of NT\$534,270 thousand and an increase in retained earnings of NT\$534,270 thousand on January 1, 2018.

- (3) With the retrospective adoption of IFRS 9 by associates accounted for using equity method, the corresponding adjustments made by the Company would result in an increase in investments accounted for using equity method of NT\$400,138 thousand, a decrease in other equity-unrealized gain or loss on financial assets at FVTOCI of NT\$765,199 thousand, an increase in other equity- unrealized gain or loss on available-for-sale financial assets of NT\$420,089 thousand and an increase in retained earnings of NT\$745,248 thousand on January 1, 2018.

Hedge accounting

The Company prospectively applies the requirements for hedge accounting upon initial application of IFRS 9. In addition, due to the amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers, all derivative and non-derivative financial assets and financial liabilities which are designated as hedging instruments are presented as financial assets and financial liabilities for hedging starting 2018.

2) IFRS 15 “Revenue from Contracts with Customers” and related amendments

IFRS 15 establishes principles for recognizing revenue that apply to all contracts with customers, and will supersede IAS 18, “Revenue,” IAS 11, “Construction Contracts,” and a number of revenue-related interpretations. Please refer to Note 4 for information relating to the relevant accounting policies.

The Company elected only to retrospectively apply IFRS 15 to contracts that were not completed on January 1, 2018 and elected not to restate prior reporting period with the cumulative effect of the initial application recognized at the date of initial application.

The impact on assets, liabilities and equity when retrospectively applying IFRS 15 on January 1, 2018 is detailed below:

	Carrying Amount as of December 31, 2017 (IAS 18 and Revenue-related Interpretations)	Adjustments Arising from Initial Application	Carrying Amount as of January 1, 2018 (IFRS 15)	Note
Investments accounted for using equity method	\$ 463,986,364	\$ <u>32,030</u>	\$ 464,018,394	(1)
Total effect on assets		\$ <u>32,030</u>		
Provisions - current	13,174,825	\$ (13,174,825)	-	(2)
Accrued expenses and other current liabilities	57,686,386	<u>13,174,825</u>	70,861,211	(2)
Total effect on liabilities		\$ <u>-</u>		
Retained earnings	1,233,362,010	\$ <u>32,030</u>	1,233,394,040	(1)
Total effect on equity		\$ <u>32,030</u>		

(1) Prior to the application of IFRS 15, the Company recognizes revenue based on the accounting treatment of the sales of goods. Under IFRS 15, certain subsidiaries and associates accounted for using equity method will change to recognize revenue over time because customers are deemed to have control over the products when the products are manufactured. As a result, the Company will adjust related investments and equity accordingly.

(2) Prior to the application of IFRS 15, the Company recognized the estimation of sales returns and allowance as provisions. Under IFRS 15, the Company recognizes such estimation as refund liability (classified under accrued expenses and other current liabilities).

The following table shows the amount affected in the current period by the application of IFRS 15 as compared to IAS 18:

Impact on Assets, Liabilities and Equity

	December 31, 2018
Increase in investments accounted for using equity method	\$ <u>31,791</u>
Total effect on assets	\$ <u>31,791</u>
Decrease in provisions - current	\$ (21,199,032)
Increase in accrued expenses and other current liabilities	<u>21,199,032</u>
Total effect on liabilities	\$ <u>-</u>
Increase in retained earnings	\$ <u>31,791</u>
Total effect on equity	\$ <u>31,791</u>

Impact on Total Comprehensive Income

	Year Ended December 31, 2018
Increase in share of the profit or loss of associates	<u>\$ 31,791</u>
Increase in net income for the year	<u>\$ 31,791</u>

- 3) Please refer to Note 29 for the disclosure of amendment to IAS 7 “Disclosure Initiative”
- b. Amendments to the Regulations Governing the Preparation of Financial Reports by Securities Issuers for application starting from 2019 and the IFRSs issued by IASB and endorsed by FSC with effective date starting 2019.

New, Amended or Revised Standards and Interpretations (the “New IFRSs”)	Effective Date Announced by IASB (Note 1)
Annual Improvements to IFRSs 2015-2017 Cycle	January 1, 2019
Amendments to IFRS 9 “Prepayment Features with Negative Compensation”	January 1, 2019 (Note 2)
IFRS 16 “Leases”	January 1, 2019
Amendments to IAS 19 “Plan Amendment, Curtailment or Settlement”	January 1, 2019 (Note 3)
Amendments to IAS 28 “Long-term Interests in Associates and Joint Ventures”	January 1, 2019
IFRIC 23 “Uncertainty over Income Tax Treatments”	January 1, 2019

Note 1: Unless stated otherwise, the above New IFRSs are effective for annual periods beginning on or after their respective effective dates.

Note 2: The FSC permits the election for early adoption of the amendments starting from 2018.

Note 3: The Company shall apply these amendments to plan amendments, curtailments or settlements occurring on or after January 1, 2019.

Except for the following items, the Company believes that the adoption of aforementioned standards or interpretations will not have a significant effect on the Company’s accounting policies.

1) IFRS 16 “Leases”

IFRS 16 sets out the accounting standards for leases that will supersede IAS 17 “Leases”, IFRIC 4 “Determining whether an Arrangement contains a Lease”, and a number of related interpretations.

Definition of a lease

Upon initial application of IFRS 16, the Company will apply the guidance of IFRS 16 in determining whether contracts are, or contain, a lease only to contracts entered into (or changed) on or after January 1, 2019. Contracts identified as containing a lease under IAS 17 and IFRIC 4 will not be reassessed and will be accounted for in accordance with the transitional provisions under IFRS 16.

The Company as lessee

Upon initial application of IFRS 16, except for payments for low-value asset and short-term leases which will be recognized as expenses on a straight-line basis, the Company will recognize right-of-use assets and lease liabilities for all leases on the parent company only balance sheets. On the parent company only statements of comprehensive income, the Company will present the depreciation expense charged on right-of-use assets separately from the interest expense accrued on lease liabilities and computed using the effective interest method. On the parent company only statements of cash flows, cash payments for both the principal portion and the interest portion of lease liabilities are classified within financing activities.

Upon initial application of IFRS 16, the Company will apply IFRS 16 retrospectively with the cumulative effect of the initial application recognized at the date of initial application but will not restate comparative information.

Leases agreements classified as operating leases under IAS 17, except for leases of low-value asset and short-term leases, will be measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate on January 1, 2019. Right-of-use assets are measured at an amount equal to the lease liabilities, adjusted by the amount of any prepaid or accrued lease payments. Right-of-use assets are subject to impairment testing under IAS 36.

The Company will apply the following practical expedients to measure right-of-use assets and lease liabilities on January 1, 2019 :

- a) The Company will apply a single discount rate to a portfolio of leases with reasonably similar characteristics to measure lease liabilities.
- b) The Company will account for those leases for which the lease term ends on or before December 31, 2019 as short-term leases.
- c) Except for lease payment, the Company will exclude incremental costs of obtaining the lease from the measurement of right-of-use assets on January 1, 2019.
- d) The Company will determine lease terms (e.g. lease periods) based on the projected status on January 1, 2019, to measure lease liabilities.

The weighted average lessee's incremental borrowing rate used by the Company to calculate lease liabilities recognized on January 1, 2019 is 1.25%. The reconciliation between the lease liabilities recognized and the future minimum lease payments of non-cancellable operating lease on December 31, 2018 is presented as follows:

The future minimum lease payments of non-cancellable operating lease on December 31, 2018	\$ 18,721,881
Less: Recognition exemption for short-term leases	<u>(3,163,562)</u>
Undiscounted gross amounts on January 1, 2019	<u>\$ 15,558,319</u>
Discounted using the incremental borrowing rate on January 1, 2019	\$ 14,652,188
Add: Adjustments as a result of a different treatment of extension and purchase options	<u>3,106,390</u>
Lease liabilities recognized on January 1, 2019	<u>\$ 17,758,578</u>

The Company as lessor

Except for sublease transactions, the Company will not make any adjustments for leases in which it is a lessor, and will account for those leases under IFRS 16 starting from January 1, 2019. On the basis of the remaining contractual terms and conditions on January 1, 2019, all of the Company's subleases will be classified as operating leases.

Impact on assets, liabilities and equity on January 1, 2019

	Carrying Amount as of December 31, 2018	Adjustments Arising from Initial Application	Adjusted Carrying Amount as of January 1, 2019
Other current assets	\$ 4,184,918	\$ (6,783)	\$ 4,178,135
Right-of-use assets	-	17,831,257	17,831,257
Refundable deposits and others	1,666,863	<u>(966)</u>	1,665,897
Total effect on assets		<u>\$ 17,823,508</u>	
Accrued expenses and other current liabilities	49,778,042	\$ 2,347,167	52,125,209
Lease liabilities - noncurrent	-	15,411,411	15,411,411
Other noncurrent liabilities	451,488	<u>64,930</u>	516,418
Total effect on liabilities		<u>\$ 17,823,508</u>	
Total effect on equity		<u>\$ -</u>	

- c. The IFRSs issued by IASB but not yet endorsed and issued into effect by FSC

New, Revised or Amended Standards and Interpretations	Effective Date Issued by IASB
Amendments to IFRS 3 "Definition of a Business"	January 1, 2020 (Note 1)
Amendments to IFRS 10 and IAS 28 "Sale or Contribution of Assets between an Investor and its Associate or Joint Venture"	To be determined by IASB
Amendments to IAS 1 and IAS 8 "Definition of Material"	January 1, 2020 (Note 2)

Note 1: The Company shall apply these amendments to business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after January 1, 2020 and to asset acquisitions that occur on or after the beginning of that period.

Note 2: The Company shall apply these amendments prospectively for annual reporting periods beginning on or after January 1, 2020.

As of the date the accompanying parent company only financial statements were issued, the Company continues in evaluating the impact on its financial position and financial performance as a result of the initial adoption of the aforementioned standards or interpretations. The related impact will be disclosed when the Company completes the evaluation.

4. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

For the convenience of readers, the accompanying parent company only financial statements have been translated into English from the original Chinese version prepared and used in the R.O.C. If there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese-language parent company only financial statements shall prevail.

Statement of Compliance

The accompanying parent company only financial statements have been prepared in conformity with the Regulations Governing the Preparation of Financial Reports by Securities Issuers (the “Accounting Standards Used in Preparation of the Parent Company Only Financial Statements”).

Basis of Preparation

The accompanying parent company only financial statements have been prepared on the historical cost basis except for financial instruments that are measured at fair values, as explained in the accounting policies below. Historical cost is generally based on the fair value of the consideration given in exchange for the assets.

When preparing the parent company only financial statements, the Company account for subsidiaries and associates by using the equity method. In order to agree with the amount of net income, other comprehensive income and equity attributable to shareholders of the parent in the consolidated financial statements, the differences of the accounting treatment between the parent company only basis and the consolidated basis are adjusted under the heading of investments accounted for using equity method, share of profits of subsidiaries and associates and share of other comprehensive income of subsidiaries and associates in the parent company only financial statements.

Foreign Currencies

In preparing the parent company only financial statements, transactions in currencies other than the entity’s functional currency (foreign currencies) are recognized at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Such exchange differences are recognized in profit or loss in the year in which they arise. Non-monetary items measured at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Exchange differences arising on the retranslation of non-monetary items are included in profit or loss for the year except for exchange differences arising on the retranslation of non-monetary items in respect of which gains and losses are recognized directly in other comprehensive income, in which case, the exchange differences are also recognized directly in other comprehensive income. Non-monetary items that are measured in terms of historical cost in foreign currencies are not retranslated.

For the purposes of presenting parent company only financial statements, the assets and liabilities of the Company’s foreign operations are translated into NT\$ using exchange rates prevailing at the end of each reporting period. Income and expense items are translated at the average exchange rates for the period. Exchange differences arising, if any, are recognized in other comprehensive income and accumulated in equity.

Classification of Current and Noncurrent Assets and Liabilities

Current assets are assets held for trading purposes and assets expected to be converted to cash, sold or consumed within one year from the end of the reporting period. Current liabilities are obligations incurred for trading purposes and obligations expected to be settled within one year from the end of the reporting period. Assets and liabilities that are not classified as current are noncurrent assets and liabilities, respectively.

Cash Equivalents

Cash equivalents, for the purpose of meeting short-term cash commitments, consist of highly liquid time deposits and investments that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

Financial Instruments

Financial assets and liabilities shall be recognized when the Company becomes a party to the contractual provisions of the instruments.

Financial assets and liabilities are initially recognized at fair values. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognized immediately in profit or loss.

Financial Assets

The classification of financial assets depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Regular way purchases or sales of financial assets are recognized and derecognized on a trade date or settlement date basis for which financial assets were classified in the same way, respectively. Regular way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace.

a. Category of financial assets and measurement

2018

Financial assets are classified into the following categories: financial assets at FVTPL, investments in debt instruments and equity instruments at FVTOCI, and financial assets at amortized cost.

1) Financial asset at FVTPL

For certain financial assets which include debt instruments that do not meet the criteria of amortized cost or FVTOCI, it is mandatorily required to measure them at FVTPL. Any gain or loss arising from remeasurement is recognized in profit or loss. The net gain or loss recognized in profit or loss incorporates any interest earned on the financial asset.

2) Investments in debt instruments at FVTOCI

Debt instruments with contractual terms specifying that cash flows are solely payments of principal and interest on the principal amount outstanding, together with objective of collecting contractual cash flows and selling the financial assets, are measured at FVTOCI.

Interest income calculated using the effective interest method, foreign exchange gains and losses and impairment gains or losses on investments in debt instruments at FVTOCI are recognized in profit or loss. Other changes in the carrying amount of these debt instruments are recognized in other comprehensive income and will be reclassified to profit or loss when these debt instruments are disposed.

3) Investments in equity instruments at FVTOCI

On initial recognition, the Company may irrevocably designate investments in equity investments that is not held for trading as at FVTOCI.

Investments in equity instruments at FVTOCI are subsequently measured at fair value with gains and losses arising from changes in fair value recognized in other comprehensive income and accumulated in other equity.

Dividends on these investments in equity instruments at FVTOCI are recognized in profit or loss when the Company's right to receive the dividends is established, unless the Company's rights clearly represent a recovery of part of the cost of the investment.

4) Measured at amortized cost

Cash and cash equivalents, debt instrument investments, notes and accounts receivable (including related parties), other receivables and refundable deposits are measured at amortized cost.

Debt instruments with contractual terms specifying that cash flows are solely payments of principal and interest on the principal amount outstanding, together with objective of holding financial assets in order to collect contractual cash flows, are measured at amortized cost.

Subsequent to initial recognition, financial assets measured at amortized cost are measured at amortized cost, which equals to carrying amount determined by the effective interest method less any impairment loss.

2017

Financial assets are classified into the following specified categories: Financial assets at FVTPL, available-for-sale financial assets, held-to-maturity financial assets and loans and receivables.

1) Financial asset at FVTPL

Financial assets are classified as at fair value through profit or loss when the financial asset is either held for trading or it is designated as at fair value through profit or loss.

Financial assets at fair value through profit or loss are stated at fair value, with any gains or losses arising on remeasurement recognized in profit or loss.

2) Available-for-sale financial assets

Available-for-sale financial assets are non-derivative financial assets that are either designated as available-for-sale or are not classified as (a) loans and receivables, (b) held-to-maturity financial assets or (c) financial assets at fair value through profit or loss.

Available-for-sale financial assets are measured at fair value. Interest income from available-for-sale monetary financial assets and dividends on available-for-sale equity investments are recognized in profit or loss. Other changes in the carrying amount of available-for-sale financial assets are recognized in other comprehensive income. When the investment is disposed of or is determined to be impaired, the cumulative gain or loss previously recognized in other comprehensive income is reclassified to profit or loss.

Dividends on available-for-sale equity instruments are recognized in profit or loss when the Company's right to receive the dividends is established.

Available-for-sale equity instruments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured are measured at cost less any identified impairment losses at the end of each reporting period. Such equity instruments are subsequently remeasured at fair value when their fair value can be reliably measured, and the difference between the carrying amount and fair value is recognized in profit or loss or other comprehensive income.

3) Held-to-maturity financial assets

Held-to-maturity investments are non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the Company has the positive intent and ability to hold to maturity. Subsequent to initial recognition, held-to-maturity financial assets are measured at amortized cost using the effective interest method less any impairment.

4) Loans and receivables

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. Loans and receivables including cash and cash equivalents, notes and accounts receivable and other receivables are measured at amortized cost using the effective interest method, less any impairment, except for those loans and receivables with immaterial discounted effect.

b. Impairment of financial assets

2018

At the end of each reporting period, a loss allowance for expected credit loss is recognized for financial assets at amortized cost (including accounts receivable) and for investments in debt instruments that are measured at FVTOCI.

The loss allowance for accounts receivable is measured at an amount equal to lifetime expected credit losses. For financial assets at amortized cost and investments in debt instruments that are measured at FVTOCI, when the credit risk on the financial instrument has not increased significantly since initial recognition, a loss allowance is recognized at an amount equal to expected credit loss resulting from possible default events of a financial instrument within 12 months after the reporting date. If, on the other hand, there has been a significant increase in credit risk since initial recognition, a loss allowance is recognized at an amount equal to expected credit loss resulting from all possible default events over the expected life of a financial instrument.

The Company recognizes an impairment loss in profit or loss for all financial instruments with a corresponding adjustment to their carrying amount through a loss allowance account, except for investments in debt instruments that are measured at FVTOCI, for which the loss allowance is recognized in other comprehensive income and does not reduce the carrying amount of the financial asset.

2017

Financial assets, other than those carried at FVTPL, are assessed for indicators of impairment at the end of each reporting period. Those financial assets are considered to be impaired when there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial assets, their estimated future cash flows have been affected.

For financial assets carried at amortized cost, such as trade receivables, assets that are assessed not to be impaired individually are, in addition, assessed for impairment on a collective basis. The Company assesses the collectability of receivables by performing the account aging analysis and examining current trends in the credit quality of its customers.

For financial assets carried at amortized cost, the amount of the impairment loss is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate.

For financial assets measured at amortized cost, if, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment loss was recognized, the previously recognized impairment loss is reversed through profit or loss to the extent that the carrying amount of the financial assets at the date the impairment loss is reversed does not exceed what the amortized cost would have been had the impairment loss not been recognized.

When an available-for-sale financial asset is considered to be impaired, cumulative gains or losses previously recognized in other comprehensive income are reclassified to profit or loss in the year.

In respect of available-for-sale equity instruments, impairment losses previously recognized in profit or loss are not reversed through profit or loss. Any increase in fair value subsequent to the recognition of an impairment loss is recognized in other comprehensive income and accumulated under the heading of unrealized gains or losses from available-for-sale financial assets.

For financial assets carried at cost, the amount of the impairment loss is measured as the difference between the asset's carrying amount and the present value of the estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment loss will not be reversed in subsequent periods.

The carrying amount of the financial asset is reduced by the impairment loss directly for all financial assets with the exception of trade receivables, where the carrying amount is reduced through the use of an allowance account. When a trade receivable is considered uncollectible, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited against the allowance account.

c. Derecognition of financial assets

2018

The Company derecognizes a financial asset only when the contractual rights to the cash flows from the financial asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the financial asset to another entity.

On derecognition of a financial asset at amortized cost in its entirety, the difference between the asset's carrying amount and the sum of the consideration received and receivable is recognized in profit or loss. On derecognition of an investment in a debt instrument at FVTOCI, the difference between the asset's carrying amount and the sum of the consideration received and receivable and the cumulative gain or loss that had been recognized in other comprehensive income is recognized in profit or loss. However, on derecognition of an investment in an equity instrument at FVTOCI, the cumulative gain or loss that had been recognized in other comprehensive income is transferred directly to retained earnings, without recycling through profit or loss.

2017

The Company derecognizes a financial asset only when the contractual rights to the cash flows from the financial asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the financial asset to another entity.

On derecognition of a financial asset in its entirety, the difference between the financial asset's carrying amount and the sum of the consideration received and receivable and the cumulative gain or loss that had been recognized in other comprehensive income and accumulated in equity is recognized in profit or loss.

Financial Liabilities and Equity Instruments

Classification as debt or equity

Debt and equity instruments issued by the Company are classified as either financial liabilities or as equity in accordance with the substance of the contractual arrangements and the definitions of a financial liability and an equity instrument.

Equity instruments

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the Company are recognized at the proceeds received, net of direct issue costs.

Financial liabilities

Financial liabilities are subsequently measured either at amortized cost using effective interest method or at FVTPL.

Financial liabilities are classified as at fair value through profit or loss when the financial liability is either held for trading or is designated as at fair value through profit or loss.

Financial liabilities at fair value through profit or loss are stated at fair value, with any gains or losses arising on remeasurement recognized in profit or loss.

Financial liabilities other than those held for trading purposes and designated as at FVTPL are subsequently measured at amortized cost at the end of each reporting period.

Derecognition of financial liabilities

The Company derecognizes financial liabilities when, and only when, the Company's obligations are discharged, cancelled or they expire. The difference between the carrying amount of the financial liability derecognized and the consideration paid and payable is recognized in profit or loss.

Derivative Financial Instruments

Derivative financial instruments are initially recognized at fair value at the date the derivative contracts are entered into and are subsequently remeasured to their fair value at the end of each reporting period. The resulting gain or loss is recognized in profit or loss immediately unless the derivative financial instrument is designated and effective as a hedging instrument, in which event the timing of the recognition in profit or loss depends on the nature of the hedge relationship.

Financial Instruments Designated as at Fair Value through Profit or Loss

A financial instrument may be designated as at FVTPL upon initial recognition. The financial instrument forms part of a group of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Company's documented risk management or investment strategy, and information about the grouping is provided internally on that basis.

Hedge Accounting

Cash flow hedge

The Company designates certain hedging instruments, such as forward exchange contracts and foreign currency deposits, to partially hedge its foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). The effective portion of changes in the fair value of hedging instruments is recognized in other comprehensive income. When the forecast transactions actually take place, the associated gains or losses that were recognized in other comprehensive income are removed from equity and included in the initial cost of the hedged items. The gains or losses from hedging instruments relating to the ineffective portion are recognized immediately in profit or loss.

2018

The Company prospectively discontinues hedge accounting only when the hedging relationship ceases to meet the qualifying criteria; for instance when the hedging instrument expires or is sold, terminated or exercised.

2017

Hedge accounting was discontinued prospectively when the Company revoked the designated hedging relationship, when the hedging instrument expired or was sold, terminated, or exercised; or no longer met the criteria for hedge accounting.

Inventories

Inventories are stated at the lower of cost or net realizable value. Inventories are recorded at standard cost and adjusted to approximate weighted-average cost at the end of the reporting period. Net realizable value represents the estimated selling price of inventories less all estimated costs of completion and costs necessary to make the sale.

Investments Accounted for Using Equity Method

Investments accounted for using the equity method include investments in subsidiaries and associates.

Investment in subsidiaries

A subsidiary is an entity that is controlled by the Company.

Under the equity method, an investment in a subsidiary is initially recognized at cost and adjusted thereafter to recognize the Company's share of profit or loss and other comprehensive income of the subsidiary as well as the distribution received. The Company also recognized its share in the changes in the equity of subsidiaries.

Changes in the Company's ownership interests in subsidiaries that do not result in the Company losing control over the subsidiaries are accounted for as equity transactions. Any difference between the carrying amount of the subsidiary and the fair value of the consideration paid or received is recognized directly in equity.

When the Company loses control of a subsidiary, any retained investment of the former subsidiary is measured at the fair value at that date. A gain or loss is recognized in profit or loss and calculated as the difference between (a) the aggregate of the fair value of consideration received and the fair value of any retained interest at the date when control is lost; and (b) the previous carrying amount of the investments in such subsidiary. In addition, the Company shall account for all amounts previously recognized in other comprehensive income in relation to the subsidiary on the same basis as would be required if the subsidiary had directly disposed of the related assets and liabilities.

When the Company transacts with its subsidiaries, profits and losses resulting from the transactions with the subsidiaries are recognized in the Company's parent company only financial statements only to the extent of interests in the subsidiaries that are not owned by the Company.

Investment in associates

An associate is an entity over which the Company has significant influence and that is neither a subsidiary nor a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of the investee but is not control or joint control over those policies.

The operating results and assets and liabilities of associates are incorporated in these parent company only financial statements using the equity method of accounting. Under the equity method, an investment in an associate is initially recognized in the statement of financial position at cost and adjusted thereafter to recognize the Company's share of profit or loss and other comprehensive income of the associate as well as the distribution received. The Company also recognizes its share in the changes in the equities of associates.

Any excess of the cost of acquisition over the Company's share of the net fair value of the identifiable assets, liabilities and contingent liabilities of an associate recognized at the date of acquisition is recognized as goodwill, which is included within the carrying amount of the investment. Any excess of the Company's share of the net fair value of the identifiable assets, liabilities and contingent liabilities over the cost of acquisition, after reassessment, is recognized immediately in profit or loss.

When necessary, the entire carrying amount of the investment (including goodwill) is tested for impairment as a single asset by comparing its recoverable amount (higher of value in use and fair value less costs to sell) with its carrying amount. Any impairment loss recognized forms part of the carrying amount of the investment. Any reversal of that impairment loss is recognized to the extent that the recoverable amount of the investment subsequently increases.

The Company discontinues the use of the equity method from the date when the Company ceases to have significant influence over an associate. When the Company retains an interest in the former associate, the Company measures the retained interest at fair value at that date. The difference between the carrying amount of the associate at the date the equity method was discontinued, and the fair value of any retained interest and any proceeds from disposing of a part interest in the associate is included in the determination of the gain or loss on disposal of the associate. In addition, the Company shall account for all amounts recognized in other comprehensive income in relation to that associate on the same basis as would be required if the associate had directly disposed of the related assets or liabilities. If the Company's ownership interest in an associate is reduced as a result of disposal, but the investment continues to be an associate, the Company should reclassify to profit or loss only a proportionate amount of the gain or loss previously recognized in other comprehensive income.

When the Company subscribes to additional shares in an associate at a percentage different from its existing ownership percentage, the resulting carrying amount of the investment differs from the amount of the Company's proportionate interest in the net assets of the associate. The Company records such a difference as an adjustment to investments with the corresponding amount charged or credited to capital surplus. If the Company's ownership interest is reduced due to the additional subscription to the shares of associate by other investors, the proportionate amount of the gains or losses previously recognized in other comprehensive income in relation to that associate shall be reclassified to profit or loss on the same basis as would be required if the associate had directly disposed of the related assets or liabilities.

When the Company transacts with an associate, profits and losses resulting from the transactions with the associate are recognized in the Company's parent company only financial statements only to the extent of interests in the associate that are not owned by the Company.

Property, Plant and Equipment

Property, plant and equipment are measured at cost less accumulated depreciation and accumulated impairment. Costs include any incremental costs that are directly attributable to the construction or acquisition of the item of property, plant and equipment.

Property, plant and equipment in the course of construction for production, supply or administrative purposes are carried at cost, less any recognized impairment loss. Such assets are classified to the appropriate categories of property, plant and equipment when completed and ready for intended use. Depreciation of these assets, on the same basis as other identical categories of property, plant and equipment, commences when the assets are available for their intended use.

Depreciation is recognized so as to write off the cost of the assets less their residual values over their useful lives, and it is computed using the straight-line method over the following estimated useful lives: buildings - 10 to 20 years; machinery and equipment - 2 to 5 years; and office equipment - 3 to 5 years. The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimates accounted for on a prospective basis. Land is not depreciated.

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use of the assets. Any gain or loss arising on the disposal or retirement of an item of property, plant and equipment is determined as the difference between the sales proceeds and the carrying amount of the asset and is recognized in profit or loss.

Leases

Leases are classified as finance lease whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

The Company as lessor

Rental income from operating leases is recognized on a straight-line basis over the term of the relevant lease.

The Company as lessee

Operating lease payments are recognized as an expense on a straight-line basis over the lease term.

Intangible Assets

Goodwill

Goodwill arising on an acquisition of a business is carried at cost as established at the date of acquisition of the business less accumulated impairment losses, if any.

Other intangible assets

Other separately acquired intangible assets with finite useful lives are carried at cost less accumulated amortization and accumulated impairment losses. Amortization is recognized using the straight-line method over the following estimated useful lives: Technology license fees - the estimated life of the technology or the term of the technology transfer contract; software and system design costs - 3 years or contract period; patent and others - the economic life or contract period. The estimated useful life and amortization method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for on a prospective basis.

Impairment of Tangible and Intangible Assets

Goodwill

Goodwill is not amortized and instead is tested for impairment annually, or more frequently when there is an indication that the cash generating unit may be impaired. For the purpose of impairment testing, goodwill is allocated to each of the Company's cash generating units or groups of cash-generating units that are expected to benefit. If the recoverable amount of a cash generating unit is less than its carrying amount, the difference is allocated first to reduce the carrying amount of any goodwill allocated to such cash-generating unit and then to the other assets of the cash generating unit pro rata based on the carrying amount of each asset in the cash generating unit. Any impairment loss for goodwill is recognized directly in profit or loss. An impairment loss recognized for goodwill is not reversed in subsequent periods.

Other tangible and intangible assets

At the end of each reporting period, the Company reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss. When it is not possible to estimate the recoverable amount of an individual asset, the Company estimates the recoverable amount of the cash-generating unit to which the asset belongs. When a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual cash-generating units, or otherwise they are allocated to the smallest group of cash-generating units for which a reasonable and consistent allocation basis can be identified.

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset or cash-generating unit is estimated to be less than its carrying amount, the carrying amount of the asset or cash-generating unit is reduced to its recoverable amount. An impairment loss is recognized immediately in profit or loss.

When an impairment loss subsequently reverses, the carrying amount of the asset or a cash-generating unit is increased to the revised estimate of its recoverable amount, but the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset or cash-generating unit in prior years. A reversal of an impairment loss is recognized immediately in profit or loss.

Provision

Provisions are recognized when the Company has a present obligation (legal or constructive) as a result of a past event, it is probable that the Company will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation.

The amount recognized as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking into account the risks and uncertainties surrounding the obligation. When a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows.

Guarantee Deposit

Guarantee deposit mainly consists of cash received under deposit agreements with customers to ensure they have access to the Company's specified capacity; and as guarantee of accounts receivable to ensure payment from customers. Cash received from customers is recorded as guarantee deposit upon receipt. Guarantee deposits are refunded to customers when terms and conditions set forth in the deposit agreements have been satisfied.

Revenue Recognition

2018

The Company recognizes revenue when performance obligations are satisfied. The performance obligations are satisfied when customers obtain control of the promised goods which is generally when the goods are delivered to the customers' specified locations.

Revenue from sale of goods is measured at the fair value of the consideration received or receivable. Revenue is reduced for estimated customer returns, rebates and other similar allowances. Estimated sales returns and other allowances is generally made and adjusted based on historical experience and the consideration of varying contractual terms to recognize refund liabilities, which is classified under accrued expenses and other current liabilities.

In principle, payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. Due to the short term nature of the receivables from sale of goods with the immaterial discounted effect, the Company measures them at the original invoice amounts without discounting.

2017

Revenue is measured at the fair value of the consideration received or receivable. Revenue is reduced for estimated customer returns, rebates and other similar allowances.

Sale of goods

Revenue from the sale of goods is recognized when the goods are delivered and titles have passed, at which time all the following conditions are satisfied:

- The Company has transferred to the buyer the significant risks and rewards of ownership of the goods;
- The Company retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- The amount of revenue can be measured reliably;
- It is probable that the economic benefits associated with the transaction will flow to the Company; and
- The costs incurred or to be incurred in respect of the transaction can be measured reliably.

In principle, payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. Due to the short term nature of the receivables from sale of goods with the immaterial discounted effect, the Company measures them at the original invoice amounts without discounting.

Dividend and interest income

Dividend income from investments is recognized when the shareholder's right to receive payment has been established, provided that it is probable that the economic benefits will flow to the Company and the amount of income can be measured reliably.

Interest income from a financial asset is recognized when it is probable that the economic benefits will flow to the Company and the amount of income can be measured reliably. Interest income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable.

Employee Benefits

Short-term employee benefits

Liabilities recognized in respect of short-term employee benefits are measured at the undiscounted amount of the benefits expected to be paid in exchange for service rendered by employees.

Retirement benefits

For defined contribution retirement benefit plans, payments to the benefit plan are recognized as an expense when the employees have rendered service entitling them to the contribution. For defined benefit retirement benefit plans, the cost of providing benefit is recognized based on actuarial calculations.

Defined benefit costs (including service cost, net interest and rereasurement) under the defined benefit retirement benefit plans are determined using the Projected Unit Credit Method. Service cost (including current service cost), and net interest on the net defined benefit liability (asset) are recognized as employee benefits expense in the period they occur. Rereasurement, comprising actuarial gains and losses and the return on plan assets (excluding interest), is recognized in other comprehensive income in the period in which they occur. Rereasurement recognized in other comprehensive income is reflected immediately in retained earnings and will not be reclassified to profit or loss.

Net defined benefit liability represents the actual deficit in the Company's defined benefit plan.

Taxation

Income tax expense represents the sum of the tax currently payable and deferred tax.

Current tax

Income tax on unappropriated earnings is expensed in the year the shareholders approved the appropriation of earnings which is the year subsequent to the year the earnings are generated.

Adjustments of prior years' tax liabilities are added to or deducted from the current year's tax provision.

Deferred tax

Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities in the parent company only financial statements and the corresponding tax bases used in the computation of taxable profit. Deferred tax liabilities are generally recognized for all taxable temporary differences. Deferred tax assets are generally recognized for all deductible temporary differences and tax credits for research and development expenses to the extent that it is probable that taxable profits will be available against which those deductible temporary differences can be utilized.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in subsidiaries and associates, except where the Company is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. Deferred tax assets arising from deductible temporary differences associated with such investments are only recognized to the extent that it is probable that there will be sufficient taxable profits against which to utilize the benefits of the temporary differences and they are expected to reverse in the foreseeable future.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the deferred tax asset to be recovered. The deferred tax assets which originally not recognized is also reviewed at the end of each reporting period and recognized to the extent that it is probable that sufficient taxable profits will be available to allow all or part of the deferred tax asset to be recovered.

Deferred tax liabilities and assets are measured at the tax rates that are expected to apply in the year in which the liability is settled or the asset is realized, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Company expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Current and deferred tax for the year

Current and deferred tax are recognized in profit or loss, except when they relate to items that are recognized in other comprehensive income or directly in equity, in which case, the current and deferred tax are also recognized in other comprehensive income or directly in equity, respectively.

5. CRITICAL ACCOUNTING JUDGMENTS AND KEY SOURCES OF ESTIMATION AND UNCERTAINTY

In the application of the aforementioned Company's accounting policies, the Company is required to make judgments, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the year in which the estimate is revised if the revision affects only that year, or in the year of the revision and future years if the revision affects both current and future years.

Revenue Recognition

The Company recognizes revenue when the conditions described in Note 4 are satisfied. The Company also records estimated future returns and other allowances in the same period the related revenue is recorded. Estimated sales returns and other allowances is generally made and adjusted based on historical experience and the consideration of varying contractual terms, and the Company periodically reviews the adequacy of the estimation used.

Timing to commence depreciation of property, plant and equipment

As described in Note 4, depreciation of property, plant and equipment begins when the assets are available for use, and in the condition necessary for the assets to be capable of operating in the intended manner. The criteria to determine whether assets are available for their intended use vary within categories of assets as well as involve subjective judgments, thus validity of the timing to commence depreciation of property, plant and equipment could have a material impact on the Company's financial performance.

Impairment of Tangible and Intangible Assets Other than Goodwill

In the process of evaluating the potential impairment of tangible and intangible assets other than goodwill, the Company is required to make subjective judgments in determining the independent cash flows, useful lives, expected future revenue and expenses related to the specific asset groups with the consideration of the nature of semiconductor industry. Any changes in these estimates based on changed economic conditions or business strategies could result in significant impairment charges or reversal in future years.

Impairment of Goodwill

The assessment of impairment of goodwill requires the Company to make subjective judgment to determine the identified cash-generating units, allocate the goodwill to relevant cash-generating units and estimate the recoverable amount of relevant cash-generating units.

Impairment Assessment on Investment Using Equity Method

The Company assesses the impairment of investments accounted for using the equity method whenever triggering events or changes in circumstances indicate that an investment may be impaired and carrying value may not be recoverable. The Company measures the impairment based on a projected future cash flow of the investees, including the underlying assumptions of sales growth rate and capacity utilization rate formulated by such investees' internal management team. The Company also takes into account market conditions and the relevant industry trends to ensure the reasonableness of such assumptions.

Realization of Deferred Income Tax Assets

Deferred tax assets are recognized to the extent that it is probable that future taxable profits will be available against which those deferred tax assets can be utilized. Assessment of the realization of the deferred tax assets requires subjective judgment and estimate, including the future revenue growth and profitability, tax holidays, the amount of tax credits can be utilized and feasible tax planning strategies. Any changes in the global economic environment, the industry trends and relevant laws and regulations could result in significant adjustments to the deferred tax assets.

Valuation of Inventory

Inventories are stated at the lower of cost or net realizable value, and the Company uses judgment and estimate to determine the net realizable value of inventory at the end of each reporting period.

The Company estimates the net realizable value of inventory for obsolescence and unmarketable items at the end of reporting period and then writes down the cost of inventories to net realizable value. The net realizable value of the inventory is mainly determined based on assumptions of future demand within a specific time horizon.

Recognition and Measurement of Defined Benefit Plans

Net defined benefit liability and the resulting defined benefit costs under defined benefit pension plans are calculated using the Projected Unit Credit Method. Actuarial assumptions comprise the discount rate, rate of employee turnover, and future salary increase rate. Changes in economic circumstances and market conditions will affect these assumptions and may have a material impact on the amount of the expense and the liability.

6. CASH AND CASH EQUIVALENTS

	December 31, 2018	December 31, 2017
Cash and deposits in banks	\$ 238,473,857	\$ 239,176,841
Repurchase agreements collateralized by corporate bonds	1,229,600	-
Commercial paper	<u>499,068</u>	<u>-</u>
	<u>\$ 240,202,525</u>	<u>\$ 239,176,841</u>

Deposits in banks consisted of highly liquid time deposits that were readily convertible to known amounts of cash and were subject to an insignificant risk of changes in value.

7. FINANCIAL ASSETS AND LIABILITIES AT FAIR VALUE THROUGH PROFIT OR LOSS

	December 31, 2018	December 31, 2017
<u>Financial assets</u>		
Mandatorily measured at FVTPL		
Forward exchange contracts	\$ 54,115	\$ -
Held for trading		
Forward exchange contracts	<u>-</u>	<u>373,351</u>
	<u>\$ 54,115</u>	<u>\$ 373,351</u>
<u>Financial liabilities</u>		
Held for trading		
Forward exchange contracts	<u>\$ 30,232</u>	<u>\$ 18,764</u>

The Company entered into derivative contracts to manage exposures due to fluctuations of foreign exchange rates. These derivative contracts did not meet the criteria for hedge accounting. Therefore, the Company did not apply hedge accounting treatment for these derivative contracts.

Outstanding forward exchange contracts consisted of the following:

	Maturity Date	Contract Amount (In Thousands)
<u>December 31, 2018</u>		
Sell NT\$/Buy EUR	January 2019 to March 2019	NT\$18,545,854/EUR527,000
Sell NT\$/Buy JPY	January 2019 to March 2019	NT\$4,757,858/JPY17,200,000
Sell US\$/Buy JPY	January 2019	US\$162,834/JPY17,976,014
Sell US\$/Buy NT\$	January 2019	US\$110,000/NT\$3,386,459
<u>December 31, 2017</u>		
Sell NT\$/Buy EUR	January 2018 to February 2018	NT\$6,002,786/EUR169,000
Sell NT\$/Buy JPY	February 2018	NT\$996,294/JPY3,800,000
Sell US\$/Buy NT\$	January 2018	US\$1,643,000/NT\$49,120,205

8. HEDGING FINANCIAL INSTRUMENTS

2018

**December 31,
2018**

Financial assets- current

Cash flow hedges

Forward exchange contracts

\$ 23,497

Financial liabilities- current

Cash flow hedges

Forward exchange contracts

\$ 1,941

The Company entered into forward exchange contracts and foreign currency deposits to partially hedge foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). The hedge ratio is adjusted in response to the changes in the financial market and capped at 100%. The forward exchange contracts have maturities of 12 months or less.

On the basis of economic relationships, the Company expects that the value of forward exchange contracts and foreign currency deposits and the value of hedged transactions will change in opposite directions in response to movements in foreign exchange rates.

The main source of hedge ineffectiveness in these hedging relationships is driven by the effect of the counterparty's own credit risk on the fair value of forward exchange contracts and foreign currency deposits. No other sources of ineffectiveness emerged from these hedging relationships. For the year ended December 31, 2018, refer to Note 20(d) for gain or loss arising from changes in the fair value of hedging instruments and the amount transferred to initial carrying amount of hedged items.

The following tables summarize the information relating to the hedges for foreign currency risk as of December 31, 2018.

Hedging Instruments	Contract Amount (in Thousands)	Maturity	Balance in Other Equity (Continuing Hedges)
Forward exchange contracts	NT\$3,917,657/EUR112,000	February 2019 to April 2019	\$ 23,601

The effect for the year ended December 31, 2018 is detailed below:

Hedged Items	Increase (Decrease) in Value Used for Calculating Hedge Ineffectiveness
Hedging Instruments	
Forward exchange contracts	\$ 34,563
Foreign currency deposits	<u>6,412</u>
	<u>\$ 40,975</u>
Hedged Items	
Forecast transaction (capital expenditures)	<u>\$ (40,975)</u>

2017

The Company's hedging policies for 2017 are the same as those mentioned previously in 2018, the instruments employed are as follows:

	December 31, 2017
<u>Financial assets- current</u>	
Cash flow hedges	
Forward exchange contracts	<u>\$ 7,378</u>
<u>Financial liabilities- current</u>	
Cash flow hedges	
Forward exchange contracts	<u>\$ 15,562</u>

The Company entered into forward exchange contracts to partially hedge foreign exchange rate risks associated with certain highly probable forecast transactions (capital expenditures). These contracts have maturities of 12 months or less.

Outstanding forward exchange contracts consisted of the following:

	Maturity Date	Contract Amount (In Thousands)
<u>December 31, 2017</u>		
Sell NT\$/Buy EUR	February 2018 to May 2018	NT\$2,649,104/EUR75,000

9. NOTES AND ACCOUNTS RECEIVABLE, NET

	December 31, 2018	December 31, 2017
At amortized cost		
Notes and accounts receivable	\$ 33,097,452	\$ 27,124,552
Less: Loss allowance	<u>(7,132)</u>	<u>(469,125)</u>
	33,090,320	26,655,427
At FVTOCI	<u>3,595,069</u>	<u>-</u>
	<u>\$ 36,685,389</u>	<u>\$ 26,655,427</u>

The Company signed a contract with the bank to sell certain accounts receivable without recourse and transaction cost required. These accounts receivable are classified as at FVTOCI because they are held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets.

2018

In principle, the payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month when the invoice is issued. Aside from recognizing impairment losses on credit-impaired accounts receivable, the Company recognizes loss allowance based on the expected credit loss ratio of customers by different risk levels. Such risk levels are determined with factors of historical loss ratios and customers' financial conditions, competitiveness and business outlook. For accounts receivable past due over 90 days without collaterals or guarantees, the Company recognizes loss allowance at full amount.

Aging analysis of notes and accounts receivable, net

	December 31, 2018
Not past due	\$ 29,258,313
Past due	
Past due within 30 days	6,956,366
Past due 31-60 days	464,879
Past due 61-120 days	2,872
Past due over 121 days	<u>2,959</u>
	<u>\$ 36,685,389</u>

Movements of the loss allowance for accounts receivable

Balance at January 1, 2018 (IAS 39)	\$ 469,125
Effect of retrospective application of IFRS 9	<u>(244,773)</u>
Balance at January 1, 2018 (IFRS 9)	224,352
Provision (Reversal)	<u>(217,220)</u>
Balance at December 31, 2018	<u>\$ 7,132</u>

For the year ended December 31, 2018, the decrease in loss allowance was mainly due to the variations from accounts receivable balance of different risk levels.

2017

In principle, the payment term granted to customers is due 30 days from the invoice date or 30 days from the end of the month of when the invoice is issued. The allowance for doubtful receivables is assessed by reference to the collectability of receivables by performing the account aging analysis, historical experience and current financial condition of customers.

Except for those impaired, for the rest of the notes and accounts receivable, the account aging analysis at the end of the reporting period is summarized in the following table. There was no impairment concern for the accounts receivable that were past due without recognizing a specific allowance for doubtful receivables since there was no significant change in the credit quality of its customers after the assessment. In addition, the Company's subsidiary has obtained guarantee of NT\$2,427,548 thousand against certain receivables.

Aging analysis of notes and accounts receivable, net

	December 31, 2017
Neither past due nor impaired	\$ 19,632,314
Past due but not impaired	
Past due within 30 days	5,169,209
Past due 31-60 days	929,672
Past due 61-120 days	582,821
Past due over 121 days	<u>341,411</u>
	<u>\$ 26,655,427</u>

Movements of the allowance for doubtful receivables

	Individually Assessed for Impairment	Collectively Assessed for Impairment	Total
Balance at January 1, 2017	\$ -	\$ 475,430	\$ 475,430
Reversal/Write-off	<u>-</u>	<u>(6,305)</u>	<u>(6,305)</u>
Balance at December 31, 2017	<u>\$ -</u>	<u>\$ 469,125</u>	<u>\$ 469,125</u>

10. INVENTORIES

	December 31, 2018	December 31, 2017
Finished goods	\$ 10,920,351	\$ 9,596,837
Work in process	70,405,998	52,166,234
Raw materials	14,110,534	6,566,716
Supplies and spare parts	<u>2,651,277</u>	<u>1,967,658</u>
	<u>\$ 98,088,160</u>	<u>\$ 70,297,445</u>

Write-down of inventories to net realizable value (excluding computer virus outbreak losses) and reversal of write-down of inventories resulting from the increase in net realizable value in the amount of NT\$1,098,915 thousand and NT\$878,346 thousand, respectively, were included in the cost of revenue for the years ended December 31, 2018 and 2017. Please refer to computer virus outbreak losses in Note 35.

11. INVESTMENTS ACCOUNTED FOR USING EQUITY METHOD

Investments accounted for using the equity method consisted of the following:

	December 31, 2018	December 31, 2017
Subsidiaries	\$ 531,717,913	\$ 446,148,086
Associates	<u>17,842,971</u>	<u>17,838,278</u>
	<u>\$ 549,560,884</u>	<u>\$ 463,986,364</u>

a. Investments in subsidiaries

Subsidiaries consisted of the following:

Subsidiaries	Principal Activities	Place of Incorporation and Operation	Carrying Amount		% of Ownership and Voting Rights Held by the Company	
			December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
TSMC Global Ltd. (TSMC Global)	Investment activities	Tortola, British Virgin Islands	\$ 393,577,931	\$ 309,211,877	100%	100%
TSMC China Company Limited (TSMC China)	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	Shanghai, China	55,466,911	51,060,885	100%	100%
TSMC Partners, Ltd. (TSMC Partners)	Investing in companies involved in the design, manufacture, and other related business in the semiconductor industry and other investment activities	Tortola, British Virgin Islands	52,339,094	49,684,287	100%	100%
TSMC Nanjing Company Limited (TSMC Nanjing)	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	Nanjing, China	20,601,413	26,493,740	100%	100%
VisEra Technologies Company Ltd. (VisEra Tech)	Engaged in manufacturing electronic spare parts and in researching, developing, designing, manufacturing, selling, packaging and testing of color filter	Hsinchu, Taiwan	4,531,929	4,667,162	87%	87%
TSMC North America	Selling and marketing of integrated circuits and other semiconductor devices	San Jose, California, U.S.A.	4,269,393	4,001,003	100%	100%
TSMC Europe B.V. (TSMC Europe)	Customer service and supporting activities	Amsterdam, the Netherlands	445,828	407,324	100%	100%
VentureTech Alliance Fund III, L.P. (VTAF III)	Investing in new start-up technology companies	Cayman Islands	194,660	152,836	98%	98%
VentureTech Alliance Fund II, L.P. (VTAF II)	Investing in new start-up technology companies	Cayman Islands	128,758	320,533	98%	98%
TSMC Japan Limited (TSMC Japan)	Customer service and supporting activities	Yokohama, Japan	141,136	129,446	100%	100%
TSMC Korea Limited (TSMC Korea)	Customer service and supporting activities	Seoul, Korea	40,966	39,210	100%	100%
TSMC Solar Europe GmbH	Selling of solar related products and providing customer service	Hamburg, Germany	<u>(20,106)</u>	<u>(20,217)</u>	100%	100%
			<u>\$ 531,717,913</u>	<u>\$ 446,148,086</u>		

TSMC Solar Europe GmbH is under liquidation procedures.

In both 2018 and 2017, the Company continually increased its investment in TSMC Nanjing for the amount of NT\$2,361,320 thousand and NT\$21,724,892 thousand. This project was approved by the Investment Commission, Ministry of Economic Affairs, R.O.C. (MOEA).

To lower the hedging cost, in both of 2018 and 2017, the Company continually increased its investment in TSMC Global for the amount of NT\$62,272,080 thousand and NT\$60,683,010 thousand, respectively. This project was approved by the Investment Commission, MOEA.

b. Investments in associates

Associates consisted of the following:

Name of Associate	Principal Activities	Place of Incorporation and Operation	Carrying Amount		% of Ownership and Voting Rights Held by the Company	
			December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Vanguard International Semiconductor Corporation (VIS)	Manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing and design service of masks	Hsinchu, Taiwan	\$ 9,006,126	\$ 8,568,344	28%	28%
Systems on Silicon Manufacturing Company Pte Ltd. (SSMC)	Manufacturing and selling of integrated circuits and other semiconductor devices	Singapore	5,772,815	5,677,640	39%	39%
Xintec Inc. (Xintec)	Wafer level chip size packaging and wafer level post passivation interconnection service	Taoyuan, Taiwan	1,764,607	2,292,100	41%	41%
Global Unichip Corporation (GUC)	Researching, developing, manufacturing, testing and marketing of integrated circuits	Hsinchu, Taiwan	<u>1,299,423</u>	<u>1,300,194</u>	35%	35%
			<u>\$ 17,842,971</u>	<u>\$ 17,838,278</u>		

As of December 31, 2018 and 2017, no investments in associates are individually material to the Company. Please refer to the parent company only statements of comprehensive income for recognition of share of both profit (loss) and other comprehensive income (loss) of associates that are not individually material.

The market prices of the investments accounted for using the equity method in publicly traded stocks calculated by the closing price at the end of the reporting period are summarized as follows. The closing price represents the quoted price in active markets, the level 1 fair value measurement.

Name of Associate	December 31, 2018	December 31, 2017
VIS	<u>\$ 27,621,298</u>	<u>\$ 30,638,751</u>
GUC	<u>\$ 9,617,699</u>	<u>\$ 11,905,404</u>
Xintec	<u>\$ 3,783,585</u>	<u>\$ 9,180,759</u>

12. PROPERTY, PLANT AND EQUIPMENT

	Land	Buildings	Machinery and Equipment	Office Equipment	Equipment under Installation and Construction in Progress	Total
<u>Cost</u>						
Balance at January 1, 2018	\$ 3,212,000	\$ 357,391,050	\$ 2,369,226,722	\$ 39,403,217	\$ 144,776,878	\$ 2,914,009,867
Additions (Deductions)	-	24,665,225	231,468,189	5,036,411	26,500,451	287,670,276
Disposals or retirements	-	(410,891)	(15,065,446)	(716,942)	-	(16,193,279)
Balance at December 31, 2018	<u>\$ 3,212,000</u>	<u>\$ 381,645,384</u>	<u>\$ 2,585,629,465</u>	<u>\$ 43,722,686</u>	<u>\$ 171,277,329</u>	<u>\$ 3,185,486,864</u>
<u>Accumulated depreciation and impairment</u>						
Balance at January 1, 2018	\$ -	\$ 176,623,784	\$ 1,695,482,201	\$ 25,547,912	\$ -	\$ 1,897,653,897
Additions	-	22,534,543	246,686,584	5,119,413	-	274,340,540
Disposals or retirements	-	(398,955)	(11,102,618)	(716,409)	-	(12,217,982)
	-	-	423,468	-	-	423,468
Balance at December 31, 2018	<u>\$ -</u>	<u>\$ 198,759,372</u>	<u>\$ 1,931,489,635</u>	<u>\$ 29,950,916</u>	<u>\$ -</u>	<u>\$ 2,160,199,923</u>
Carrying amounts at December 31, 2018	<u>\$ 3,212,000</u>	<u>\$ 182,886,012</u>	<u>\$ 654,139,830</u>	<u>\$ 13,771,770</u>	<u>\$ 171,277,329</u>	<u>\$ 1,025,286,941</u>
<u>Cost</u>						
Balance at January 1, 2017	\$ 3,212,000	\$ 281,936,412	\$ 1,960,457,480	\$ 31,830,657	\$ 384,197,526	\$ 2,661,634,075
Additions (Deductions)	-	75,491,595	458,690,837	7,888,336	(239,420,648)	302,650,120
Disposals or retirements	-	(36,957)	(49,921,595)	(315,776)	-	(50,274,328)
Balance at December 31, 2017	<u>\$ 3,212,000</u>	<u>\$ 357,391,050</u>	<u>\$ 2,369,226,722</u>	<u>\$ 39,403,217</u>	<u>\$ 144,776,878</u>	<u>\$ 2,914,009,867</u>
<u>Accumulated depreciation and impairment</u>						
Balance at January 1, 2017	\$ -	\$ 156,854,513	\$ 1,504,061,808	\$ 21,316,417	\$ -	\$ 1,682,232,738
Additions	-	19,798,087	226,251,816	4,547,232	-	250,597,135
Disposals or retirements	-	(28,816)	(34,831,423)	(315,737)	-	(35,175,976)
Balance at December 31, 2017	<u>\$ -</u>	<u>\$ 176,623,784</u>	<u>\$ 1,695,482,201</u>	<u>\$ 25,547,912</u>	<u>\$ -</u>	<u>\$ 1,897,653,897</u>
Carrying amounts at December 31, 2017	<u>\$ 3,212,000</u>	<u>\$ 180,767,266</u>	<u>\$ 673,744,521</u>	<u>\$ 13,855,305</u>	<u>\$ 144,776,878</u>	<u>\$ 1,016,355,970</u>

The significant part of the Company's buildings includes main plants, mechanical and electrical power equipment and clean rooms, and the related depreciation is calculated using the estimated useful lives of 20 years, 10 years and 10 years, respectively.

For the year ended December 31, 2018, the Company recognized an impairment loss of NT\$423,468 thousand for certain machinery and equipment that was assessed to have no future use, and the recoverable amount of certain machinery and equipment was nil. Such impairment loss was recognized in other operating income and expenses.

13. INTANGIBLE ASSETS

	Goodwill	Technology License Fees	Software and System Design Costs	Patent and Others	Total
<u>Cost</u>					
Balance at January 1, 2018	\$ 1,567,756	\$ 10,388,175	\$ 24,963,709	\$ 5,590,392	\$ 42,510,032
Additions	-	533,669	4,361,894	2,017,145	6,912,708
Disposals or retirements	-	-	(185,592)	-	(185,592)
Balance at December 31, 2018	<u>\$ 1,567,756</u>	<u>\$ 10,921,844</u>	<u>\$ 29,140,011</u>	<u>\$ 7,607,537</u>	<u>\$ 49,237,148</u>
<u>Accumulated amortization and impairment</u>					
Balance at January 1, 2018	\$ -	\$ 7,639,775	\$ 20,282,457	\$ 4,717,673	\$ 32,639,905
Additions	-	1,063,616	2,766,396	522,835	4,352,847
Disposals or retirements	-	-	(185,534)	-	(185,534)
Balance at December 31, 2018	<u>\$ -</u>	<u>\$ 8,703,391</u>	<u>\$ 22,863,319</u>	<u>\$ 5,240,508</u>	<u>\$ 36,807,218</u>
Carrying amounts at December 31, 2018	<u>\$ 1,567,756</u>	<u>\$ 2,218,453</u>	<u>\$ 6,276,692</u>	<u>\$ 2,367,029</u>	<u>\$ 12,429,930</u>
<u>Cost</u>					
Balance at January 1, 2017	\$ 1,567,756	\$ 9,490,320	\$ 22,063,589	\$ 5,241,203	\$ 38,362,868
Additions	-	897,855	2,900,120	349,189	4,147,164
Balance at December 31, 2017	<u>\$ 1,567,756</u>	<u>\$ 10,388,175</u>	<u>\$ 24,963,709</u>	<u>\$ 5,590,392</u>	<u>\$ 42,510,032</u>
<u>Accumulated amortization and impairment</u>					
Balance at January 1, 2017	\$ -	\$ 6,091,513	\$ 17,991,500	\$ 4,231,864	\$ 28,314,877
Additions	-	1,548,262	2,290,957	485,809	4,325,028
Balance at December 31, 2017	<u>\$ -</u>	<u>\$ 7,639,775</u>	<u>\$ 20,282,457</u>	<u>\$ 4,717,673</u>	<u>\$ 32,639,905</u>
Carrying amounts at December 31, 2017	<u>\$ 1,567,756</u>	<u>\$ 2,748,400</u>	<u>\$ 4,681,252</u>	<u>\$ 872,719</u>	<u>\$ 9,870,127</u>

The Company's goodwill has been tested for impairment at the end of the annual reporting period and the recoverable amount is determined based on the value in use. The value in use was calculated based on the cash flow forecast from the financial budgets covering the future five-year period, and the Company used annual discount rates of 9.0% and 8.5% in its test of impairment as of December 31, 2018 and 2017, respectively, to reflect the relevant specific risk in the cash-generating unit.

For the years ended December 31, 2018 and 2017, the Company did not recognize any impairment loss on goodwill.

14. OTHER ASSETS

	December 31, 2018	December 31, 2017
Tax receivable	\$ 3,245,082	\$ 1,992,258
Prepaid expenses	939,176	492,247
Others	<u>660</u>	<u>287</u>
	<u>\$ 4,184,918</u>	<u>\$ 2,484,792</u>

15. SHORT-TERM LOANS

	December 31, 2018	December 31, 2017
Unsecured loans	\$ 88,754,640	\$ 63,766,850
Related parties unsecured loans	<u>3,227,700</u>	<u>-</u>
	<u>\$ 91,982,340</u>	<u>\$ 91,982,340</u>
Original loan content		
US\$ (in thousands)	\$ 2,715,000	\$ 2,150,000
EUR(in thousands)	242,000	-
Annual interest rate	0.01%-3.22%	1.54%-1.82%
Maturity date	Due by April 2019	Due by February 2018

The annual interest rate of short-term loans from related parties was not significantly different from those of sales to third parties.

16. PROVISIONS

The Company's current provisions were provisions for sales returns and allowances.

	Sales Returns and Allowances
<u>Year Ended December 31, 2017</u>	
Balance, beginning of year	\$ 16,991,612
Provision	44,244,876
Payment	<u>(48,061,663)</u>
Balance, end of year	<u>\$ 13,174,825</u>

Provisions for sales returns and allowances are estimated based on historical experience and the consideration of varying contractual terms, and are recognized as a reduction of revenue in the same year of the related product sales.

Starting from 2018, the Company recognizes the estimation of sales returns and allowance as refund liability (classified under accrued expenses and other current liabilities) upon initial application of IFRS 15.

17. BONDS PAYABLE

	December 31, 2018	December 31, 2017
Domestic unsecured bonds	\$ 91,800,000	\$ 116,100,000
Less: Current portion	<u>(34,900,000)</u>	<u>(24,300,000)</u>
	<u>\$ 56,900,000</u>	<u>\$ 91,800,000</u>

The major terms of domestic unsecured bonds are as follows:

Issuance	Tranche	Issuance Period	Total Amount	Coupon Rate	Repayment and Interest Payment
100-1	B	September 2011 to September 2018	\$ 7,500,000	1.63%	Bullet repayment; interest payable annually
100-2	A	January 2012 to January 2017	10,000,000	1.29%	The same as above
	B	January 2012 to January 2019	7,000,000	1.46%	The same as above
101-1	A	August 2012 to August 2017	9,900,000	1.28%	The same as above
	B	August 2012 to August 2019	9,000,000	1.40%	The same as above
101-2	A	September 2012 to September 2017	12,700,000	1.28%	The same as above
	B	September 2012 to September 2019	9,000,000	1.39%	The same as above
101-3	-	October 2012 to October 2022	4,400,000	1.53%	The same as above
101-4	A	January 2013 to January 2018	10,600,000	1.23%	The same as above
	B	January 2013 to January 2020	10,000,000	1.35%	The same as above
	C	January 2013 to January 2023	3,000,000	1.49%	The same as above
102-1	A	February 2013 to February 2018	6,200,000	1.23%	The same as above
	B	February 2013 to February 2020	11,600,000	1.38%	The same as above
	C	February 2013 to February 2023	3,600,000	1.50%	The same as above
102-2	A	July 2013 to July 2020	10,200,000	1.50%	The same as above
	B	July 2013 to July 2023	3,500,000	1.70%	The same as above
102-3	A	August 2013 to August 2017	4,000,000	1.34%	The same as above
	B	August 2013 to August 2019	8,500,000	1.52%	The same as above
102-4	B	September 2013 to September 2017	1,500,000	1.45%	The same as above
	C	September 2013 to March 2019	1,400,000	1.60%	Bullet repayment; interest payable annually (interest for the six months prior to maturity will accrue on the basis of actual days and be repayable at maturity)

(Continued)

Issuance	Tranche	Issuance Period	Total Amount	Coupon Rate	Repayment and Interest Payment
102-4	D	September 2013 to March 2021	\$ 2,600,000	1.85%	Bullet repayment; interest payable annually (interest for the six months prior to maturity will accrue on the basis of actual days and be repayable at maturity)
	E	September 2013 to March 2023	5,400,000	2.05%	The same as above
	F	September 2013 to September 2023	2,600,000	2.10%	Bullet repayment; interest payable annually (Concluded)

18. RETIREMENT BENEFIT PLANS

a. Defined contribution plans

The plan under the R.O.C. Labor Pension Act (the “Act”) is deemed a defined contribution plan. Pursuant to the Act, the Company has made monthly contributions equal to 6% of each employee’s monthly salary to employees’ pension accounts. Accordingly, the Company recognized expenses of NT\$2,028,928 thousand and NT\$1,905,444 thousand for the years ended December 31, 2018 and 2017, respectively.

b. Defined benefit plans

The Company has defined benefit plans under the R.O.C. Labor Standards Law that provide benefits based on an employee’s length of service and average monthly salary for the six-month period prior to retirement. The Company contributes an amount equal to 2% of salaries paid each month to their respective pension funds (the Funds), which are administered by the Labor Pension Fund Supervisory Committee (the Committee) and deposited in the Committee’s name in the Bank of Taiwan. Before the end of each year, the Company assesses the balance in the Funds. If the amount of the balance in the Funds is inadequate to pay retirement benefits for employees who conform to retirement requirements in the next year, the Company is required to fund the difference in one appropriation that should be made before the end of March of the next year. The Funds are operated and managed by the government’s designated authorities; as such, the Company does not have any right to intervene in the investments of the Funds.

Amounts recognized in respect of these defined benefit plans were as follows:

	Years Ended December 31	
	2018	2017
Current service cost	\$ 137,758	\$ 145,026
Net interest expense	<u>144,108</u>	<u>126,525</u>
Components of defined benefit costs recognized in profit or loss	<u>281,866</u>	<u>271,551</u>
Remeasurement on the net defined benefit liability:		
Return on plan assets (excluding amounts included in net interest expense)	(71,288)	29,290
Actuarial loss arising from experience adjustments	334,630	483,846
Actuarial loss(gain) arising from changes in financial assumptions	<u>597,820</u>	<u>(258,455)</u>
Components of defined benefit costs recognized in other comprehensive income	<u>861,162</u>	<u>254,681</u>
Total	<u>\$ 1,143,028</u>	<u>\$ 526,232</u>

The pension costs of the aforementioned defined benefit plans were recognized in profit or loss by the following categories:

	Years Ended December 31	
	2018	2017
Cost of revenue	\$ 177,772	\$ 175,357
Research and development expenses	79,143	75,340
General and administrative expenses	20,591	16,669
Marketing expenses	<u>4,360</u>	<u>4,185</u>
	<u>\$ 281,866</u>	<u>\$ 271,551</u>

The amounts arising from the defined benefit obligation of the Company were as follows:

	December 31, 2018	December 31, 2017
Present value of defined benefit obligation	\$ 13,662,684	\$ 12,774,593
Fair value of plan assets	<u>(4,011,279)</u>	<u>(3,923,889)</u>
Net defined benefit liability	<u>\$ 9,651,405</u>	<u>\$ 8,850,704</u>

Movements in the present value of the defined benefit obligation were as follows:

	Years Ended December 31	
	2018	2017
Balance, beginning of year	\$ 12,774,593	\$ 12,480,480
Current service cost	137,758	145,026
Interest expense	207,804	185,561
Remeasurement:		
Actuarial loss arising from experience adjustments	334,630	483,846
Actuarial loss (gain) arising from changes in financial assumptions	597,820	(258,455)
Benefits paid from plan assets	(274,326)	(261,865)
Benefits paid directly by the Company	<u>(115,595)</u>	<u>-</u>
Balance, end of year	<u>\$ 13,662,684</u>	<u>\$ 12,774,593</u>

Movements in the fair value of the plan assets were as follows:

	Years Ended December 31	
	2018	2017
Balance, beginning of year	\$ 3,923,889	\$ 3,929,072
Interest income	63,696	59,036
Remeasurement:		
Return on plan assets (excluding amounts included in net interest expense)	71,288	(29,290)
Contributions from employer	226,732	226,936
Benefits paid from plan assets	<u>(274,326)</u>	<u>(261,865)</u>
Balance, end of year	<u>\$ 4,011,279</u>	<u>\$ 3,923,889</u>

The fair value of the plan assets by major categories at the end of reporting period was as follows:

	December 31, 2018	December 31, 2017
Cash	\$ 756,126	\$ 707,477
Equity instruments	2,148,040	1,993,336
Debt instruments	<u>1,107,113</u>	<u>1,223,076</u>
	<u>\$ 4,011,279</u>	<u>\$ 3,923,889</u>

The actuarial valuations of the present value of the defined benefit obligation were carried out by qualified actuaries. The principal assumptions of the actuarial valuation were as follows:

	Measurement Date	
	December 31, 2018	December 31, 2017
Discount rate	1.30%	1.65%
Future salary increase rate	3.00%	3.00%

Through the defined benefit plans under the R.O.C. Labor Standards Law, the Company is exposed to the following risks:

- 1) Investment risk: The pension funds are invested in equity and debt securities, bank deposits, etc. The investment is conducted at the discretion of the government's designated authorities or under the mandated management. However, under the R.O.C. Labor Standards Law, the rate of return on assets shall not be less than the average interest rate on a two-year time deposit published by the local banks and the government is responsible for any shortfall in the event that the rate of return is less than the required rate of return.
- 2) Interest risk: A decrease in the government bond interest rate will increase the present value of the defined benefit obligation; however, this will be partially offset by an increase in the return on the debt investments of the plan assets.

Assuming a hypothetical decrease in interest rate at the end of the reporting period contributed to a decrease of 0.5% in the discount rate and all other assumptions were held constant, the present value of the defined benefit obligation would increase by NT\$921,750 thousand and NT\$890,116 thousand as of December 31, 2018 and 2017, respectively.

- 3) Salary risk: The present value of the defined benefit obligation is calculated by reference to the future salaries of plan participants. As such, an increase in the salary of the plan participants will increase the present value of the defined benefit obligation.

Assuming the expected salary rate increases by 0.5% at the end of the reporting period and all other assumptions were held constant, the present value of the defined benefit obligation would increase by NT\$901,629 thousand and NT\$873,801 thousand as of December 31, 2018 and 2017, respectively.

The sensitivity analysis presented above may not be representative of the actual change in the defined benefit obligation as it is unlikely that the change in assumptions would occur in isolation of one another as some of the assumptions may be correlated.

Furthermore, in presenting the above sensitivity analysis, the present value of the defined benefit obligation has been calculated using the projected unit credit method at the end of the reporting period, which is the same as that applied in calculating the defined benefit obligation liability.

The Company expects to make contributions of NT\$233,534 thousand to the defined benefit plans in the next year starting from December 31, 2018. The weighted average duration of the defined benefit obligation is 13 years.

19. GUARANTEE DEPOSITS

	December 31, 2018	December 31, 2017
Capacity guarantee	\$ 9,289,628	\$ 13,346,550
Others	<u>205,020</u>	<u>282,572</u>
	<u>\$ 9,494,648</u>	<u>\$ 13,629,122</u>
Current portion (classified under accrued expenses and other current liabilities)	\$ 6,148,000	\$ 6,046,643
Noncurrent portion	<u>3,346,648</u>	<u>7,582,479</u>
	<u>\$ 9,494,648</u>	<u>\$ 13,629,122</u>

Some of guarantee deposits were refunded to customers by offsetting related accounts receivable.

20. EQUITY

a. Capital stock

	December 31, 2018	December 31, 2017
Authorized shares (in thousands)	<u>28,050,000</u>	<u>28,050,000</u>
Authorized capital	<u>\$ 280,500,000</u>	<u>\$ 280,500,000</u>
Issued and paid shares (in thousands)	<u>25,930,380</u>	<u>25,930,380</u>
Issued capital	<u>\$ 259,303,805</u>	<u>\$ 259,303,805</u>

A holder of issued common shares with par value of NT\$10 per share is entitled to vote and to receive dividends.

The authorized shares include 500,000 thousand shares allocated for the exercise of employee stock options.

As of December 31, 2018, 1,068,157 thousand ADSs of the Company were traded on the NYSE. The number of common shares represented by the ADSs was 5,340,787 thousand shares (one ADS represents five common shares).

b. Capital surplus

	December 31, 2018	December 31, 2017
Additional paid-in capital	\$ 24,184,939	\$ 24,184,939
From merger	22,804,510	22,804,510
From convertible bonds	8,892,847	8,892,847
From share of changes in equities of subsidiaries	121,473	118,792
From share of changes in equities of associates	282,820	289,240
Donations	<u>29,343</u>	<u>19,208</u>
	<u>\$ 56,315,932</u>	<u>\$ 56,309,536</u>

Under the relevant laws, the capital surplus generated from donations and the excess of the issuance price over the par value of capital stock (including the stock issued for new capital, mergers and convertible bonds) may be used to offset a deficit; in addition, when the Company has no deficit, such capital surplus may be distributed as cash dividends or stock dividends up to a certain percentage of the Company's paid-in capital. The capital surplus from share of changes in equities of subsidiaries and associates and dividend of a claim extinguished by a prescription may be used to offset a deficit; however, when generated from issuance of restricted shares for employees, such capital surplus may not be used for any purpose.

c. Retained earnings and dividend policy

The Company's Articles of Incorporation provide that, when allocating the net profits for each fiscal year, the Company shall first offset its losses in previous years and then set aside the following items accordingly:

- 1) Legal capital reserve at 10% of the profits left over, until the accumulated legal capital reserve equals the Company's paid-in capital;
- 2) Special capital reserve in accordance with relevant laws or regulations or as requested by the authorities in charge;
- 3) Any balance left over shall be allocated according to the resolution of the shareholders' meeting.

TSMC's Articles of Incorporation provide the policy about the profit sharing bonus to employees, please refer to Note 28.

The Company's Articles of Incorporation also provide that profits of the Company may be distributed by way of cash dividend and/or stock dividend. However, distribution of earnings shall be made preferably by way of cash dividend. Distribution of earnings may also be made by way of stock dividend; provided that the ratio for stock dividend shall not exceed 50% of the total distribution.

Any appropriations of the profits are subject to shareholders' approval in the following year.

The appropriation for legal capital reserve shall be made until the reserve equals the Company's paid-in capital. The reserve may be used to offset a deficit, or be distributed as dividends in cash or stocks for the portion in excess of 25% of the paid-in capital if the Company incurs no loss.

Pursuant to existing regulations, the Company is required to set aside additional special capital reserve equivalent to the net debit balance of the other components of stockholders' equity, such as the accumulated balance of foreign currency translation reserve, unrealized valuation gain or loss from fair value through other comprehensive income financial assets, unrealized valuation gain or loss from available-for-sale financial assets, gain or loss from changes in fair value of hedging instruments in cash flow hedges, etc. For the subsequent decrease in the deduction amount to stockholders' equity, any special reserve appropriated may be reversed to the extent that the net debit balance reverses.

The appropriations of 2017 and 2016 earnings had been approved by the Company's shareholders in its meetings held on June 5, 2018 and June 8, 2017, respectively. The appropriations and dividends per share were as follows:

	Appropriation of Earnings		Dividends Per Share (NT\$)	
	For Fiscal Year 2017	For Fiscal Year 2016	For Fiscal Year 2017	For Fiscal Year 2016
Legal capital reserve	\$ 34,311,148	\$ 33,424,718		
Special capital reserve	26,907,527	-		
Cash dividends to shareholders	<u>207,443,044</u>	<u>181,512,663</u>	\$8	\$7
	<u>\$268,661,719</u>	<u>\$214,937,381</u>		

The Company's appropriation of earnings for 2018 had been approved in the meeting of the Board of Directors held on February 19, 2019. The appropriation and dividends per share were as follows:

	Appropriation of Earnings For Fiscal Year 2018	Dividends Per Share (NT\$) For Fiscal Year 2018
Legal capital reserve	\$ 35,113,088	
Special capital reserve	(11,459,458)	
Cash dividends to shareholders	<u>207,443,044</u>	\$ 8
	<u>\$ 231,096,674</u>	

The appropriation of earnings for 2018 is to be presented for approval in the Company's shareholders' meeting to be held on June 5, 2019 (expected).

d. Others

Changes in others were as follows:

	Year Ended December 31, 2018				
	Foreign Currency Translation Reserve	Unrealized Gain (Loss) on Financial Assets at FVTOCI	Gain (Loss) on Hedging Instruments	Unearned Stock-Based Compensation	Total
Balance, beginning of year (IFRS 9)	\$ (26,697,680)	\$ (524,915)	\$ 4,226	\$ (10,290)	\$ (27,228,659)
Exchange differences arising on translation of foreign operations	14,578,483	-	-	-	14,578,483
Unrealized gain (loss) on financial assets at FVTOCI					
Equity instruments	-	(1,189,957)	-	-	(1,189,957)
Cumulative unrealized gain (loss) of equity instruments transferred to retained earnings due to disposal	-	1,193,056	-	-	1,193,056
Gain (loss) arising on changes in the fair value of hedging instruments	-	-	40,975	-	40,975
Transferred to initial carrying amount of hedged items	-	-	(22,162)	-	(22,162)
Share of other comprehensive income (loss) of associates	76,850	(2,999,336)	-	-	(2,922,486)
Share of unearned stock-based employee compensation of associates	-	-	-	8,447	8,447
Income tax effect	-	91,828	562	-	92,390
Balance, end of year	<u>\$ (12,042,347)</u>	<u>\$ (3,429,324)</u>	<u>\$ 23,601</u>	<u>\$ (1,843)</u>	<u>\$ (15,449,913)</u>

	Year Ended December 31, 2017				
	Foreign Currency Translation Reserve	Unrealized Gain/Loss from Available-for- sale Financial Assets	Cash Flow Hedges Reserve	Unearned Stock-Based Employee Compensation	Total
Balance, beginning of year	\$ 1,661,237	\$ 2,641	\$ 105	\$ -	\$ 1,663,983
Exchange differences arising on translation of foreign operations	(28,270,770)	-	-	-	(28,270,770)
Changes in fair value of available-for-sale financial assets	-	(310,002)	-	-	(310,002)
Cumulative (gain)/loss reclassified to profit or loss upon disposal of available-for-sale financial assets	-	(115,690)	-	-	(115,690)
Gain/(loss) arising on changes in the fair value of hedging instruments	-	-	99,534	-	99,534
Transferred to initial carrying amount of hedged items	-	-	(94,851)	-	(94,851)
Share of other comprehensive income (loss) of associates	(88,147)	211,951	-	-	123,804
Share of unearned stock-based employee compensation of associates	-	-	-	(10,290)	(10,290)
Income tax effect	-	(2,974)	(562)	-	(3,536)
Balance, end of year	<u>\$ (26,697,680)</u>	<u>\$ (214,074)</u>	<u>\$ 4,226</u>	<u>\$ (10,290)</u>	<u>\$ 26,917,818</u>

The aforementioned other equity includes the changes in other equities of the Company and the Company's share of its subsidiaries and associates.

21. NET REVENUE

a. Disaggregation of revenue from contracts with customers

Product	Year Ended December 31, 2018
Wafer	\$ 906,992,422
Others	<u>116,933,291</u>
	<u>\$1,023,925,713</u>
Geography	Year Ended December 31, 2018
Taiwan	\$ 78,260,773
United States	626,493,249
China	175,794,228
Europe, the Middle East and Africa	71,068,438
Japan	58,125,879
Others	<u>14,183,146</u>
	<u>\$1,023,925,713</u>

The Company categorized the net revenue mainly based on the countries where the customers are headquartered.

Application Type	Year Ended December 31, 2018
Communication	\$ 574,350,582
Industrial/Standard	232,589,200
Computer	143,744,212
Consumer	<u>73,241,719</u>
	<u>\$1,023,925,713</u>

Resolution	Year Ended December 31, 2018
7-nanometer	\$ 81,146,571
10-nanometer	96,600,008
16/20-nanometer	209,828,511
28-nanometer	177,484,309
40/45-nanometer	101,481,881
65-nanometer	75,734,952
90-nanometer	36,543,823
0.11/0.13 micron	20,638,247
0.15/0.18 micron	80,886,264
0.25 micron and above	<u>26,647,856</u>
Wafer revenue	<u>\$ 906,992,422</u>

b. Contract balances

	December 31, 2018	January 1, 2018
Contract liabilities (classified under accrued expenses and other current liabilities)	<u>\$ 2,740,649</u>	<u>\$ 31,078,331</u>

The changes in the contract liability balances primarily result from the timing difference between the satisfaction of performance obligation and the customer's payment.

For the year ended December 31, 2018, the Company recognized NT\$30,742,181 thousand as revenue from the beginning balance of contract liability.

c. Refund liabilities

Estimated sales returns and other allowances is made and adjusted based on historical experience and the consideration of varying contractual terms, which amounted to NT\$53,382,673 thousand for the year ended December 31, 2018. As of December 31, 2018, the aforementioned refund liabilities amounted to NT\$21,199,032 thousand (classified under accrued expenses and other current liabilities).

22. OTHER OPERATING INCOME AND EXPENSES, NET

	Years Ended December 31	
	2018	2017
Loss on disposal or retirement of property, plant and equipment, net	\$ (557,598)	\$ (1,008,989)
Impairment loss on property, plant and equipment, net	(423,468)	-
Others	<u>(687,168)</u>	<u>(252,676)</u>
	<u>\$ (1,668,234)</u>	<u>\$ (1,261,665)</u>

23. OTHER INCOME

	Years Ended December 31	
	2018	2017
Interest income		
Bank deposits	\$ 1,845,471	\$ 1,522,579
Financial assets at amortized cost	1,731	-
Held-to-maturity financial assets	<u>-</u>	<u>32,213</u>
	1,847,202	1,554,792
Dividend income	<u>157,905</u>	<u>141,803</u>
	<u>\$ 2,005,107</u>	<u>\$ 1,696,595</u>

24. FINANCE COSTS

	Years Ended December 31	
	2018	2017
Interest expense		
Corporate bonds	\$ 1,485,486	\$ 1,967,750
Bank loans	1,417,287	766,001
Related parties	<u>681</u>	<u>15,889</u>
	<u>\$ 2,903,454</u>	<u>\$ 2,749,640</u>

25. OTHER GAINS AND LOSSES, NET

	Years Ended December 31	
	2018	2017
Net gain (loss) on financial instruments at FVTPL		
Mandatorily measured at FVTPL	\$ (1,498,856)	\$ -
Held for trading	-	1,252,759
Gain on disposal of financial assets, net		
Available-for-sale financial assets	-	115,690
Impairment loss on financial assets		
Financial assets carried at cost	-	(6,137)
Other gains, net	<u>130,530</u>	<u>229,927</u>
	<u>\$ (1,368,326)</u>	<u>\$ 1,592,239</u>

26. INCOME TAX

a. Income tax expense recognized in profit or loss

Income tax expense consisted of the following:

	Years Ended December 31	
	2018	2017
Current income tax expense		
Current tax expense recognized in the current year	\$ 50,511,247	\$ 55,187,468
Income tax adjustments on prior years	(963,356)	(938,292)
Other income tax adjustments	<u>149,771</u>	<u>150,168</u>
	<u>49,697,662</u>	<u>54,399,344</u>
Deferred income tax benefit		
Effect of tax rate changes	(1,466,706)	-
The origination and reversal of temporary differences	<u>(3,163,687)</u>	<u>(4,194,644)</u>
	<u>(4,630,393)</u>	<u>(4,191,644)</u>
Income tax expense recognized in profit or loss	<u>\$ 45,067,269</u>	<u>\$ 50,204,700</u>

A reconciliation of income before income tax and income tax expense recognized in profit or loss was as follows:

	Years Ended December 31	
	2018	2017
Income before tax	<u>\$ 396,198,153</u>	<u>\$ 393,316,176</u>
Income tax expense at the statutory rate	\$ 79,239,631	\$ 66,863,750
Tax effect of adjusting items:		
Nondeductible (deductible) items in determining taxable income	2,636,232	(1,438,813)
Tax-exempt income	(54,234,074)	(16,467,720)
Additional income tax under the Alternative Minimum Tax Act	21,455,854	-
Additional income tax on unappropriated earnings	7,420,479	11,835,948
Effect of tax rate changes on deferred income tax	(1,466,706)	-
The origination and reversal of temporary differences	(3,163,687)	(4,194,644)
Income tax credits	<u>(6,006,875)</u>	<u>(5,605,697)</u>
	45,880,854	50,992,824
Income tax adjustments on prior years	(963,356)	(938,292)
Other income tax adjustments	<u>149,771</u>	<u>150,168</u>
Income tax expense recognized in profit or loss	<u>\$ 45,067,269</u>	<u>\$ 50,204,700</u>

For the year ended December 31, 2017, the Company applied a tax rate of 17% for entities subject to the R.O.C. Income Tax Law. In February 2018, the Income Tax Law in the R.O.C. was amended and, starting from 2018, the corporate income tax rate was adjusted from 17% to 20%. In addition, the tax rate for 2018 unappropriated earnings was reduced from 10% to 5%.

b. Income tax expense recognized in other comprehensive income

	Years Ended December 31	
	2018	2017
Deferred income tax benefit (expense)		
Related to remeasurement of defined benefit obligation	\$ 103,339	\$ 30,562
Related to unrealized gain/loss on investments in equity instruments at FVTOCI	91,828	-
Related to gain/loss on cash flow hedges	562	(562)
Related to unrealized gain/loss on available-for-sale financial assets	<u>-</u>	<u>(2,974)</u>
	<u>\$ 195,729</u>	<u>\$ 27,026</u>

c. Deferred income tax balance

The analysis of deferred income tax assets and liabilities was as follows:

	December 31, 2018	December 31, 2017
Deferred income tax assets		
Temporary differences		
Depreciation	\$ 11,177,890	\$ 7,668,535
Refund liability	2,543,884	-
Net defined benefit liability	1,084,874	975,324
Unrealized loss on inventories	723,835	604,635
Provision for sales returns and allowance	-	1,580,979
Investments in equity instruments at FVTOCI	<u>56,191</u>	<u>-</u>
	<u>\$ 15,586,674</u>	<u>\$ 10,829,473</u>
Deferred income tax liabilities		
Temporary differences		
Unrealized exchange gains	\$ (61,677)	\$ (169,480)
Available-for-sale financial assets	-	(95,421)
Others	<u>(171,607)</u>	<u>(37,304)</u>
	<u>\$ (233,284)</u>	<u>\$ (302,205)</u>

Year Ended December 31, 2018				
	Balance, Beginning of Year	Recognized in		Balance, End of Year
		Profit or Loss	Other Comprehensive Income	
Deferred income tax assets				
Temporary differences				
Depreciation	\$ 7,668,535	\$ 3,509,355	\$ -	\$ 11,177,890
Refund liability	1,580,979	962,905	-	2,543,884
Net defined benefit liability	975,324	6,211	103,339	1,084,874
Unrealized loss on inventories	604,635	119,200	-	723,835
Investments in equity instruments at FVTOCI	-	-	56,191	56,191
	<u>\$ 10,829,473</u>	<u>\$ 4,597,671</u>	<u>\$ 159,530</u>	<u>\$ 15,586,674</u>
Deferred income tax liabilities				
Temporary differences				
Unrealized exchange gains	\$ (169,480)	\$ 107,803	\$ -	\$ (61,677)
Investments in equity instruments at FVTOCI	(95,421)	-	95,421	-
Others	<u>(37,304)</u>	<u>(75,081)</u>	<u>(59,222)</u>	<u>(111,823)</u>
	<u>\$ (302,205)</u>	<u>\$ 32,722</u>	<u>\$ 36,199</u>	<u>\$ (233,284)</u>
Year Ended December 31, 2017				
	Balance, Beginning of Year	Recognized in		Balance, End of Year
		Profit or Loss	Other Comprehensive Income	
Deferred income tax assets				
Temporary differences				
Depreciation	\$ 3,284,735	\$ 4,383,800	\$ -	\$ 7,668,535
Provision for sales returns and allowance	1,428,787	152,192	-	1,580,979
Net defined benefit liability	939,543	5,219	30,562	975,324
Unrealized loss on inventories	698,858	(94,223)	-	604,635
Others	<u>94,858</u>	<u>(94,858)</u>	<u>-</u>	<u>-</u>
	<u>\$ 6,446,781</u>	<u>\$ 4,352,130</u>	<u>\$ 30,562</u>	<u>\$ 10,829,473</u>
Deferred income tax liabilities				
Temporary differences				
Unrealized exchange gains	\$ (48,736)	\$ (120,744)	\$ -	\$ (169,480)
Available-for-sale financial assets	(92,447)	-	(2,974)	(95,421)
Others	<u>-</u>	<u>(36,742)</u>	<u>(562)</u>	<u>(37,304)</u>
	<u>\$ (141,183)</u>	<u>\$ (157,486)</u>	<u>\$ (3,536)</u>	<u>\$ (302,205)</u>

- d. The deductible temporary differences for which no deferred income tax assets have been recognized

As of December 31, 2018 and 2017, the aggregate deductible temporary differences for which no deferred income tax assets have been recognized amounted to NT\$20,060,918 thousand and NT\$26,536,307 thousand, respectively.

e. Unused tax-exemption information

As of December 31, 2018, the profits generated from the following projects of the Company are exempt from income tax for a five-year period:

	Tax-exemption Period
Construction and expansion of 2008	2015 to 2019
Construction and expansion of 2009	2018 to 2022

f. The information of unrecognized deferred income tax liabilities associated with investments

As of December 31, 2018 and 2017, the aggregate taxable temporary differences associated with investments in subsidiaries not recognized as deferred income tax liabilities amounted to NT\$112,893,001 thousand and NT\$95,003,344 thousand, respectively.

g. Income tax examination

The tax authorities have examined income tax returns of the Company through 2015. All investment tax credit adjustments assessed by the tax authorities have been recognized accordingly.

27. EARNINGS PER SHARE

	Years Ended December 31	
	2018	2017
Basic EPS	<u>\$13.54</u>	<u>\$13.23</u>
Diluted EPS	<u>\$13.54</u>	<u>\$13.23</u>

EPS is computed as follows:

	Amounts (Numerator)	Number of Shares (Denominator) (In Thousands)	EPS (NT\$)
<u>Year Ended December 31, 2018</u>			
Basic/Diluted EPS			
Net income available to common shareholders	<u>\$ 351,130,884</u>	<u>25,930,380</u>	<u>\$13.54</u>
<u>Year Ended December 31, 2017</u>			
Basic/Diluted EPS			
Net income available to common shareholders	<u>\$ 343,111,476</u>	<u>25,930,380</u>	<u>\$13.23</u>

28. ADDITIONAL INFORMATION OF EXPENSES BY NATURE

	Years Ended December 31	
	2018	2017
a. Depreciation of property, plant and equipment		
Recognized in cost of revenue	\$ 251,292,565	\$ 231,042,615
Recognized in operating expenses	23,020,118	19,490,010
Recognized in other operating income and expenses	<u>27,857</u>	<u>64,510</u>
	<u>\$ 274,340,540</u>	<u>\$ 250,597,135</u>
b. Amortization of intangible assets		
Recognized in cost of revenue	\$ 2,018,702	\$ 2,119,899
Recognized in operating expenses	<u>2,334,145</u>	<u>2,205,129</u>
	<u>\$ 4,352,847</u>	<u>\$ 4,325,028</u>
c. Research and development costs expensed as incurred	<u>\$ 84,944,461</u>	<u>\$ 79,887,723</u>
d. Employee benefits expenses		
Post-employment benefits		
Defined contribution plans	\$ 2,028,928	\$ 1,905,444
Defined benefit plans	<u>281,866</u>	<u>271,551</u>
	2,310,794	2,176,995
Other employee benefits	<u>93,694,021</u>	<u>90,611,476</u>
	<u>\$ 96,004,815</u>	<u>\$ 92,788,471</u>
Employee benefits expense summarized by function		
Recognized in cost of revenue	\$ 57,733,597	\$ 55,902,877
Recognized in operating expenses	<u>38,271,218</u>	<u>36,885,594</u>
	<u>\$ 96,004,815</u>	<u>\$ 92,788,471</u>

According to the Company's Articles of Incorporation, the Company shall allocate compensation to directors and profit sharing bonus to employees of the Company not more than 0.3% and not less than 1% of annual profits during the period, respectively.

The Company accrued profit sharing bonus to employees based on a percentage of net income before income tax, profit sharing bonus to employees and compensation to directors during the period, which amounted to NT\$23,570,040 thousand and NT\$23,019,082 thousand for the years ended December 31, 2018 and 2017, respectively; compensation to directors was expensed based on estimated amount payable. If there is a change in the proposed amounts after the annual parent company only financial statements are authorized for issue, the differences are recorded as a change in accounting estimate.

The Company's profit sharing bonus to employees and compensation to directors in the amounts of NT\$23,570,040 thousand and NT\$349,272 thousand in cash for 2018, respectively, profit sharing bonus to employees and compensation to directors in the amounts of NT\$23,019,082 thousand and NT\$368,919 thousand in cash for 2017, respectively, and profit sharing bonus to employees and compensation to directors in the amounts of NT\$22,418,339 thousand and NT\$376,432 thousand in cash for 2016, respectively, had been approved by the Board of Directors of the Company held on February 19, 2019, February 13, 2018 and February 14, 2017, respectively. There is no significant difference between the

aforementioned approved amounts and the amounts charged against earnings of 2018, 2017 and 2016, respectively.

The information about the appropriations of the Company's profit sharing bonus to employees and compensation to directors is available at the Market Observation Post System website.

29. CASH FLOW INFORMATION

Reconciliation of liabilities arising from financing activities

	Balance as of January 1, 2018	Financing Cash Flow	Non-cash changes		Balance as of December 31, 2018
			Foreign Exchange Movement	Other Changes (Note)	
Short-term loans	\$ 63,766,850	\$ 27,154,770	\$ 1,060,720	\$ -	\$ 91,982,340
Guarantee deposits	13,629,122	1,504,809	396,617	(6,035,900)	9,494,648
Bonds payable	<u>116,100,000</u>	<u>(24,300,000)</u>	<u>-</u>	<u>-</u>	<u>91,800,000</u>
Total	<u>\$ 193,495,972</u>	<u>\$ 4,359,579</u>	<u>\$ 1,457,337</u>	<u>\$ (6,035,900)</u>	<u>\$ 193,276,988</u>

Note: Other changes include guarantee deposits refunded to customers by offsetting related accounts receivable.

30. CAPITAL MANAGEMENT

The Company requires significant amounts of capital to build and expand its production facilities and acquire additional equipment. In consideration of the industry dynamics, the Company manages its capital in a manner to ensure that it has sufficient and necessary financial resources to fund its working capital needs, capital asset purchases, research and development activities, dividend payments, debt service requirements and other business requirements associated with its existing operations over the next 12 months.

31. FINANCIAL INSTRUMENTS

a. Categories of financial instruments

	December 31, 2018
Financial assets	
FVTPL (Note 1)	\$ 54,115
FVTOCI (Note 2)	5,126,829
Hedging financial assets	23,497
Amortized cost (Note 3)	<u>365,119,060</u>
	<u>\$ 370,323,501</u>
Financial liabilities	
FVTPL (Note 4)	\$ 30,232
Hedging financial liabilities	1,941
Amortized cost (Note 5)	<u>310,265,696</u>
	<u>\$ 310,297,869</u>

Note 1: Financial assets mandatorily measured at FVTPL.

Note 2: Including notes and accounts receivable, net and equity investments.

Note 3: Including cash and cash equivalents, financial assets at amortized cost, notes and accounts receivable (including related parties), other receivables and refundable deposits.

Note 4: Held for trading.

Note 5: Including short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable, and guarantee deposits.

	December 31, 2017
Financial assets	
FVTPL	\$ 373,351
Available-for-sale financial assets (Note 6)	2,808,606
Hedging derivative financial assets	7,378
Loans and receivables (Note 7)	<u>362,375,885</u>
	<u>\$ 365,565,220</u>
Financial liabilities	
FVTPL	\$ 18,764
Hedging derivative financial liabilities	15,562
Amortized cost (Note 8)	<u>294,856,247</u>
	<u>\$ 294,890,573</u>

Note 6: Including financial assets carried at cost.

Note 7: Including cash and cash equivalents, notes and accounts receivable (including related parties), other receivables and refundable deposits.

Note 8: Including short-term loans, accounts payable (including related parties), payables to contractors and equipment suppliers, accrued expenses and other current liabilities, bonds payable and guarantee deposits.

b. Financial risk management objectives

The Company seeks to ensure sufficient cost-efficient funding readily available when needed. The Company manages its exposure to foreign currency risk, interest rate risk, equity price risk, credit risk and liquidity risk with the objective to reduce the potentially adverse effects the market uncertainties may have on its financial performance.

The plans for material treasury activities are reviewed by Audit Committees and/or Board of Directors in accordance with procedures required by relevant regulations or internal controls. During the implementation of such plans, Corporate Treasury function must comply with certain treasury procedures that provide guiding principles for overall financial risk management and segregation of duties.

c. Market risk

The Company is exposed to the financial market risks, primarily changes in foreign currency exchange rates, interest rates and equity investment prices. A portion of these risks is hedged.

Foreign currency risk

Most of the Company's revenues and expenditures are denominated in foreign currencies. Consequently, the Company is exposed to foreign currency risk. To protect against reductions in value and the volatility of future cash flows caused by changes in foreign exchange rates, the Company uses derivative financial instruments, such as forward exchange contracts and cross currency swaps, and non-derivative financial instruments, such as foreign currency-denominated debt, to partially hedge the Company's existing and certain forecasted currency exposure. These hedges will offset only a portion of, but do not eliminate, the financial impact from movements in foreign currency exchange rates.

The Company's sensitivity analysis of foreign currency risk mainly focuses on the foreign currency monetary items and the derivatives financial instruments at the end of the reporting period. Assuming an unfavorable 10% movement in the levels of foreign exchanges relative to the New Taiwan dollar, the net income for the years ended December 31, 2018 and 2017 would have decreased by NT\$489,326 thousand and NT\$849,248 thousand, respectively, and the other comprehensive income for the years ended December 31, 2018 and 2017 would have decreased by NT\$315,571 thousand and NT\$265,875 thousand, respectively.

Interest rate risk

The Company is exposed to interest rate risk primarily related to its outstanding debt and investments in fixed income securities. All of the Company's bonds payable have fixed interest rates and are measured at amortized cost. As such, changes in interest rates would not affect the future cash flows.

The Company classified its investments in fixed income securities as financial assets at amortized costs starting from 2018; as held-to-maturity financial assets in 2017. Because financial assets at amortized costs and held-to-maturity fixed income securities are measured at amortized cost, changes in interest rates would not affect the fair value.

Other price risk

The Company is exposed to equity price risk for 2018 and 2017 arising from financial assets at FVTOCI and available-for-sale equity investments, respectively.

Assuming a hypothetical decrease of 5% in prices of the equity investments at the end of the reporting period for the years ended December 31, 2018 and 2017, the other comprehensive income would have decreased by NT\$65,097 thousand and NT\$120,835 thousand, respectively.

d. Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial losses to the Company. The Company is exposed to credit risks from operating activities, primarily trade receivables, and from investing activities, primarily deposits, fixed-income investments and other financial instruments with banks. Credit risk is managed separately for business related and financial related exposures. As of the end of the reporting period, the Company's maximum credit risk exposure is equal to the carrying amount of financial assets.

Business related credit risk

The Company's trade receivables are from its customers worldwide. The majority of the Company's outstanding trade receivables are not covered by collaterals or guarantees. While the Company has procedures to monitor and manage credit risk exposure on trade receivables, there is no assurance such procedures will effectively eliminate losses resulting from its credit risk. This risk is heightened during periods when economic conditions worsen.

As of December 31, 2018 and 2017, the Company's ten largest customers accounted for 76% and 74% of accounts receivable, respectively. The Company believes the concentration of credit risk is not material for the remaining accounts receivable.

Financial credit risk

The Company mitigates its financial credit risk by selecting counterparties with investment-grade credit ratings and by limiting the exposure to any individual counterparty. The Company regularly monitors and reviews the limit applied to counterparties and adjusts the limit according to market conditions and the credit standing of the counterparties.

The risk management of expected credit loss for financial assets at amortized cost and investments in debt instruments at FVTOCI is as follows:

The Company only invests in debt instruments that are rated as investment grade or higher. The credit rating information is supplied by external rating agencies. The Company assesses whether there has been a significant increase in credit risk since initial recognition by reviewing changes in external credit ratings, financial market conditions and material information of the bond-issuers.

The Company assesses the 12-month expected credit loss and lifetime expected credit loss based on the probability of default and loss given default provided by external credit rating agencies. The current credit risk assessment policies are as follows:

Category	Description	Basis for Recognizing Expected Credit Loss	Expected Credit Loss Ratio
Performing	Credit rating on trade date and valuation date: (1) Within investment grade (2) Between BB+ and BB-	12 months expected credit loss	0%
Doubtful	Credit rating on trade date and valuation date: (1) From investment grade to non-investment grade (2) From BB+~BB- to B+~CCC-	Lifetime expected credit loss-not credit impaired	-
In default	Credit rating CC or below	Lifetime expected credit loss-credit impaired	-
Write-off	There is evidence indicating that the debtor is in severe financial difficulty and the Company has no realistic prospect of recovery	Amount is written off	-

For the year ended December 31, 2018, the Company recognizes the expected credit loss NT\$0, mainly attributed to asset allocation to debt investments of higher credit rating.

e. Liquidity risk management

The objective of liquidity risk management is to ensure the Company has sufficient liquidity to fund its business operations over the next 12 months. The Company manages its liquidity risk by maintaining adequate cash and cash equivalent, debt investment at FVTPL, financial assets at FVTOCI-current, and financial assets amortized at cost-current.

The table below summarizes the maturity profile of the Company's financial liabilities based on contractual undiscounted payments, including principal and interest.

	Less Than 1 Year	2-3 Years	4-5 Years	5+ Years	Total
<u>December 31, 2018</u>					
<u>Non-derivative financial liabilities</u>					
Short-term loans	\$ 92,039,118	\$ -	\$ -	\$ -	\$ 92,039,118
Accounts payable (including related parties)	35,019,044	-	-	-	35,019,044
Payables to contractors and equipment suppliers	41,279,910	-	-	-	41,279,910
Accrued expenses and other current liabilities	40,888,712	-	-	-	40,888,712
Bonds payable	36,039,935	35,340,742	22,979,426	-	94,360,103
Guarantee deposits (including those classified under accrued expenses and other current liabilities)	6,148,000	2,884,933	461,715	-	9,494,648
	<u>251,414,719</u>	<u>38,225,675</u>	<u>23,441,141</u>	<u>-</u>	<u>313,081,535</u>
<u>Derivative financial instruments</u>					
Forward exchange contracts					
Outflows	35,608,273	-	-	-	35,608,273
Inflows	(35,681,524)	-	-	-	(35,681,524)
	<u>(73,251)</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>(73,251)</u>
	<u>\$ 251,341,468</u>	<u>\$ 38,225,675</u>	<u>\$ 23,441,141</u>	<u>\$ -</u>	<u>\$ 313,008,284</u>
<u>December 31, 2017</u>					
<u>Non-derivative financial liabilities</u>					
Short-term loans	\$ 63,801,977	\$ -	\$ -	\$ -	\$ 63,801,977
Accounts payable (including related parties)	30,434,887	-	-	-	30,434,887
Payables to contractors and equipment suppliers	50,363,976	-	-	-	50,363,976
Accrued expenses and other current liabilities	20,561,411	-	-	-	20,561,411
Bonds payable	25,791,842	68,378,787	7,777,715	18,203,601	120,151,945
Guarantee deposits (including those classified under accrued expenses and other current liabilities)	6,046,643	7,498,840	83,639	-	13,629,122
	<u>197,000,736</u>	<u>75,877,627</u>	<u>7,861,354</u>	<u>18,203,601</u>	<u>298,943,318</u>
<u>Derivative financial instruments</u>					
Forward exchange contracts					
Outflows	48,169,933	-	-	-	48,169,933
Inflows	(48,530,989)	-	-	-	(48,530,989)
	<u>(361,056)</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>(361,056)</u>
	<u>\$ 196,639,680</u>	<u>\$ 75,877,627</u>	<u>\$ 7,861,354</u>	<u>\$ 18,203,601</u>	<u>\$ 298,582,262</u>

f. Fair value of financial instruments

1) Fair value measurements recognized in the parent company only balance sheets

Fair value measurements are grouped into Levels 1 to 3 based on the degree to which the fair value is observable:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2 fair value measurements are those derived from inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data (unobservable inputs).

2) Fair value of financial instruments that are measured at fair value on a recurring basis

Fair value hierarchy

The following table presents the Company's financial assets and liabilities measured at fair value on a recurring basis:

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
<u>Financial assets at FVTPL</u>				
Mandatorily measured at FVTPL				
Forward exchange contracts	\$ -	\$ 54,115	\$ -	\$ 54,115
<u>Financial assets at FVTOCI</u>				
Investments in equity instruments				
Non-publicly traded equity investments	\$ -	\$ -	\$ 963,610	\$ 963,610
Publicly traded stocks	568,150	-	-	568,150
Notes and accounts receivable, net	-	3,595,069	-	3,595,069
	<u>\$ 568,150</u>	<u>\$ 3,595,069</u>	<u>\$ 963,610</u>	<u>\$ 5,126,829</u>
<u>Hedging financial assets</u>				
Cash flow hedges				
Forward exchange contracts	\$ -	\$ 23,497	\$ -	\$ 23,497
<u>Financial liabilities at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 30,232	\$ -	\$ 30,232
<u>Hedging financial liabilities</u>				
Cash flow hedges				
Forward exchange contracts	\$ -	\$ 1,941	\$ -	\$ 1,941

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
<u>Financial assets at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 373,351	\$ -	\$ 373,351
<u>Available-for-sale financial assets</u>				
Publicly traded stocks	\$ 2,393,555	\$ -	\$ -	\$ 2,393,555
<u>Hedging derivative financial assets</u>				
Cash flow hedges				
Forward exchange contracts	\$ -	\$ 7,378	\$ -	\$ 7,378
<u>Financial liabilities at FVTPL</u>				
Held for trading				
Forward exchange contracts	\$ -	\$ 18,764	\$ -	\$ 18,764
<u>Hedging derivative financial liabilities</u>				
Cash flow hedges				
Forward exchange contracts	\$ -	\$ 15,562	\$ -	\$ 15,562

Reconciliation of Level 3 fair value measurements of financial assets

The financial assets measured at Level 3 fair value were equity investments classified as financial assets at FVTOCI. Reconciliations for the year ended December 31, 2018 were as follows:

Balance at January 1, 2018	\$ 983,590
Recognized in other comprehensive income	(16,524)
Disposals and proceeds from return of capital of investments	<u>(3,456)</u>
Balance at December 31, 2018	<u>\$ 963,610</u>

Valuation techniques and assumptions used in Level 2 fair value measurement

The fair values of financial assets and financial liabilities are determined as follows:

- Forward exchange contracts are measured using forward exchange rates and the discounted yield curves that are derived from quoted market prices.
- The fair value of accounts receivables classified as at FVTOCI are determined by the present value of future cash flows based on the discount rate that reflects the credit risk of counterparties.

Valuation techniques and assumptions used in Level 3 fair value measurement

The fair values of non-publicly traded equity investments are mainly determined by using the asset approach and market approach.

To determine the fair value, the Company utilizes the asset approach and takes into account the net asset value measured at the fair value by independent parties.

The market approach is used to arrive at their fair value, for which the recent financing activities of investees, the market transaction prices of the similar companies and market conditions are considered.

3) Fair value of financial instruments that are not measured at fair value

Except as detailed in the following table, the Company considers that the carrying amounts of financial instruments in the parent company only financial statements that are not measured at fair value approximate their fair values.

Fair value hierarchy

The table below sets out the fair value hierarchy for the Company's assets and liabilities which are not required to measure at fair value:

	December 31, 2018				
	Carrying Amount	Fair Value			
		Level 1	Level 2	Level 3	Total
<u>Financial assets</u>					
Financial assets at amortized costs					
Commercial paper	\$ 2,294,098	\$ -	\$ 2,296,188	\$ -	\$ 2,296,188
<u>Financial liabilities</u>					
Financial liabilities at amortized costs					
Bonds payable	\$ 91,800,000	\$ -	\$ 93,171,255	\$ -	\$ 93,171,255
	December 31, 2017				
	Carrying Amount	Fair Value			
		Level 1	Level 2	Level 3	Total
Financial liabilities at amortized costs					
Bonds payable	\$ 116,100,000	\$ -	\$ 118,020,699	\$ -	\$ 118,020,699

Valuation techniques and assumptions used in Level 2 fair value measurement

The fair value of commercial paper is determined by the present value of future cash flows based on the discounted curves that are derived from the quoted market prices.

The fair value of the Company's bonds payable is determined by quoted market prices provided by third party pricing services.

32. RELATED PARTY TRANSACTIONS

The significant transactions between the Company and its related parties, other than those disclosed in other notes, are summarized as follows:

a. Related party name and categories

<u>Related Party Name</u>	<u>Related Party Categories</u>
TSMC Global	Subsidiaries
TSMC China	Subsidiaries
TSMC Nanjing	Subsidiaries
VisEra Tech	Subsidiaries
TSMC North America	Subsidiaries
TSMC Europe	Subsidiaries
TSMC Japan	Subsidiaries
TSMC Korea	Subsidiaries
TSMC Solar Europe GmbH	Subsidiaries
TSMC Design Technology Canada Inc. (TSMC Canada)	Indirect Subsidiaries
TSMC Technology, Inc. (TSMC Technology)	Indirect Subsidiaries
WaferTech, LLC (WaferTech)	Indirect Subsidiaries
GUC	Associates
VIS	Associates
SSMC	Associates
Xintec	Associates
TSMC Education and Culture Foundation	Other related parties
TSMC Charity Foundation	Other related parties

b. Net revenue

		<u>Years Ended December 31</u>	
		<u>2018</u>	<u>2017</u>
<u>Item</u>	<u>Related Party Name/Categories</u>		
Net revenue from sale of goods	TSMC North America	\$ 650,432,820	\$ 650,351,537
	Associates	6,762,827	6,941,089
	Other subsidiaries	150,407	487,112
	Other related parties	<u>330</u>	<u>133</u>
		<u>\$ 657,346,384</u>	<u>\$ 657,779,871</u>
<u>Item</u>	<u>Related Party Categories</u>		
Net revenue from royalties	Associates	\$ 362,259	\$ 482,537
	Subsidiaries	<u>568</u>	<u>264</u>
		<u>\$ 362,827</u>	<u>\$ 482,801</u>

c. Purchases

	Years Ended December 31	
	2018	2017
<u>Related Party Categories</u>		
Subsidiaries	\$ 34,136,678	\$ 30,843,591
Associates	<u>8,809,394</u>	<u>9,903,917</u>
	<u>\$ 42,946,072</u>	<u>\$ 40,747,508</u>

d. Receivables from related parties

		December 31, 2018	December 31, 2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Receivables from related parties	TSMC North America	\$ 86,057,097	\$ 91,329,510
	Associates	375,184	777,730
	Other subsidiaries	<u>20,303</u>	<u>34,597</u>
		<u>\$ 86,452,584</u>	<u>\$ 92,141,837</u>
Other receivables from related parties	TSMC North America	\$ 1,035,465	\$ 1,246,101
	TSMC Nanjing	89,334	1,754,484
	Associates	64,203	127,459
	Other subsidiaries	<u>45,660</u>	<u>15,828</u>
		<u>\$ 1,234,662</u>	<u>\$ 3,143,872</u>

e. Payables to related parties

		December 31, 2018	December 31, 2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Payables to related parties	TSMC China	\$ 1,299,072	\$ 1,440,141
	WaferTech	1,092,785	1,328,094
	Xintec	649,812	817,876
	SSMC	362,564	406,959
	VIS	357,080	409,950
	Other subsidiaries	778,396	405,127
	Other associates	7,043	9,517
	Other related parties	<u>-</u>	<u>12,000</u>
		<u>\$ 4,546,782</u>	<u>\$ 4,829,664</u>

f. Accrued expenses and other current liabilities

		December 31, 2018	December 31, 2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Accrued expenses and other	TSMC Nanjing	\$ 199,638	\$ -
current liabilities	Other subsidiaries	<u>681</u>	<u>-</u>
		<u>\$ 200,319</u>	<u>\$ -</u>

g. Disposal of property, plant and equipment

	Proceeds		
	Years Ended December 31		
	2018	2017	
<u>Related Party Name/Categories</u>			
TSMC Nanjing	\$ 2,839,622	\$ 14,336,846	
Other subsidiaries	25,380	120,790	
Associates	<u>-</u>	<u>1,355</u>	
	<u>\$ 2,865,002</u>	<u>\$ 14,458,991</u>	

	Gains		
	Years Ended December 31		
	2018	2017	
<u>Related Party Name/Categories</u>			
TSMC Nanjing	\$ 386,239	\$ 81,272	
Other subsidiaries	64,964	50,361	
Associates	<u>-</u>	<u>1,355</u>	
	<u>\$ 451,203</u>	<u>\$ 132,988</u>	

	Deferred Gains from Disposal of Property, Plant and Equipment		
	December 31,	December 31,	
	2018	2017	
<u>Related Party Name/Categories</u>			
TSMC Nanjing	\$ 234,810	\$ 574,633	
Other subsidiaries	<u>152,970</u>	<u>192,554</u>	
	<u>\$ 387,780</u>	<u>\$ 767,187</u>	

h. Others

		Years Ended December 31	
		2018	2017
<u>Item</u>	<u>Related Party Name/Categories</u>		
Manufacturing expenses	Associates	\$ 2,876,216	\$ 2,098,141
	Subsidiaries	<u>35,603</u>	<u>9,318</u>
		<u>\$ 2,911,819</u>	<u>\$ 2,107,459</u>
Research and development expenses	Subsidiaries	\$ 2,407,068	\$ 2,205,906
	Associates	<u>83,145</u>	<u>69,841</u>
		<u>\$ 2,490,213</u>	<u>\$ 2,275,747</u>
Marketing expenses - commission	TSMC Europe	\$ 463,093	\$ 437,561
	Other subsidiaries	<u>402,973</u>	<u>370,243</u>
		<u>\$ 866,066</u>	<u>\$ 807,804</u>
General and administrative expenses	Other related parties	\$ 120,756	\$ 101,500
	Subsidiaries	<u>3,426</u>	<u>3,910</u>
		<u>\$ 124,182</u>	<u>\$ 105,410</u>

The sales prices and payment terms to related parties were not significantly different from those of sales to third parties. For other related party transactions, price and terms were determined in accordance with mutual agreements.

The Company leased factory and office from associates. The lease terms and prices were both determined in accordance with mutual agreements. The rental expenses were paid to associates monthly; the related expenses were both classified under manufacturing expenses.

The Company deferred the disposal gain or loss derived from sales of property, plant and equipment to related parties using equity method, and then recognized such gain or loss over the depreciable lives of the disposed assets.

i. Compensation of key management personnel

The compensation to directors and other key management personnel for the years ended December 31, 2018 and 2017 were as follows:

		Years Ended December 31	
		2018	2017
Short-term employee benefits		\$ 1,906,266	\$ 2,071,171
Post-employment benefits		<u>3,041</u>	<u>3,375</u>
		<u>\$ 1,909,307</u>	<u>\$ 2,074,546</u>

The compensation to directors and other key management personnel were determined by the Compensation Committee of the Company in accordance with the individual performance and the market trends.

33. SIGNIFICANT OPERATING LEASE ARRANGEMENTS

The Company's major significant operating leases are arrangements on several parcels of land and machinery and equipment.

The Company expensed the lease payments as follows:

	Years Ended December 31	
	2018	2017
Minimum lease payments	<u>\$ 3,773,364</u>	<u>\$ 1,748,190</u>

Future minimum lease payments under the above non-cancellable operating leases are as follows:

	December 31, 2018	December 31, 2017
Not later than 1 year	\$ 5,510,729	\$ 2,622,896
Later than 1 year and not later than 5 years	4,957,770	4,340,428
Later than 5 years	<u>8,253,382</u>	<u>7,849,690</u>
	<u>\$ 18,721,881</u>	<u>\$ 14,813,014</u>

34. SIGNIFICANT CONTINGENT LIABILITIES AND UNRECOGNIZED COMMITMENTS

Significant contingent liabilities and unrecognized commitments of the Company as of the end of the reporting period, excluding those disclosed in other notes, were as follows:

- a. Under a technical cooperation agreement with Industrial Technology Research Institute, the R.O.C. Government or its designee approved by the Company can use up to 35% of the Company's capacity provided the Company's outstanding commitments to its customers are not prejudiced. The term of this agreement is for five years beginning from January 1, 1987 and is automatically renewed for successive periods of five years unless otherwise terminated by either party with one year prior notice. As of December 31, 2018, the R.O.C. Government did not invoke such right.
- b. Under a Shareholders Agreement entered into with Philips and EDB Investments Pte Ltd. on March 30, 1999, the parties formed a joint venture company, SSMC, which is an integrated circuit foundry in Singapore. The Company's equity interest in SSMC was 32%. Nevertheless, in September 2006, Philips spun-off its semiconductor subsidiary which was renamed as NXP B.V. Further, the Company and NXP B.V. purchased all the SSMC shares owned by EDB Investments Pte Ltd. pro rata according to the Shareholders Agreement on November 15, 2006. After the purchase, the Company and NXP B.V. currently own approximately 39% and 61% of the SSMC shares, respectively. The Company and NXP B.V. are required, in the aggregate, to purchase at least 70% of SSMC's capacity, but the Company alone is not required to purchase more than 28% of the capacity. If any party defaults on the commitment and the capacity utilization of SSMC falls below a specific percentage of its capacity, the defaulting party is required to compensate SSMC for all related unavoidable costs. There was no default from the aforementioned commitment as of December 31, 2018.

- c. In May 2017, Uri Cohen filed a complaint in the U.S. District Court for the Eastern District of Texas alleging that the Company, TSMC North America and other companies infringe four U.S. patents. Cohen's case was transferred to and consolidated with the responsive declaratory judgment case for non-infringement of Cohen's asserted patents filed by the Company and TSMC North America in the U.S. District Court for the Northern District of California. In July 2018, all pending litigations between the parties in the U.S. District Court for the Northern District of California were dismissed.
- d. On September 28, 2017, the Company was contacted by the European Commission (the "Commission"), which has asked us for information and documents concerning alleged anti-competitive practices in relation to semiconductor sales. We are cooperating with the Commission to provide the requested information and documents. In light of the fact that this proceeding is still in its preliminary stage, it is premature to predict how the case will proceed, the outcome of the proceeding or its impact.
- e. The Company entered into long-term purchase agreements of material with multiple suppliers. The relative minimum purchase quantity and price are specified in the agreements.
- f. The Company entered into a long-term purchase agreement of equipment. The relative purchase quantity and price are specified in the agreement.
- g. The Company entered into long-term energy purchase agreements with multiple suppliers. The relative purchase period, quantity and price are specified in the agreements.
- h. As of December 31, 2018, the Company provided endorsement guarantees of NT\$2,557,977 thousand to its subsidiary, TSMC North America, in respect of providing endorsement guarantees for office leasing contract.

35. SIGNIFICANT LOSSES FROM DISASTERS

The Company experienced a computer virus outbreak on August 3, 2018, which affected a number of computer systems and fab tools, and consequently impacted wafer production in Taiwan. All the impacted tools have been recovered by August 6, 2018. The Company recognized a loss of NT\$2,596,046 thousand related to this incident for the three months ended September 30, 2018, which was included in cost of revenue.

36. SIGNIFICANT SUBSEQUENT EVENTS

On January 19, 2019, the Company discovered a wafer contamination issue in a fab in Taiwan caused by a batch of unqualified photoresist materials. After investigation, the Company immediately stopped using the unqualified materials. As of the date the accompanying parent company only financial statements were issued, a preliminary estimated loss of NT\$6,100,000 thousand will be recognized in cost of revenue for the three months ended March 31, 2019.

37. EXCHANGE RATE INFORMATION OF FOREIGN-CURRENCY FINANCIAL ASSETS AND LIABILITIES

The following information was summarized according to the foreign currencies other than the functional currency of the Company. The exchange rates disclosed were used to translate the foreign currencies into the functional currency. The significant financial assets and liabilities denominated in foreign currencies were as follows:

	Foreign Currencies (In Thousands)	Exchange Rate (Note)	Carrying Amount (In Thousands)
<u>December 31, 2018</u>			
<u>Financial assets</u>			
Monetary items			
USD	\$ 4,527,578	30.740	\$ 139,177,748
EUR	2,171	35.22	76,462
JPY	235,512	0.2783	65,543
Non-monetary items			
HKD	144,567	3.93	568,150
<u>Financial liabilities</u>			
Monetary items			
USD	4,147,398	30.740	127,491,021
EUR	471,127	35.22	16,593,099
JPY	33,416,236	0.2783	9,299,738
<u>December 31, 2017</u>			
<u>Financial assets</u>			
Monetary items			
USD	5,494,191	29.659	162,952,207
EUR	236,279	35.45	8,376,078
JPY	34,012,314	0.2629	8,941,837
Non-monetary items			
HKD	285,336	3.80	1,084,276
<u>Financial liabilities</u>			
Monetary items			
USD	3,880,441	29.659	115,090,012
EUR	410,686	35.45	14,558,807
JPY	35,365,911	0.2629	9,297,698

Note: Exchange rate represents the number of N.T. dollars for which one foreign currency could be exchanged.

Please refer to the parent company only statements of comprehensive income for the total of realized and unrealized foreign exchange gain and loss for the years ended December 31, 2018 and 2017, respectively. Since there were varieties of foreign currency transactions of the Company, the Company was unable to disclose foreign exchange gain (loss) towards each foreign currency with significant impact.

38. ADDITIONAL DISCLOSURES

Following are the additional disclosures required by the Securities and Futures Bureau for the Company:

- a. Financings provided: Please see Table 1 attached;
- b. Endorsement/guarantee provided: Please see Table 2 attached;
- c. Marketable securities held (excluding investments in subsidiaries and associates): Please see Table 3 attached;
- d. Marketable securities acquired and disposed of at costs or prices of at least NT\$300 million or 20% of the paid-in capital: Please see Table 4 attached;
- e. Acquisition of individual real estate properties at costs of at least NT\$300 million or 20% of the paid-in capital: Please see Table 5 attached;
- f. Disposal of individual real estate properties at prices of at least NT\$300 million or 20% of the paid-in capital: None;
- g. Total purchases from or sales to related parties of at least NT\$100 million or 20% of the paid-in capital: Please see Table 6 attached;
- h. Receivables from related parties amounting to at least NT\$100 million or 20% of the paid-in capital: Please see Table 7 attached;
- i. Information about the derivative financial instruments transaction: Please see Notes 7 and 8;
- j. Names, locations, and related information of investees over which the Company exercises significant influence (excluding information on investment in mainland China): Please see Table 8 attached;
- k. Information on investment in mainland China
 - 1) The name of the investee in mainland China, the main businesses and products, its issued capital, method of investment, information on inflow or outflow of capital, percentage of ownership, income (losses) of the investee, share of profits/losses of investee, ending balance, amount received as dividends from the investee, and the limitation on investee: Please see Table 9 attached.
 - 2) Significant direct or indirect transactions with the investee, its prices and terms of payment, unrealized gain or loss, and other related information which is helpful to understand the impact of investment in mainland China on financial reports: Please see Note 32.

39. OPERATING SEGMENTS INFORMATION

The Company has provided the operating segments disclosure in the consolidated financial statements.

TABLE 1

Taiwan Semiconductor Manufacturing Company Limited and Investees

FINANCINGS PROVIDED

FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

No.	Financing Company	Counter-party	Financial Statement Account	Related Party	Maximum Balance for the Period (foreign currencies in Thousands) (Note 3)	Ending Balance (foreign currencies in Thousands) (Note 3)	Amount Actually Drawn (foreign currencies in Thousands)	Interest Rate	Nature for Financing (Note 4)	Transaction Amounts	Reason for Financing (Note 4)	Allowance for Bad Debt	Collateral		Financing Limits for Each Borrowing Company (Note 1 and 2)	Financing Company's Total Financing Amount Limits (Note 1 and 2)
													Item	Value		
1	TSMC China	TSMC Nanjing	Other receivables from related parties	Yes	\$ 52,859,100 (RMB 7,000,000) & (US\$ 700,000)	\$ 46,065,560 (RMB 7,000,000) & (US\$ 479,000)	\$ 30,829,260 (RMB 6,000,000) & (US\$ 129,000)	1.30%-1.96%	The need for short-term and long-term financing	\$ -	Operating capital	\$ -	-	\$ -	\$ 55,586,818	\$ 55,586,818
2	TSMC Global	TSMC	Other receivables from related parties	Yes	\$ 46,110,000 (US\$ 1,500,000)	\$ 46,110,000 (US\$ 1,500,000)	\$ 3,227,700 (US\$ 105,000)	2.53%	The need for short-term financing	-	Operating capital	-	-	-	393,577,931	393,577,931

Note 1: The total amount available for lending purposes shall not exceed the net worth of TSMC China. The total amount for lending to a company for funding for a short-term period shall not exceed ten percent (10%) of the net worth of TSMC China. In addition, the total amount lendable to any one borrower shall be no more than thirty percent (30%) of the borrower's net worth. The above restriction does not apply to the subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC. However, the total amount lendable to any such subsidiary of TSMC shall not exceed forty percent (40%) of the net worth of TSMC China. When there is a lending for funding needs by TSMC China to TSMC, or to the subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC, which are not located in Taiwan, the lending will not be subject to the restriction set forth in the above paragraph of this Article. Notwithstanding the foregoing, the aggregate amount available for lending to such borrowers and the total amount lendable to each of such borrowers still shall not exceed the net worth of TSMC China.

Note 2: The total amount available for lending purpose shall not exceed the net worth of TSMC Global. The total amount for lending to a company for funding for a short-term period shall not exceed ten percent (10%) of the net worth of TSMC Global. In addition, the total amount lendable to any one borrower shall be no more than thirty percent (30%) of the borrower's net worth. While TSMC, or foreign subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC will not be subject to this restriction, their total borrowing amount still shall not exceed the net worth of TSMC Global. Notwithstanding the foregoing, the aggregate amount for lending to Taiwan companies other than TSMC shall not exceed forty percent (40%) of the net worth of TSMC Global.

Note 3: The maximum balance for the period and ending balance represent the amounts approved by the Board of Directors.

Note 4: The restriction of the term of each loan for funding not exceeding one year shall not apply to inter-company loans for funding between offshore subsidiaries in which the Company holds, directly or indirectly, 100% of the voting shares.

TABLE 2

Taiwan Semiconductor Manufacturing Company Limited and Investees

ENDORSEMENTS/GUARANTEES PROVIDED
FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

No.	Endorsee/Provider	Guaranteed Party		Limits on Endorsement/ Guarantee Amount Provided to Each Guaranteed Party (Notes 1 and 2)	Maximum Balance for the Period (US\$ in Thousands) (Note 3)	Ending Balance (US\$ in Thousands) (Note 3)	Amount Actually Drawn (US\$ in Thousands)	Amount of Endorsement/ Guarantee Collateralized by Properties	Ratio of Accumulated Endorsement/ Guarantee to Net Equity per Latest Financial Statements	Maximum Endorsement/ Guarantee Amount Allowable (Note 2)	Guarantee Provided by Parent Company	Guarantee Provided by A Subsidiary	Guarantee Provided to Subsidiaries in Mainland China
		Name	Nature of Relationship										
0	TSMC	TSMC Global	Subsidiary	\$ 419,204,416	\$ 35,351,000 (US\$ 1,150,000)	\$ -	\$ -	\$ -	-	\$ 419,204,416	Yes	No	No
		TSMC North America	Subsidiary	419,204,416	2,557,977 (US\$ 83,213)	2,557,977 (US\$ 83,213)	2,557,977 (US\$ 83,213)	-	0.15%	419,204,416	Yes	No	No

Note 1: The total amount of the guarantee provided by TSMC to any individual entity shall not exceed ten percent (10%) of TSMC's net worth, or the net worth of such entity. However, subsidiaries whose voting shares are 100% owned, directly or indirectly, by TSMC are not subject to the above restrictions after the approval of the Board of Directors.

Note 2: The total amount of guarantee shall not exceed twenty-five percent (25%) of TSMC's net worth.

Note 3: The maximum balance for the period and ending balance represent the amounts approved by the Board of Directors.

Taiwan Semiconductor Manufacturing Company Limited and Investees

MARKETABLE SECURITIES HELD
DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC	Commercial paper Taiwan Power Company CPC Corporation, Taiwan	- -	Financial assets at amortized cost "	180 50	\$ 1,795,261 498,837	N/A N/A	\$ 1,797,107 499,080	
	Non-publicly traded equity investments United Industrial Gases Co., Ltd.	-	Financial assets at fair value through other comprehensive income	21,230	493,225	10	493,225	
	Shin-Etsu Handotai Taiwan Co., Ltd.	-	"	10,500	379,176	7	379,176	
	Global Investment Holding Inc.	-	"	11,124	78,430	6	78,430	
	W.K. Technology Fund IV	-	"	806	5,747	2	5,747	
	Crimson Asia Capital	-	"	-	4,554	1	4,554	
	Horizon Ventures Fund	-	"	-	2,477	12	2,477	
	Publicly traded stocks Semiconductor Manufacturing International Corporation	-	Financial assets at fair value through other comprehensive income	21,105	568,150	-	568,150	
	Non-publicly traded equity investments Shanghai Walden Venture Capital Enterprise	-	Financial assets at fair value through other comprehensive income	-	8,904	6	8,904	
	China Walden Venture Investments II, L.P. China Walden Venture Investments III, L.P. Tela Innovations Mcube Inc. Sonics, Inc.	- - - - -	" " " " "	- - 10,440 6,333 637	US\$ 8,175 US\$ 1,486 - - -	9 4 25 12 9	US\$ 8,175 US\$ 1,486 - - -	
TSMC Global	Corporate bond Bank of America Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 44,755	N/A	US\$ 44,755	
	JPMorgan Chase & Co	-	"	-	US\$ 44,291	N/A	US\$ 44,291	
	Morgan Stanley	-	"	-	US\$ 40,237	N/A	US\$ 40,237	
	Goldman Sachs Group Inc/The Citigroup Inc	- -	" "	- -	US\$ 32,464 US\$ 28,602	N/A N/A	US\$ 32,464 US\$ 28,602	
	CVS Health Corp	-	"	-	US\$ 27,238	N/A	US\$ 27,238	
	AT&T Inc	-	"	-	US\$ 23,123	N/A	US\$ 23,123	
	Comcast Corp	-	"	-	US\$ 18,894	N/A	US\$ 18,894	
	Verizon Communications Inc	-	"	-	US\$ 15,927	N/A	US\$ 15,927	
	HSBC Holdings PLC	-	"	-	US\$ 15,571	N/A	US\$ 15,571	
	BAT Capital Corp	-	"	-	US\$ 12,594	N/A	US\$ 12,594	
	Apple Inc	-	"	-	US\$ 12,585	N/A	US\$ 12,585	
	Daimler Finance North America LLC	-	"	-	US\$ 12,578	N/A	US\$ 12,578	
	PNC Bank NA	-	"	-	US\$ 12,203	N/A	US\$ 12,203	
	Nordea Bank Abp	-	"	-	US\$ 11,704	N/A	US\$ 11,704	
	AbbVie Inc	-	"	-	US\$ 11,504	N/A	US\$ 11,504	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	United Technologies Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 11,159	N/A	US\$ 11,159	
	American International Group Inc	-	"	-	US\$ 10,737	N/A	US\$ 10,737	
	Ford Motor Credit Co LLC	-	"	-	US\$ 10,153	N/A	US\$ 10,153	
	Credit Suisse AG/New York NY	-	"	-	US\$ 10,096	N/A	US\$ 10,096	
	Sumitomo Mitsui Financial Group Inc	-	"	-	US\$ 10,008	N/A	US\$ 10,008	
	Mitsubishi UFJ Financial Group Inc	-	"	-	US\$ 9,547	N/A	US\$ 9,547	
	Duke Energy Corp	-	"	-	US\$ 9,228	N/A	US\$ 9,228	
	Macquarie Group Ltd	-	"	-	US\$ 8,970	N/A	US\$ 8,970	
	Analog Devices Inc	-	"	-	US\$ 8,841	N/A	US\$ 8,841	
	ABN AMRO Bank NV	-	"	-	US\$ 8,652	N/A	US\$ 8,652	
	ERAC USA Finance LLC	-	"	-	US\$ 8,601	N/A	US\$ 8,601	
	Wells Fargo & Co	-	"	-	US\$ 8,495	N/A	US\$ 8,495	
	Tencent Holdings Ltd	-	"	-	US\$ 8,089	N/A	US\$ 8,089	
	Intercontinental Exchange Inc	-	"	-	US\$ 7,850	N/A	US\$ 7,850	
	Celgene Corp	-	"	-	US\$ 7,726	N/A	US\$ 7,726	
	American Express Credit Corp	-	"	-	US\$ 7,718	N/A	US\$ 7,718	
	Huntington National Bank/The	-	"	-	US\$ 7,717	N/A	US\$ 7,717	
	Wells Fargo Bank NA	-	"	-	US\$ 7,621	N/A	US\$ 7,621	
	Siemens Financieringsmaatschappij NV	-	"	-	US\$ 7,517	N/A	US\$ 7,517	
	Cardinal Health Inc	-	"	-	US\$ 7,484	N/A	US\$ 7,484	
	Citizens Bank NA/Providence RI	-	"	-	US\$ 7,469	N/A	US\$ 7,469	
	Cooperative Rabobank U.A./NY	-	"	-	US\$ 7,462	N/A	US\$ 7,462	
	QUALCOMM Inc	-	"	-	US\$ 7,432	N/A	US\$ 7,432	
	Reliance Standard Life Global Funding II	-	"	-	US\$ 7,387	N/A	US\$ 7,387	
	UBS Group Funding Switzerland AG	-	"	-	US\$ 7,367	N/A	US\$ 7,367	
	Hewlett Packard Enterprise Co	-	"	-	US\$ 7,327	N/A	US\$ 7,327	
	ANZ New Zealand Int'l Ltd/London	-	"	-	US\$ 7,270	N/A	US\$ 7,270	
	Microsoft Corp	-	"	-	US\$ 7,152	N/A	US\$ 7,152	
	Deutsche Telekom International Finance BV	-	"	-	US\$ 7,110	N/A	US\$ 7,110	
	African Development Bank	-	"	-	US\$ 7,097	N/A	US\$ 7,097	
	Svenska Handelsbanken AB	-	"	-	US\$ 7,081	N/A	US\$ 7,081	
	General Dynamics Corp	-	"	-	US\$ 7,039	N/A	US\$ 7,039	
	Welltower Inc	-	"	-	US\$ 6,995	N/A	US\$ 6,995	
	Banco Santander SA	-	"	-	US\$ 6,907	N/A	US\$ 6,907	
	Bank of New York Mellon Corp/The	-	"	-	US\$ 6,907	N/A	US\$ 6,907	
	Toyota Motor Credit Corp	-	"	-	US\$ 6,902	N/A	US\$ 6,902	
	Mizuho Financial Group Inc	-	"	-	US\$ 6,783	N/A	US\$ 6,783	
	BB&T Corp	-	"	-	US\$ 6,703	N/A	US\$ 6,703	
	Hyundai Capital America	-	"	-	US\$ 6,644	N/A	US\$ 6,644	
	Anheuser-Busch InBev Finance Inc	-	"	-	US\$ 6,637	N/A	US\$ 6,637	
	BP Capital Markets PLC	-	"	-	US\$ 6,589	N/A	US\$ 6,589	
	Southern Co/The	-	"	-	US\$ 6,477	N/A	US\$ 6,477	
	Westpac Banking Corp	-	"	-	US\$ 6,474	N/A	US\$ 6,474	
	Sun Trust Bank/Atlanta GA	-	"	-	US\$ 6,467	N/A	US\$ 6,467	
	Tyson Foods Inc	-	"	-	US\$ 6,213	N/A	US\$ 6,213	
	Dominion Energy Inc	-	"	-	US\$ 6,187	N/A	US\$ 6,187	
	Air Lease Corp	-	"	-	US\$ 6,161	N/A	US\$ 6,161	
	21st Century Fox America Inc	-	"	-	US\$ 6,152	N/A	US\$ 6,152	
	KeyBank NA/Cleveland OH	-	"	-	US\$ 6,049	N/A	US\$ 6,049	
	Fifth Third Bancorp	-	"	-	US\$ 6,045	N/A	US\$ 6,045	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	Northrop Grumman Corp	-	Financial assets at fair value through other comprehensive income	-	US\$ 6,036	N/A	US\$ 6,036
	KeyCorp	-	"	-	US\$ 5,806	N/A	US\$ 5,806
	SMBC Aviation Capital Finance DAC	-	"	-	US\$ 5,806	N/A	US\$ 5,806
	Santander UK Group Holdings PLC	-	"	-	US\$ 5,782	N/A	US\$ 5,782
	UBS AG/London	-	"	-	US\$ 5,772	N/A	US\$ 5,772
	DowDuPont Inc	-	"	-	US\$ 5,757	N/A	US\$ 5,757
	BPCE SA	-	"	-	US\$ 5,709	N/A	US\$ 5,709
	AXA Equitable Holdings Inc	-	"	-	US\$ 5,662	N/A	US\$ 5,662
	Aviation Capital Group LLC	-	"	-	US\$ 5,657	N/A	US\$ 5,657
	BP Capital Markets America Inc	-	"	-	US\$ 5,616	N/A	US\$ 5,616
	Reckitt Benckiser Treasury Services PLC	-	"	-	US\$ 5,611	N/A	US\$ 5,611
	Enterprise Products Operating LLC	-	"	-	US\$ 5,589	N/A	US\$ 5,589
	Santander UK PLC	-	"	-	US\$ 5,568	N/A	US\$ 5,568
	Oracle Corp	-	"	-	US\$ 5,521	N/A	US\$ 5,521
	Penske Truck Leasing Co Lp / PTL Finance Corp	-	"	-	US\$ 5,399	N/A	US\$ 5,399
	ITC Holdings Corp	-	"	-	US\$ 5,350	N/A	US\$ 5,350
	Capital One N/A	-	"	-	US\$ 5,305	N/A	US\$ 5,305
	Western Union Co/The	-	"	-	US\$ 5,218	N/A	US\$ 5,218
	International Bank for Reconstruction & Development	-	"	-	US\$ 5,186	N/A	US\$ 5,186
	Sompo International Holdings Ltd	-	"	-	US\$ 5,092	N/A	US\$ 5,092
	Jackson National Life Global Funding	-	"	-	US\$ 5,069	N/A	US\$ 5,069
	Manufacturers & Traders Trust Co	-	"	-	US\$ 5,049	N/A	US\$ 5,049
	Sun Trust Banks Inc	-	"	-	US\$ 5,044	N/A	US\$ 5,044
	Toronto-Dominion Bank/The	-	"	-	US\$ 5,000	N/A	US\$ 5,000
	UBS AG/Stamford CT	-	"	-	US\$ 4,972	N/A	US\$ 4,972
	Cigna Holding Co	-	"	-	US\$ 4,917	N/A	US\$ 4,917
	Marriott International Inc/MD	-	"	-	US\$ 4,799	N/A	US\$ 4,799
	Cox Communications Inc	-	"	-	US\$ 4,791	N/A	US\$ 4,791
	Ryder System Inc	-	"	-	US\$ 4,778	N/A	US\$ 4,778
	NextEra Energy Capital Holdings Inc	-	"	-	US\$ 4,706	N/A	US\$ 4,706
	US Bank NA/Cincinnati OH	-	"	-	US\$ 4,644	N/A	US\$ 4,644
	Five Corners Funding Trust	-	"	-	US\$ 4,624	N/A	US\$ 4,624
	Credit Suisse Group Funding Guernsey Ltd	-	"	-	US\$ 4,564	N/A	US\$ 4,564
	American Express Co	-	"	-	US\$ 4,547	N/A	US\$ 4,547
	BNP Paribas SA	-	"	-	US\$ 4,530	N/A	US\$ 4,530
	Angen Inc	-	"	-	US\$ 4,526	N/A	US\$ 4,526
	AEP Texas Inc	-	"	-	US\$ 4,502	N/A	US\$ 4,502
	New York Life Global Funding	-	"	-	US\$ 4,448	N/A	US\$ 4,448
	Barclays PLC	-	"	-	US\$ 4,216	N/A	US\$ 4,216
	Credit Agricole SA/London	-	"	-	US\$ 4,118	N/A	US\$ 4,118
	Vodafone Group PLC	-	"	-	US\$ 4,040	N/A	US\$ 4,040
	Fifth Third Bank/Cincinnati OH	-	"	-	US\$ 4,031	N/A	US\$ 4,031
	Banque Federative du Credit Mutuel SA	-	"	-	US\$ 4,028	N/A	US\$ 4,028
	Exelon Generation Co LLC	-	"	-	US\$ 3,969	N/A	US\$ 3,969
	European Investment Bank	-	"	-	US\$ 3,903	N/A	US\$ 3,903
	Bank of Nova Scotia/The	-	"	-	US\$ 3,862	N/A	US\$ 3,862
	Air Liquide Finance SA	-	"	-	US\$ 3,827	N/A	US\$ 3,827
	Edison International	-	"	-	US\$ 3,762	N/A	US\$ 3,762
	Alimentation Couche-Tard Inc	-	"	-	US\$ 3,656	N/A	US\$ 3,656
	Macquarie Bank Ltd	-	"	-	US\$ 3,643	N/A	US\$ 3,643

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Bayer US Finance II LLC	-	Financial assets at fair value through other comprehensive income	-	US\$ 3,638	N/A	US\$ 3,638	
	Barclays Bank PLC	-	"	-	US\$ 3,621	N/A	US\$ 3,621	
	Asian Development Bank	-	"	-	US\$ 3,594	N/A	US\$ 3,594	
	Canadian Imperial Bank of Commerce	-	"	-	US\$ 3,586	N/A	US\$ 3,586	
	Branch Banking & Trust Co	-	"	-	US\$ 3,489	N/A	US\$ 3,489	
	Royal Bank of Canada	-	"	-	US\$ 3,484	N/A	US\$ 3,484	
	Keurig Dr Pepper Inc	-	"	-	US\$ 3,480	N/A	US\$ 3,480	
	Capital One Financial Corp	-	"	-	US\$ 3,426	N/A	US\$ 3,426	
	BMW US Capital LLC	-	"	-	US\$ 3,406	N/A	US\$ 3,406	
	Enel Finance International NV	-	"	-	US\$ 3,385	N/A	US\$ 3,385	
	Mondelez International Holdings Netherlands BV	-	"	-	US\$ 3,382	N/A	US\$ 3,382	
	LyondellBasell Industries NV	-	"	-	US\$ 3,366	N/A	US\$ 3,366	
	Lloyds Banking Group PLC	-	"	-	US\$ 3,222	N/A	US\$ 3,222	
	Inter-American Development Bank	-	"	-	US\$ 3,118	N/A	US\$ 3,118	
	Digital Realty Trust LP	-	"	-	US\$ 3,102	N/A	US\$ 3,102	
	Bank of Montreal	-	"	-	US\$ 3,086	N/A	US\$ 3,086	
	Walgreens Boots Alliance Inc	-	"	-	US\$ 3,075	N/A	US\$ 3,075	
	Skandinaviska Enskilda Banken AB	-	"	-	US\$ 3,058	N/A	US\$ 3,058	
	Schlumberger Holdings Corp	-	"	-	US\$ 3,019	N/A	US\$ 3,019	
	State Street Corp	-	"	-	US\$ 3,007	N/A	US\$ 3,007	
	Eversource Energy	-	"	-	US\$ 2,915	N/A	US\$ 2,915	
	Anthem Inc	-	"	-	US\$ 2,843	N/A	US\$ 2,843	
	Charles Schwab Corp/The	-	"	-	US\$ 2,793	N/A	US\$ 2,793	
	National Australia Bank Ltd/New York	-	"	-	US\$ 2,741	N/A	US\$ 2,741	
	Express Scripts Holding Co	-	"	-	US\$ 2,727	N/A	US\$ 2,727	
	Shell International Finance BV	-	"	-	US\$ 2,718	N/A	US\$ 2,718	
	ING Groep NV	-	"	-	US\$ 2,664	N/A	US\$ 2,664	
	Nestle Holdings Inc	-	"	-	US\$ 2,611	N/A	US\$ 2,611	
	McCormick & Co Inc/MD	-	"	-	US\$ 2,595	N/A	US\$ 2,595	
	PartnerRe Finance B LLC	-	"	-	US\$ 2,568	N/A	US\$ 2,568	
	Sprint Spectrum Co LLC / Sprint Spectrum Co III LLC / Sprint Spectrum Co III LLC	-	"	-	US\$ 2,502	N/A	US\$ 2,502	
	Berkshire Hathaway Energy Co	-	"	-	US\$ 2,501	N/A	US\$ 2,501	
	WR Berkley Corp	-	"	-	US\$ 2,484	N/A	US\$ 2,484	
	Delta Air Lines 2007-1 Class A Pass Through Trust	-	"	-	US\$ 2,483	N/A	US\$ 2,483	
	Lam Research Corp	-	"	-	US\$ 2,482	N/A	US\$ 2,482	
	Ventas Realty LP / Ventas Capital Corp	-	"	-	US\$ 2,416	N/A	US\$ 2,416	
	NiSource Inc	-	"	-	US\$ 2,377	N/A	US\$ 2,377	
	DXC Technology Co	-	"	-	US\$ 2,345	N/A	US\$ 2,345	
	El du Pont de Nemours & Co	-	"	-	US\$ 2,326	N/A	US\$ 2,326	
	Xylem Inc/NY	-	"	-	US\$ 2,319	N/A	US\$ 2,319	
	MUFG Bank Ltd	-	"	-	US\$ 2,296	N/A	US\$ 2,296	
	NBCUniversal Media LLC	-	"	-	US\$ 2,252	N/A	US\$ 2,252	
	Lloyds Bank PLC	-	"	-	US\$ 2,219	N/A	US\$ 2,219	
	Cintas Corp No 2	-	"	-	US\$ 2,165	N/A	US\$ 2,165	
	Sumitomo Mitsui Banking Corp	-	"	-	US\$ 2,164	N/A	US\$ 2,164	
	Gilead Sciences Inc	-	"	-	US\$ 2,101	N/A	US\$ 2,101	
	ProAssurance Corp	-	"	-	US\$ 2,094	N/A	US\$ 2,094	
	HCP Inc	-	"	-	US\$ 2,039	N/A	US\$ 2,039	
	Volkswagen Group of America Finance LLC	-	"	-	US\$ 2,024	N/A	US\$ 2,024	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	EOG Resources Inc	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,003	N/A	US\$ 2,003	
	Roche Holdings Inc	-	"	-	US\$ 1,999	N/A	US\$ 1,999	
	British Telecommunications PLC	-	"	-	US\$ 1,997	N/A	US\$ 1,997	
	Aetna Inc	-	"	-	US\$ 1,997	N/A	US\$ 1,997	
	Realty Income Corp	-	"	-	US\$ 1,959	N/A	US\$ 1,959	
	Caterpillar Financial Services Corp	-	"	-	US\$ 1,938	N/A	US\$ 1,938	
	American Airlines 2013-2 Class A Pass Through Trust	-	"	-	US\$ 1,925	N/A	US\$ 1,925	
	Huntington Bancshares Inc/OH	-	"	-	US\$ 1,912	N/A	US\$ 1,912	
	Duke Realty LP	-	"	-	US\$ 1,895	N/A	US\$ 1,895	
	Dow Chemical Co/The	-	"	-	US\$ 1,881	N/A	US\$ 1,881	
	Societe Generale SA	-	"	-	US\$ 1,819	N/A	US\$ 1,819	
	General Mills Inc	-	"	-	US\$ 1,818	N/A	US\$ 1,818	
	Simon Property Group LP	-	"	-	US\$ 1,781	N/A	US\$ 1,781	
	Visa Inc	-	"	-	US\$ 1,755	N/A	US\$ 1,755	
	UnitedHealth Group Inc	-	"	-	US\$ 1,752	N/A	US\$ 1,752	
	WestRock RKT Co	-	"	-	US\$ 1,746	N/A	US\$ 1,746	
	Brambles USA Inc	-	"	-	US\$ 1,740	N/A	US\$ 1,740	
	PSEG Power LLC	-	"	-	US\$ 1,730	N/A	US\$ 1,730	
	Dominion Energy Gas Holdings LLC	-	"	-	US\$ 1,726	N/A	US\$ 1,726	
	McKesson Corp	-	"	-	US\$ 1,707	N/A	US\$ 1,707	
	Danske Bank A/S	-	"	-	US\$ 1,687	N/A	US\$ 1,687	
	Standard Chartered PLC	-	"	-	US\$ 1,680	N/A	US\$ 1,680	
	Wisconsin Public Service Corp	-	"	-	US\$ 1,678	N/A	US\$ 1,678	
	Regions Financial Corp	-	"	-	US\$ 1,658	N/A	US\$ 1,658	
	Amazon.com Inc	-	"	-	US\$ 1,581	N/A	US\$ 1,581	
	Principal Life Global Funding II	-	"	-	US\$ 1,564	N/A	US\$ 1,564	
	Husky Energy Inc	-	"	-	US\$ 1,557	N/A	US\$ 1,557	
	General Electric Co	-	"	-	US\$ 1,552	N/A	US\$ 1,552	
	American Electric Power Co Inc	-	"	-	US\$ 1,546	N/A	US\$ 1,546	
	Weyerhaeuser Co	-	"	-	US\$ 1,537	N/A	US\$ 1,537	
	Lincoln National Corp	-	"	-	US\$ 1,536	N/A	US\$ 1,536	
	AIG Global Funding	-	"	-	US\$ 1,491	N/A	US\$ 1,491	
	Harley-Davidson Financial Services Inc	-	"	-	US\$ 1,490	N/A	US\$ 1,490	
	Compass Bank	-	"	-	US\$ 1,483	N/A	US\$ 1,483	
	O'Reilly Automotive Inc	-	"	-	US\$ 1,470	N/A	US\$ 1,470	
	John Deere Capital Corp	-	"	-	US\$ 1,470	N/A	US\$ 1,470	
	Nissan Motor Acceptance Corp	-	"	-	US\$ 1,466	N/A	US\$ 1,466	
	Guardian Life Global Funding	-	"	-	US\$ 1,459	N/A	US\$ 1,459	
	Public Service Electric & Gas Co	-	"	-	US\$ 1,457	N/A	US\$ 1,457	
	Fiserv Inc	-	"	-	US\$ 1,455	N/A	US\$ 1,455	
	Oesterreichische Kontrollbank AG	-	"	-	US\$ 1,441	N/A	US\$ 1,441	
	TransCanada PipeLines Ltd	-	"	-	US\$ 1,436	N/A	US\$ 1,436	
	HSBC Bank PLC	-	"	-	US\$ 1,434	N/A	US\$ 1,434	
	Eastman Chemical Co	-	"	-	US\$ 1,433	N/A	US\$ 1,433	
	CBS Corp	-	"	-	US\$ 1,420	N/A	US\$ 1,420	
	Takeda Pharmaceutical Co Ltd	-	"	-	US\$ 1,412	N/A	US\$ 1,412	
	IBM Credit LLC	-	"	-	US\$ 1,407	N/A	US\$ 1,407	
	Monongahela Power Co	-	"	-	US\$ 1,387	N/A	US\$ 1,387	
	Choe Global Markets Inc	-	"	-	US\$ 1,368	N/A	US\$ 1,368	
	Texas Eastern Transmission LP	-	"	-	US\$ 1,363	N/A	US\$ 1,363	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	Georgia-Pacific LLC	-	Financial assets at fair value through other comprehensive income	-	US\$ 1,346	N/A	US\$ 1,346
	Kreditanstalt fuer Wiederaufbau	-	"	-	US\$ 1,331	N/A	US\$ 1,331
	Rockwell Collins Inc	-	"	-	US\$ 1,321	N/A	US\$ 1,321
	GATX Corp	-	"	-	US\$ 1,265	N/A	US\$ 1,265
	Energy Arkansas LLC	-	"	-	US\$ 1,262	N/A	US\$ 1,262
	CNA Financial Corp	-	"	-	US\$ 1,249	N/A	US\$ 1,249
	Energy Corp	-	"	-	US\$ 1,226	N/A	US\$ 1,226
	CenterPoint Energy Inc	-	"	-	US\$ 1,224	N/A	US\$ 1,224
	Consolidated Edison Inc	-	"	-	US\$ 1,203	N/A	US\$ 1,203
	Glencore Funding LLC	-	"	-	US\$ 1,190	N/A	US\$ 1,190
	GlaxoSmithKline Capital PLC	-	"	-	US\$ 1,182	N/A	US\$ 1,182
	Regions Bank/Birmingham AL	-	"	-	US\$ 1,157	N/A	US\$ 1,157
	Magellan Midstream Partners LP	-	"	-	US\$ 1,149	N/A	US\$ 1,149
	Woolworths Group Ltd	-	"	-	US\$ 1,099	N/A	US\$ 1,099
	Commonwealth Bank of Australia/New York NY	-	"	-	US\$ 1,094	N/A	US\$ 1,094
	Interpublic Group of Cos Inc/The	-	"	-	US\$ 1,086	N/A	US\$ 1,086
	Swedbank AB	-	"	-	US\$ 1,061	N/A	US\$ 1,061
	Reinsurance Group of America Inc	-	"	-	US\$ 1,037	N/A	US\$ 1,037
	Quest Diagnostics Inc	-	"	-	US\$ 1,026	N/A	US\$ 1,026
	Prudential Financial Inc	-	"	-	US\$ 1,026	N/A	US\$ 1,026
	Glencore Finance Canada Ltd	-	"	-	US\$ 1,022	N/A	US\$ 1,022
	Athene Global Funding	-	"	-	US\$ 1,020	N/A	US\$ 1,020
	Commonwealth Edison Co	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	DNB Bank ASA	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	Scentre Group Trust 1/Scentre Group Trust 2	-	"	-	US\$ 1,014	N/A	US\$ 1,014
	Mitsubishi UFJ Trust & Banking Corp	-	"	-	US\$ 1,013	N/A	US\$ 1,013
	DTE Energy Co	-	"	-	US\$ 1,010	N/A	US\$ 1,010
	Union Pacific Corp	-	"	-	US\$ 1,008	N/A	US\$ 1,008
	Commonwealth Bank of Australia	-	"	-	US\$ 1,003	N/A	US\$ 1,003
	Philip Morris International Inc	-	"	-	US\$ 1,001	N/A	US\$ 1,001
	Equinor ASA	-	"	-	US\$ 995	N/A	US\$ 995
	Southern California Edison Co	-	"	-	US\$ 994	N/A	US\$ 994
	Laboratory Corp of America Holdings	-	"	-	US\$ 993	N/A	US\$ 993
	Biogen Inc	-	"	-	US\$ 992	N/A	US\$ 992
	Halliburton Co	-	"	-	US\$ 989	N/A	US\$ 989
	Sysco Corp	-	"	-	US\$ 988	N/A	US\$ 988
	Unum Group	-	"	-	US\$ 987	N/A	US\$ 987
	Orange SA	-	"	-	US\$ 986	N/A	US\$ 986
	BOC Aviation Ltd	-	"	-	US\$ 985	N/A	US\$ 985
	Priscoa Global Funding I	-	"	-	US\$ 985	N/A	US\$ 985
	Energy Texas Inc	-	"	-	US\$ 982	N/A	US\$ 982
	Protective Life Global Funding	-	"	-	US\$ 979	N/A	US\$ 979
	Moody's Corp	-	"	-	US\$ 978	N/A	US\$ 978
	Holcim US Finance Sarl & Cie SCS	-	"	-	US\$ 973	N/A	US\$ 973
	Healthcare Trust of America Holdings LP	-	"	-	US\$ 970	N/A	US\$ 970
	State Grid Overseas Investment 2016 Ltd	-	"	-	US\$ 968	N/A	US\$ 968
	Loews Corp	-	"	-	US\$ 965	N/A	US\$ 965
	Citibank NA	-	"	-	US\$ 954	N/A	US\$ 954
	Bunge Ltd Finance Corp	-	"	-	US\$ 953	N/A	US\$ 953
	Anheuser-Busch InBev Worldwide Inc	-	"	-	US\$ 921	N/A	US\$ 921

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Coca-Cola Femsa SAB de CV	-	Financial assets at fair value through other comprehensive income	-	US\$ 892	N/A	US\$ 892	
	Lockheed Martin Corp	-	"	-	US\$ 889	N/A	US\$ 889	
	CNOOC Finance 2011 Ltd	-	"	-	US\$ 860	N/A	US\$ 860	
	CA Inc	-	"	-	US\$ 857	N/A	US\$ 857	
	Marsh & McLennan Cos Inc	-	"	-	US\$ 853	N/A	US\$ 853	
	Viterra Inc	-	"	-	US\$ 850	N/A	US\$ 850	
	Baker Hughes a GE Co LLC/Baker Hughes Co-Obligor Inc	-	"	-	US\$ 823	N/A	US\$ 823	
	Intesa Sanpaolo SpA	-	"	-	US\$ 804	N/A	US\$ 804	
	Aon PLC	-	"	-	US\$ 800	N/A	US\$ 800	
	Alterra Finance LLC	-	"	-	US\$ 787	N/A	US\$ 787	
	ONEOK Partners LP	-	"	-	US\$ 783	N/A	US\$ 783	
	Activision Blizzard Inc	-	"	-	US\$ 774	N/A	US\$ 774	
	Suncorp-Metway Ltd	-	"	-	US\$ 774	N/A	US\$ 774	
	AXIS Specialty Finance LLC	-	"	-	US\$ 771	N/A	US\$ 771	
	Sinopec Capital 2013 Ltd	-	"	-	US\$ 771	N/A	US\$ 771	
	Nomura Holdings Inc	-	"	-	US\$ 769	N/A	US\$ 769	
	Manulife Financial Corp	-	"	-	US\$ 769	N/A	US\$ 769	
	Incitec Pivot Finance LLC	-	"	-	US\$ 767	N/A	US\$ 767	
	Warner Media LLC	-	"	-	US\$ 758	N/A	US\$ 758	
	AutoZone Inc	-	"	-	US\$ 753	N/A	US\$ 753	
	Baidu Inc	-	"	-	US\$ 745	N/A	US\$ 745	
	Walmart Inc	-	"	-	US\$ 744	N/A	US\$ 744	
	Metropolitan Life Global Funding I	-	"	-	US\$ 738	N/A	US\$ 738	
	Pinnacle West Capital Corp	-	"	-	US\$ 734	N/A	US\$ 734	
	WEC Energy Group Inc	-	"	-	US\$ 733	N/A	US\$ 733	
	Phillips 66	-	"	-	US\$ 701	N/A	US\$ 701	
	Thermo Fisher Scientific Inc	-	"	-	US\$ 701	N/A	US\$ 701	
	Australia & New Zealand Banking Group Ltd/New York NY	-	"	-	US\$ 695	N/A	US\$ 695	
	eBay Inc	-	"	-	US\$ 695	N/A	US\$ 695	
	APT Pipelines Ltd	-	"	-	US\$ 695	N/A	US\$ 695	
	Baker Hughes a GE Co LLC	-	"	-	US\$ 691	N/A	US\$ 691	
	Textron Inc	-	"	-	US\$ 685	N/A	US\$ 685	
	Reynolds American Inc	-	"	-	US\$ 670	N/A	US\$ 670	
	Vornado Realty LP	-	"	-	US\$ 669	N/A	US\$ 669	
	Rochester Gas & Electric Corp	-	"	-	US\$ 660	N/A	US\$ 660	
	National Oilwell Varco Inc	-	"	-	US\$ 659	N/A	US\$ 659	
	Norfolk Southern Railway Co	-	"	-	US\$ 656	N/A	US\$ 656	
	Ohio Power Co	-	"	-	US\$ 635	N/A	US\$ 635	
	Toledo Edison Co/The	-	"	-	US\$ 630	N/A	US\$ 630	
	Wm Wrigley Jr Co	-	"	-	US\$ 624	N/A	US\$ 624	
	ERP Operating LP	-	"	-	US\$ 623	N/A	US\$ 623	
	Alexandria Real Estate Equities Inc	-	"	-	US\$ 618	N/A	US\$ 618	
	RBC USA Holdco Corp	-	"	-	US\$ 618	N/A	US\$ 618	
	Citizens Financial Group Inc	-	"	-	US\$ 613	N/A	US\$ 613	
	Grupo Bimbo SAB de CV	-	"	-	US\$ 612	N/A	US\$ 612	
	Liberty Property LP	-	"	-	US\$ 612	N/A	US\$ 612	
	Nutrien Ltd	-	"	-	US\$ 610	N/A	US\$ 610	
	Continental Airlines 2000-1 Class A-1 Pass Through Trust	-	"	-	US\$ 605	N/A	US\$ 605	
	Continental Airlines 2007-1 Class A Pass Through Trust	-	"	-	US\$ 600	N/A	US\$ 600	
	Daiwa Securities Group Inc	-	"	-	US\$ 599	N/A	US\$ 599	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	MUFG Union Bank NA	-	Financial assets at fair value through other comprehensive income	-	US\$ 598	N/A	US\$ 598	
	OneBeacon US Holdings Inc	-	"	-	US\$ 597	N/A	US\$ 597	
	US Bancorp	-	"	-	US\$ 595	N/A	US\$ 595	
	Ontario Teachers' Cadillac Fairview Properties Trust	-	"	-	US\$ 594	N/A	US\$ 594	
	BAT International Finance PLC	-	"	-	US\$ 591	N/A	US\$ 591	
	Kimco Realty Corp	-	"	-	US\$ 589	N/A	US\$ 589	
	Life Technologies Corp	-	"	-	US\$ 585	N/A	US\$ 585	
	AXIS Specialty Finance PLC	-	"	-	US\$ 574	N/A	US\$ 574	
	Nationwide Financial Services Inc	-	"	-	US\$ 569	N/A	US\$ 569	
	ABC Inc	-	"	-	US\$ 568	N/A	US\$ 568	
	Host Hotels & Resorts LP	-	"	-	US\$ 564	N/A	US\$ 564	
	AvalonBay Communities Inc	-	"	-	US\$ 563	N/A	US\$ 563	
	Duke Energy Progress LLC	-	"	-	US\$ 551	N/A	US\$ 551	
	Church & Dwight Co Inc	-	"	-	US\$ 525	N/A	US\$ 525	
	Sempra Energy	-	"	-	US\$ 518	N/A	US\$ 518	
	Fulton Financial Corp	-	"	-	US\$ 510	N/A	US\$ 510	
	ASB Bank Ltd	-	"	-	US\$ 501	N/A	US\$ 501	
	Regency Centers Corp	-	"	-	US\$ 498	N/A	US\$ 498	
	TD Ameritrade Holding Corp	-	"	-	US\$ 497	N/A	US\$ 497	
	Sumitomo Mitsui Trust Bank Ltd	-	"	-	US\$ 496	N/A	US\$ 496	
	Highwoods Realty LP	-	"	-	US\$ 493	N/A	US\$ 493	
	ORIX Corp	-	"	-	US\$ 490	N/A	US\$ 490	
	International Paper Co	-	"	-	US\$ 478	N/A	US\$ 478	
	MassMutual Global Funding II	-	"	-	US\$ 477	N/A	US\$ 477	
	Diageo Capital PLC	-	"	-	US\$ 475	N/A	US\$ 475	
	Comerica Inc	-	"	-	US\$ 472	N/A	US\$ 472	
	Ent SpA	-	"	-	US\$ 459	N/A	US\$ 459	
	Spire Inc	-	"	-	US\$ 456	N/A	US\$ 456	
	Narragansett Electric Co/The	-	"	-	US\$ 454	N/A	US\$ 454	
	United Overseas Bank Ltd	-	"	-	US\$ 453	N/A	US\$ 453	
	Duke Energy Carolinas LLC	-	"	-	US\$ 451	N/A	US\$ 451	
	Eaton Corp	-	"	-	US\$ 449	N/A	US\$ 449	
	Public Service Enterprise Group Inc	-	"	-	US\$ 446	N/A	US\$ 446	
	Total Capital International SA	-	"	-	US\$ 429	N/A	US\$ 429	
	Burlington Northern Santa Fe LLC	-	"	-	US\$ 424	N/A	US\$ 424	
	Columbia Pipeline Group Inc	-	"	-	US\$ 412	N/A	US\$ 412	
	Canadian Pacific Railway Co	-	"	-	US\$ 412	N/A	US\$ 412	
	Marathon Petroleum Corp	-	"	-	US\$ 412	N/A	US\$ 412	
	Valero Energy Corp	-	"	-	US\$ 412	N/A	US\$ 412	
	Texas-New Mexico Power Co	-	"	-	US\$ 406	N/A	US\$ 406	
	Eaton Electric Holdings LLC	-	"	-	US\$ 403	N/A	US\$ 403	
	Markel Corp	-	"	-	US\$ 400	N/A	US\$ 400	
	Tanger Properties LP	-	"	-	US\$ 393	N/A	US\$ 393	
	Southern Power Co	-	"	-	US\$ 388	N/A	US\$ 388	
	Continental Airlines 2012-1 Class A Pass Through Trust	-	"	-	US\$ 385	N/A	US\$ 385	
	StanCorp Financial Group Inc	-	"	-	US\$ 379	N/A	US\$ 379	
	Aon Corp	-	"	-	US\$ 377	N/A	US\$ 377	
	First Niagara Financial Group Inc	-	"	-	US\$ 364	N/A	US\$ 364	
	CenterPoint Energy Resources Corp	-	"	-	US\$ 355	N/A	US\$ 355	
	American Honda Finance Corp	-	"	-	US\$ 354	N/A	US\$ 354	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Deutsche Bank AG	-	Financial assets at fair value through other comprehensive income	-	US\$ 348	N/A	US\$ 348	
	Cooperative Rabobank UA	-	"	-	US\$ 340	N/A	US\$ 340	
	Schlumberger Finance Canada Ltd	-	"	-	US\$ 293	N/A	US\$ 293	
	Elit Lilly & Co	-	"	-	US\$ 289	N/A	US\$ 289	
	Amphenol Corp	-	"	-	US\$ 286	N/A	US\$ 286	
	BAE Systems Holdings Inc	-	"	-	US\$ 282	N/A	US\$ 282	
	Home Depot Inc/The	-	"	-	US\$ 277	N/A	US\$ 277	
	EMD Finance LLC	-	"	-	US\$ 277	N/A	US\$ 277	
	Archer-Daniels-Midland Co	-	"	-	US\$ 250	N/A	US\$ 250	
	Hartford Financial Services Group Inc/The	-	"	-	US\$ 228	N/A	US\$ 228	
	Rolls-Royce PLC	-	"	-	US\$ 221	N/A	US\$ 221	
	Protective Life Corp	-	"	-	US\$ 216	N/A	US\$ 216	
	WestRock MWV LLC	-	"	-	US\$ 210	N/A	US\$ 210	
	ING Bank NV	-	"	-	US\$ 207	N/A	US\$ 207	
	Fidelity National Information Services Inc	-	"	-	US\$ 202	N/A	US\$ 202	
	Equifax Inc	-	"	-	US\$ 174	N/A	US\$ 174	
	Packaging Corp of America	-	"	-	US\$ 157	N/A	US\$ 157	
	Schneider Electric SE	-	"	-	US\$ 157	N/A	US\$ 157	
	Wells Fargo & Co	-	Financial assets at amortized cost	-	US\$ 149,941	N/A	US\$ 150,065	
	JPMorgan Chase & Co.	-	"	-	US\$ 124,948	N/A	US\$ 125,726	
	Westpac Banking Corp.	-	"	-	US\$ 99,987	N/A	US\$ 100,111	
	Goldman Sachs Group, Inc.	-	"	-	US\$ 99,900	N/A	US\$ 100,103	
	Commonwealth Bank of Australia	-	"	-	US\$ 49,994	N/A	US\$ 50,037	
	National Australia Bank	-	"	-	US\$ 49,994	N/A	US\$ 50,010	
	Bank of Nova Scotia	-	"	-	US\$ 49,976	N/A	US\$ 50,077	
	Industrial and Commercial Bank of China	-	"	-	US\$ 9,996	N/A	US\$ 10,000	
	Government bond	-	Financial assets at fair value through other comprehensive income	-	US\$ 287,628	N/A	US\$ 287,628	
	United States Treasury Note/Bond	-	"	-	US\$ 68,164	N/A	US\$ 68,164	
	United States Treasury Floating Rate Note	-	"	-	US\$ 3,408	N/A	US\$ 3,408	
	Abu Dhabi Government International Bond	-	"	-	US\$ 2,248	N/A	US\$ 2,248	
	United States Treasury Bill	-	"	-	US\$ 1,315	N/A	US\$ 1,315	
	Qatar Government International Bond	-	"	-	US\$ 47,996	N/A	US\$ 47,996	
	Agency bonds/Agency mortgage-backed securities	-	Financial assets at fair value through Profit or Loss	-	US\$ 33,767	N/A	US\$ 33,767	
	Freddie Mac REMICS	-	"	-	US\$ 24,518	N/A	US\$ 24,518	
	Fannie Mae REMICS	-	"	-	US\$ 1,859	N/A	US\$ 1,859	
	Government National Mortgage Association	-	"	-	US\$ 1,713	N/A	US\$ 1,713	
	Fannie Mae Interest Strip	-	"	-	US\$ 1,380	N/A	US\$ 1,380	
	Freddie Mac Multifamily Structured Pass Through Certificates	-	"	-	US\$ 398,735	N/A	US\$ 398,735	
	Freddie Mac Strips	-	Financial assets at fair value through other comprehensive income	-	US\$ 133,948	N/A	US\$ 133,948	
	Fannie Mae Pool	-	"	-	US\$ 131,341	N/A	US\$ 131,341	
	Freddie Mac Gold Pool	-	"	-	US\$ 128,236	N/A	US\$ 128,236	
	Fannie Mae REMICS	-	"	-	US\$ 112,050	N/A	US\$ 112,050	
	Government National Mortgage Association	-	"	-	US\$ 51,015	N/A	US\$ 51,015	
	Freddie Mac REMICS	-	"	-	US\$ 27,141	N/A	US\$ 27,141	
	Ginnie Mae II Pool	-	"	-				
	Fannie Mae	-	"	-				

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	Ginnie Mae	-	Financial assets at fair value through other comprehensive income	-	US\$ 16,081	N/A	US\$ 16,081	
	Fannie Mae-Aces	-	"	-	US\$ 5,796	N/A	US\$ 5,796	
	Freddie Mac Non Gold Pool	-	"	-	US\$ 2,684	N/A	US\$ 2,684	
	Freddie Mac Multifamily Structured Pass Through Certificates	-	"	-	US\$ 2,554	N/A	US\$ 2,554	
	Province of Quebec Canada	-	"	-	US\$ 2,514	N/A	US\$ 2,514	
	FHLMC-GNMA	-	"	-	US\$ 1,486	N/A	US\$ 1,486	
	Federal Farm Credit Banks	-	"	-	US\$ 891	N/A	US\$ 891	
	NCUA Guaranteed Notes Trust 2010-R2	-	"	-	US\$ 842	N/A	US\$ 842	
	Ginnie Mae I Pool	-	"	-	US\$ 632	N/A	US\$ 632	
	Kowloon-Canton Railway Corp	-	"	-	US\$ 554	N/A	US\$ 554	
	Federal Home Loan Mortgage Corp	-	"	-	US\$ 500	N/A	US\$ 500	
	Federal National Mortgage Association	-	"	-	US\$ 370	N/A	US\$ 370	
	NCUA Guaranteed Notes Trust 2010-R1	-	"	-	US\$ 335	N/A	US\$ 335	
	Fannie Mae Benchmark REMIC	-	"	-	US\$ 132	N/A	US\$ 132	
	Freddie Mac	-	"	-	US\$ 15	N/A	US\$ 15	
	Asset-backed securities							
	Citibank Credit Card Issuance Trust	-	Financial assets at fair value through other comprehensive income	-	US\$ 68,487	N/A	US\$ 68,487	
	Chase Issuance Trust	-	"	-	US\$ 43,604	N/A	US\$ 43,604	
	American Express Credit Account Master Trust	-	"	-	US\$ 42,144	N/A	US\$ 42,144	
	Discover Card Execution Note Trust	-	"	-	US\$ 37,495	N/A	US\$ 37,495	
	Ford Credit Floorman Master Owner Trust A	-	"	-	US\$ 26,702	N/A	US\$ 26,702	
	Hyundai Auto Receivables Trust 2018-B	-	"	-	US\$ 8,122	N/A	US\$ 8,122	
	BA Credit Card Trust	-	"	-	US\$ 8,092	N/A	US\$ 8,092	
	Nissan Master Owner Trust Receivables	-	"	-	US\$ 7,989	N/A	US\$ 7,989	
	CGDBB Commercial Mortgage Trust 2017-BIOC	-	"	-	US\$ 7,430	N/A	US\$ 7,430	
	Capital One Multi-Asset Execution Trust	-	"	-	US\$ 7,304	N/A	US\$ 7,304	
	BX Commercial Mortgage Trust 2018-IND	-	"	-	US\$ 6,946	N/A	US\$ 6,946	
	UBS-Barclays Commercial Mortgage Trust 2012-C2	-	"	-	US\$ 6,313	N/A	US\$ 6,313	
	Mercedes-Benz Master Owner Trust 2016-B	-	"	-	US\$ 6,012	N/A	US\$ 6,012	
	Ford Credit Auto Owner Trust 2016-REV1	-	"	-	US\$ 5,917	N/A	US\$ 5,917	
	BBCMS 2018-TALL Mortgage Trust	-	"	-	US\$ 5,403	N/A	US\$ 5,403	
	Chesapeake Funding II LLC	-	"	-	US\$ 5,328	N/A	US\$ 5,328	
	Morgan Stanley Bank of America Merrill Lynch Trust 2013-C10	-	"	-	US\$ 4,879	N/A	US\$ 4,879	
	Ford Credit Auto Owner Trust 2015-REV1	-	"	-	US\$ 4,871	N/A	US\$ 4,871	
	Volvo Financial Equipment Master Owner Trust	-	"	-	US\$ 4,510	N/A	US\$ 4,510	
	UBS Commercial Mortgage Trust 2018-C10	-	"	-	US\$ 4,047	N/A	US\$ 4,047	
	JPMCC Commercial Mortgage Securities Trust 2017-JP7	-	"	-	US\$ 3,960	N/A	US\$ 3,960	
	J.P. Morgan Chase Commercial Mortgage Securities Trust 2016-WIK1	-	"	-	US\$ 3,932	N/A	US\$ 3,932	
	BANK 2017-BNK5	-	"	-	US\$ 3,902	N/A	US\$ 3,902	
	BANK 2017-BNK6	-	"	-	US\$ 3,899	N/A	US\$ 3,899	
	Nissan Auto Lease Trust 2016-B	-	"	-	US\$ 3,886	N/A	US\$ 3,886	
	Cold Storage Trust 2017-ICE3	-	"	-	US\$ 3,732	N/A	US\$ 3,732	
	GS Mortgage Securities Corp II	-	"	-	US\$ 3,247	N/A	US\$ 3,247	
	COMM 2015-CCRE25 Mortgage Trust	-	"	-	US\$ 2,998	N/A	US\$ 2,998	
	GS Mortgage Securities Corp Trust 2018-RVR	-	"	-	US\$ 2,989	N/A	US\$ 2,989	
	Honda Auto Receivables 2017-2 Owner Trust	-	"	-	US\$ 2,947	N/A	US\$ 2,947	
	GM Financial Consumer Automobile Receivables Trust 2017-2	-	"	-	US\$ 2,945	N/A	US\$ 2,945	

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	BMW Floorplan Master Owner Trust	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,800	N/A	US\$ 2,800
	GS Mortgage Securities Trust 2011-GC3	-	"	-	US\$ 2,750	N/A	US\$ 2,750
	Hertz Fleet Lease Funding LP	-	"	-	US\$ 2,672	N/A	US\$ 2,672
	Morgan Stanley Capital I Trust 2018-H3	-	"	-	US\$ 2,596	N/A	US\$ 2,596
	GS Mortgage Securities Trust 2013-GC112	-	"	-	US\$ 2,576	N/A	US\$ 2,576
	Toyota Auto Receivables 2018-C Owner Trust	-	"	-	US\$ 2,554	N/A	US\$ 2,554
	JPMDB Commercial Mortgage Securities Trust 2016-C2	-	"	-	US\$ 2,512	N/A	US\$ 2,512
	Nissan Auto Lease Trust 2017-A	-	"	-	US\$ 2,386	N/A	US\$ 2,386
	Toyota Auto Receivables 2018-A Owner Trust	-	"	-	US\$ 2,306	N/A	US\$ 2,306
	Hyundai Auto Lease Securitization Trust 2017-B	-	"	-	US\$ 2,252	N/A	US\$ 2,252
	Wells Fargo Commercial Mortgage Trust 2015-LC20	-	"	-	US\$ 2,127	N/A	US\$ 2,127
	UBS Commercial Mortgage Trust 2018-C11	-	"	-	US\$ 2,083	N/A	US\$ 2,083
	COMM 2013-CCRE12 Mortgage Trust	-	"	-	US\$ 2,061	N/A	US\$ 2,061
	Ford Credit Auto Owner Trust 2017-C	-	"	-	US\$ 2,046	N/A	US\$ 2,046
	BENCHMARK 2018-B4	-	"	-	US\$ 2,034	N/A	US\$ 2,034
	JPMBB Commercial Mortgage Securities Trust 2014-C19	-	"	-	US\$ 2,017	N/A	US\$ 2,017
	COMM 2015-CCRE22 Mortgage Trust	-	"	-	US\$ 2,010	N/A	US\$ 2,010
	Wells Fargo Commercial Mortgage Trust 2015-C30	-	"	-	US\$ 2,006	N/A	US\$ 2,006
	UBS-Barclays Commercial Mortgage Trust 2013-C6	-	"	-	US\$ 1,979	N/A	US\$ 1,979
	Toyota Auto Receivables 2016-B Owner Trust	-	"	-	US\$ 1,977	N/A	US\$ 1,977
	Citigroup Commercial Mortgage Trust 2017-P8	-	"	-	US\$ 1,974	N/A	US\$ 1,974
	Toyota Auto Receivables 2017-C Owner Trust	-	"	-	US\$ 1,960	N/A	US\$ 1,960
	Mercedes-Benz Auto Lease Trust 2018-B	-	"	-	US\$ 1,953	N/A	US\$ 1,953
	JPMDB Commercial Mortgage Securities Trust 2017-C7	-	"	-	US\$ 1,944	N/A	US\$ 1,944
	Morgan Stanley Bank of America Merrill Lynch Trust 2016-C31	-	"	-	US\$ 1,940	N/A	US\$ 1,940
	GM Financial Automobile Leasing Trust 2016-3	-	"	-	US\$ 1,931	N/A	US\$ 1,931
	Morgan Stanley Capital I Trust 2016-UB11	-	"	-	US\$ 1,868	N/A	US\$ 1,868
	Ford Credit Auto Lease Trust 2017-B	-	"	-	US\$ 1,863	N/A	US\$ 1,863
	BANK 2018-BNK14	-	"	-	US\$ 1,811	N/A	US\$ 1,811
	BMW Vehicle Lease Trust	-	"	-	US\$ 1,801	N/A	US\$ 1,801
	Ford Credit Auto Lease Trust	-	"	-	US\$ 1,799	N/A	US\$ 1,799
	Wheels SPV 2 LLC	-	"	-	US\$ 1,788	N/A	US\$ 1,788
	Citigroup Commercial Mortgage Trust 2015-GC35	-	"	-	US\$ 1,783	N/A	US\$ 1,783
	Morgan Stanley Bank of America Merrill Lynch Trust 2013-C8	-	"	-	US\$ 1,771	N/A	US\$ 1,771
	BENCHMARK 2018-B6 Mortgage Trust	-	"	-	US\$ 1,766	N/A	US\$ 1,766
	CarMax Auto Owner Trust	-	"	-	US\$ 1,756	N/A	US\$ 1,756
	Nelnet Student Loan Trust 2010-4	-	"	-	US\$ 1,742	N/A	US\$ 1,742
	SLM Student Loan Trust 2005-4	-	"	-	US\$ 1,722	N/A	US\$ 1,722
	UBS-Barclays Commercial Mortgage Trust 2013-C5	-	"	-	US\$ 1,707	N/A	US\$ 1,707
	Hyundai Auto Lease Securitization Trust 2016-C	-	"	-	US\$ 1,670	N/A	US\$ 1,670
	Ford Credit Auto Lease Trust 2017-A	-	"	-	US\$ 1,603	N/A	US\$ 1,603
	Edsouth Indenture No 10 LLC	-	"	-	US\$ 1,598	N/A	US\$ 1,598
	Ford Credit Auto Owner Trust 2015-A	-	"	-	US\$ 1,541	N/A	US\$ 1,541
	Navient Student Loan Trust 2017-1	-	"	-	US\$ 1,540	N/A	US\$ 1,540
	Nelnet Student Loan Trust 2018-3	-	"	-	US\$ 1,538	N/A	US\$ 1,538
	COMM 2015-PC1 Mortgage Trust	-	"	-	US\$ 1,500	N/A	US\$ 1,500
	Ford Credit Auto Lease Trust 2018-A	-	"	-	US\$ 1,497	N/A	US\$ 1,497
	Morgan Stanley Capital I Trust 2017-H1	-	"	-	US\$ 1,481	N/A	US\$ 1,481
	SLM Student Loan Trust 2013-6	-	"	-	US\$ 1,465	N/A	US\$ 1,465
	JPMCC Commercial Mortgage Securities Trust 2017-JP5	-	"	-	US\$ 1,460	N/A	US\$ 1,460

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Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
TSMC Global	ECMC Group Student Loan Trust 2018-2	-	Financial assets at fair value through other comprehensive income	-	US\$ 1,448	N/A	US\$ 1,448	
	Nelnet Student Loan Trust 2012-1	-	"	-	US\$ 1,446	N/A	US\$ 1,446	
	Pheaa Student Loan Trust 2018-1	-	"	-	US\$ 1,443	N/A	US\$ 1,443	
	Toyota Auto Receivables 2018-B Owner Trust	-	"	-	US\$ 1,432	N/A	US\$ 1,432	
	Mercedes-Benz Master Owner Trust 2018-BA	-	"	-	US\$ 1,396	N/A	US\$ 1,396	
	Ford Credit Auto Owner Trust 2014-REV2	-	"	-	US\$ 1,390	N/A	US\$ 1,390	
	Nelnet Student Loan Trust 2006-2	-	"	-	US\$ 1,388	N/A	US\$ 1,388	
	COMM 2013-CCRE6 Mortgage Trust	-	"	-	US\$ 1,360	N/A	US\$ 1,360	
	GM Financial Automobile Leasing Trust 2017-1	-	"	-	US\$ 1,299	N/A	US\$ 1,299	
	COMM 2015-DC1 Mortgage Trust	-	"	-	US\$ 1,253	N/A	US\$ 1,253	
	Enterprise Fleet Financing LLC	-	"	-	US\$ 1,251	N/A	US\$ 1,251	
	Hyundai Auto Lease Securitization Trust 2018-A	-	"	-	US\$ 1,246	N/A	US\$ 1,246	
	JPMBB Commercial Mortgage Securities Trust 2016-C1	-	"	-	US\$ 1,243	N/A	US\$ 1,243	
	Morgan Stanley Bank of America Merrill Lynch Trust 2015-C20	-	"	-	US\$ 1,196	N/A	US\$ 1,196	
	Hyundai Auto Lease Securitization Trust 2017-C	-	"	-	US\$ 1,049	N/A	US\$ 1,049	
	Nissan Auto Receivables 2016-B Owner Trust	-	"	-	US\$ 1,043	N/A	US\$ 1,043	
	WFRBS Commercial Mortgage Trust 2011-C4	-	"	-	US\$ 1,036	N/A	US\$ 1,036	
	GM Financial Consumer Automobile Receivables Trust 2018-4	-	"	-	US\$ 1,023	N/A	US\$ 1,023	
	COMM 2014-CCRE20 Mortgage Trust	-	"	-	US\$ 1,009	N/A	US\$ 1,009	
	Nissan Auto Receivables 2017-B Owner Trust	-	"	-	US\$ 1,008	N/A	US\$ 1,008	
	Morgan Stanley Bank of America Merrill Lynch Trust 2014 C19	-	"	-	US\$ 1,006	N/A	US\$ 1,006	
	Nissan Auto Receivables 2018-B Owner Trust	-	"	-	US\$ 1,004	N/A	US\$ 1,004	
	JPMBB Commercial Mortgage Securities Trust 2014-C21	-	"	-	US\$ 1,002	N/A	US\$ 1,002	
	Navient Student Loan Trust 2017-3	-	"	-	US\$ 1,000	N/A	US\$ 1,000	
	GM Financial Consumer Automobile 2017-1	-	"	-	US\$ 986	N/A	US\$ 986	
	Ford Credit Auto Owner Trust 2017-REV1	-	"	-	US\$ 985	N/A	US\$ 985	
	Citigroup Commercial Mortgage Trust 2013-GC11	-	"	-	US\$ 969	N/A	US\$ 969	
	JPMBB Commercial Mortgage Securities Trust 2015-C31	-	"	-	US\$ 945	N/A	US\$ 945	
	Honda Auto Receivables 2018-2 Owner Trust	-	"	-	US\$ 911	N/A	US\$ 911	
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-1C9	-	"	-	US\$ 897	N/A	US\$ 897	
	CarMax Auto Owner Trust 2018-1	-	"	-	US\$ 873	N/A	US\$ 873	
	Morgan Stanley Bank of America Merrill Lynch Trust 2012-C6	-	"	-	US\$ 853	N/A	US\$ 853	
	Mercedes-Benz Auto Receivables Trust 2018-1	-	"	-	US\$ 841	N/A	US\$ 841	
	280 Park Avenue 2017-280P Mortgage Trust	-	"	-	US\$ 822	N/A	US\$ 822	
	SLM Student Loan Trust 2012-3	-	"	-	US\$ 816	N/A	US\$ 816	
	Ford Credit Auto Owner Trust 2015-REV2	-	"	-	US\$ 803	N/A	US\$ 803	
	Navient Student Loan Trust 2018-1	-	"	-	US\$ 799	N/A	US\$ 799	
	Ford Credit Auto Owner Trust/Ford Credit 2014-REV1	-	"	-	US\$ 798	N/A	US\$ 798	
	Honda Auto Receivables 2018-3 Owner Trust	-	"	-	US\$ 792	N/A	US\$ 792	
	SLM Student Loan Trust 2013-1	-	"	-	US\$ 786	N/A	US\$ 786	
	CFCRE Commercial Mortgage Trust 2011-C1	-	"	-	US\$ 776	N/A	US\$ 776	
	Mercedes-Benz Auto Lease Trust 2018-A	-	"	-	US\$ 770	N/A	US\$ 770	
	GM Financial Automobile Leasing Trust 2018-1	-	"	-	US\$ 753	N/A	US\$ 753	
	COMM 2015-LC19 Mortgage Trust	-	"	-	US\$ 716	N/A	US\$ 716	
	Toyota Auto Receivables 2018-D Owner Trust	-	"	-	US\$ 706	N/A	US\$ 706	
	Ally Auto Receivables Trust 2018-3	-	"	-	US\$ 699	N/A	US\$ 699	
	SLM Student Loan Trust 2013-4	-	"	-	US\$ 688	N/A	US\$ 688	
	Wells Fargo Commercial Mortgage Trust 2015-C28	-	"	-	US\$ 670	N/A	US\$ 670	
	Mercedes-Benz Auto Lease Trust 2016-B	-	"	-	US\$ 649	N/A	US\$ 649	

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018			Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)
TSMC Global	Ford Credit Auto Owner Trust 2018-A	-	Financial assets at fair value through other comprehensive income	-	US\$ 640	N/A	US\$ 640
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-C6	-	"	-	US\$ 636	N/A	US\$ 636
	JP Morgan Chase Commercial Mortgage Securities Trust 2012-WLDN	-	"	-	US\$ 607	N/A	US\$ 607
	DBGS 2018-BIOD Mortgage Trust	-	"	-	US\$ 585	N/A	US\$ 585
	Hyundai Auto Receivables Trust 2015-A	-	"	-	US\$ 573	N/A	US\$ 573
	COMM 2016-SAVA Mortgage Trust	-	"	-	US\$ 571	N/A	US\$ 571
	DBUBS 2011-LC2 Mortgage Trust	-	"	-	US\$ 555	N/A	US\$ 555
	ARI Fleet Lease Trust 2018-A	-	"	-	US\$ 514	N/A	US\$ 514
	GS Mortgage Securities Trust 2014-GC18	-	"	-	US\$ 508	N/A	US\$ 508
	CD 2016-CD2 Mortgage Trust	-	"	-	US\$ 505	N/A	US\$ 505
	COMM 2014-CCRE19 Mortgage Trust	-	"	-	US\$ 500	N/A	US\$ 500
	Ford Credit Auto Owner Trust 2016-A	-	"	-	US\$ 499	N/A	US\$ 499
	Hyundai Auto Lease Securitization Trust 2017-A	-	"	-	US\$ 485	N/A	US\$ 485
	WFRBS Commercial Mortgage Trust 2014-C25	-	"	-	US\$ 433	N/A	US\$ 433
	GM Financial Automobile Leasing Trust 2018-2	-	"	-	US\$ 404	N/A	US\$ 404
	Morgan Stanley Bank of America Merrill Lynch Trust 2014-C18	-	"	-	US\$ 390	N/A	US\$ 390
	Honda Auto Receivables 2017-4 Owner Trust	-	"	-	US\$ 377	N/A	US\$ 377
	Wells Fargo Commercial Mortgage Trust 2016-LC24	-	"	-	US\$ 366	N/A	US\$ 366
	Morgan Stanley Bank of America Merrill Lynch Trust 2014-C16	-	"	-	US\$ 357	N/A	US\$ 357
	ARI Fleet Lease Trust 2018-B	-	"	-	US\$ 337	N/A	US\$ 337
	BMW Vehicle Lease Trust 2018-1	-	"	-	US\$ 331	N/A	US\$ 331
	JPMBB Commercial Mortgage Securities Trust 2013-C14	-	"	-	US\$ 317	N/A	US\$ 317
	GM Financial Automobile Leasing Trust 2017-2	-	"	-	US\$ 300	N/A	US\$ 300
	Wells Fargo Commercial Mortgage Trust 2015-NXS1	-	"	-	US\$ 269	N/A	US\$ 269
	BMW Vehicle Lease Trust 2016-2	-	"	-	US\$ 264	N/A	US\$ 264
	Honda Auto Receivables 2016-2 Owner Trust	-	"	-	US\$ 259	N/A	US\$ 259
	Wells Fargo Commercial Mortgage Trust 2015-SG1	-	"	-	US\$ 248	N/A	US\$ 248
	Citigroup Commercial Mortgage Trust 2014-GC23	-	"	-	US\$ 214	N/A	US\$ 214
	BMW Vehicle Lease Trust 2017-2	-	"	-	US\$ 199	N/A	US\$ 199
	GS Mortgage Securities Trust 2010-C1	-	"	-	US\$ 187	N/A	US\$ 187
	WFRBS Commercial Mortgage Trust 2011-C5	-	"	-	US\$ 141	N/A	US\$ 141
	COMM 2014-CCRE15 Mortgage Trust	-	"	-	US\$ 123	N/A	US\$ 123
	GS Mortgage Securities Trust 2014-GC24	-	"	-	US\$ 96	N/A	US\$ 96
	GS Mortgage Securities Trust 2010-C2	-	"	-	US\$ 82	N/A	US\$ 82
	Honda Auto Receivables 2015-4 Owner Trust	-	"	-	US\$ 45	N/A	US\$ 45
	Commercial paper	-	"	-	US\$ 32	N/A	US\$ 32
	Royal Bank of Canada/New York NY	-	Financial assets at fair value through other comprehensive income	-	US\$ 2,000	N/A	US\$ 2,000
	Toronto-Dominion Bank/NY	-	"	-	US\$ 1,500	N/A	US\$ 1,500
	Non-publicly traded equity investments Primavera Capital Fund II L.P.	-	Financial assets at fair value through other comprehensive income	-	US\$ 70,460	4	US\$ 70,460
VTAF II	Non-publicly traded equity investments Sentelic	-	Financial assets at fair value through other comprehensive income	1,019	US\$ 2,039	4	US\$ 2,039
	Aether Systems, Inc.	-	"	1,085	US\$ 353	20	US\$ 353

(Continued)

Held Company Name	Marketable Securities Type and Name	Relationship with the Company	Financial Statement Account	December 31, 2018				Note
				Shares/Units (In Thousands)	Carrying Value (Foreign Currencies in Thousands)	Percentage of Ownership (%)	Fair Value (Foreign Currencies in Thousands)	
VTAF II	5V Technologies, Inc.	-	Financial assets at fair value through other comprehensive income	364	US\$ 313	2	US\$ 313	
	Publicly traded stocks Aquantia	-	Financial assets at fair value through other comprehensive income	83	US\$ 730	-	US\$ 730	
VTAF III	Non-publicly traded equity investments Liquid LEDs Lighting Corp.	-	Financial assets at fair value through other comprehensive income	1,952	US\$ 800	14	US\$ 800	
	Neoconix, Inc.	-	"	4,147	US\$ 174	-	US\$ 174	
Growth Fund	Non-publicly traded equity investments Innovium, Inc.	-	Financial assets at fair value through other comprehensive income	451	US\$ 2,393	-	US\$ 2,393	
	CNEX Labs, Inc.	-	"	237	US\$ 775	-	US\$ 775	

(Concluded)

TABLE 4

Taiwan Semiconductor Manufacturing Company Limited and Investees

MARKETABLE SECURITIES ACQUIRED AND DISPOSED OF AT COSTS OR PRICES OF AT LEAST NT\$300 MILLION OR 20% OF THE PAID-IN CAPITAL

FOR THE YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Company Name	Marketable Securities Type and Name	Financial Statement Account	Counter-party	Nature of Relationship	Beginning Balance		Acquisition		Disposal		Gain/Loss on Disposal	Ending Balance (Note 1)	
					Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount	Shares/Units (In Thousands)	Amount		Shares/Units (In Thousands)	Amount
TSMC	Commercial paper CPC Corporation, Taiwan	Financial assets at amortized cost	-	-	-	\$ -	50	\$ 498,837	-	\$ -	\$ -	50	\$ 498,837
	Non-publicly traded equity investments TSMC Global	Investments accounted for using equity method (Note 2)	-	Subsidiary	9	309,211,877	2	62,272,080	-	-	-	11	393,577,931
	TSMC Nanjing	"	-	Subsidiary	-	26,493,740	-	2,361,320	-	-	-	-	20,601,413
	Publicly traded stocks Motech	Financial assets at fair value through other comprehensive income	-	-	58,320	1,309,279	-	-	58,320	651,973	1,831,241	-	-
	Corporate bond Bank of America Corp	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 40,876	-	US\$ 10,852	-	US\$ 5,990	US\$ 6,027	-	US\$ 44,755
TSMC Global	Citigroup Inc	"	-	-	-	US\$ 29,911	-	US\$ 11,293	-	US\$ 12,000	US\$ 12,128	-	US\$ 28,602
	CVS Health Corp	"	-	-	-	US\$ 10,018	-	US\$ 18,102	-	US\$ 684	US\$ 692	-	US\$ 27,238
	AT&T Inc	"	-	-	-	US\$ 26,867	-	US\$ 9,299	-	US\$ 12,438	US\$ 12,482	-	US\$ 23,123
	Comcast Corp	"	-	-	-	US\$ 1,256	-	US\$ 18,768	-	US\$ 1,210	US\$ 1,212	-	US\$ 18,894
	BAT Capital Corp	"	-	-	-	US\$ 17,024	-	US\$ 13,719	-	US\$ 17,590	US\$ 17,732	-	US\$ 12,594
	United Technologies Corp	"	-	-	-	US\$ 1,761	-	US\$ 10,490	-	US\$ 984	US\$ 1,000	-	US\$ 11,159
	Morgan Stanley	"	-	-	-	US\$ 12,722	-	US\$ 8,573	-	US\$ 12,105	US\$ 12,257	-	US\$ 8,928
	Celgene Corp	"	-	-	-	US\$ 6,181	-	US\$ 10,575	-	US\$ 8,673	US\$ 8,860	-	US\$ 7,726
	Cooperative Rabobank U/A/NY	"	-	-	-	US\$ 1,450	-	US\$ 13,474	-	US\$ 7,326	US\$ 7,453	-	US\$ 7,462
	Asian Development Bank	"	-	-	-	US\$ 11,073	-	US\$ 3,576	-	US\$ 11,075	US\$ 11,075	-	US\$ 3,594
	Inter American	"	-	-	-	US\$ -	-	US\$ 21,168	-	US\$ 21,166	US\$ 21,166	-	US\$ -
	Development Bank JPMorgan Chase & Co.	Financial assets at amortized cost	-	-	-	US\$ 10,013	-	US\$ -	-	US\$ 10,000	US\$ 10,000	-	US\$ -
	Government bond United States Treasury Note/Bond	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 202,689	-	US\$ 483,976	-	US\$ 401,246	US\$ 403,883	-	US\$ 283,314
	United States Treasury Floating Rate Note	"	-	-	-	US\$ 49,901	-	US\$ 124,504	-	US\$ 106,171	US\$ 106,123	-	US\$ 68,164
	United States Treasury Bill	"	-	-	-	US\$ 2,997	-	US\$ 175,861	-	US\$ 176,725	US\$ 176,682	-	US\$ 2,248

(Continued)

Company Name	Marketable Securities Type and Name	Financial Statement Account	Counter-party	Nature of Relationship	Beginning Balance Shares/Units (In Thousands)	Beginning Balance Amount	Acquisition Shares/Units (In Thousands)	Acquisition Amount	Disposal Shares/Units (In Thousands)	Disposal Amount	Disposal Carrying Value	Gain/Loss on Disposal	Ending Balance (Note 1) Shares/Units (In Thousands)	Ending Balance (Note 1) Amount
TSMC Global	Agency bonds/Agency mortgage-backed securities FNMA Pool BM4681	Financial assets at fair value through other comprehensive income	-	-	-	US\$ -	-	US\$ 35,947	-	US\$ 4,026	US\$ 4,089	US\$ (63)	-	US\$ 31,784
	FNMA Pool BM4495	"	-	-	-	US\$ -	-	US\$ 29,035	-	US\$ 1,249	US\$ 1,361	US\$ (112)	-	US\$ 27,324
	FNMA Pool BM1948	"	-	-	-	US\$ 41,275	-	US\$ 5,534	-	US\$ 18,653	US\$ 19,922	US\$ (1,269)	-	US\$ 26,046
	FED HM LN PC Pool G61603	"	-	-	-	US\$ -	-	US\$ 27,059	-	US\$ 1,256	US\$ 1,387	US\$ (131)	-	US\$ 25,515
	FNMA Pool CA2352	"	-	-	-	US\$ -	-	US\$ 25,688	-	US\$ 492	US\$ 517	US\$ (25)	-	US\$ 25,130
	FNMA TBA 30 Yr 5	"	-	-	-	US\$ -	-	US\$ 186,999	-	US\$ 162,191	US\$ 162,197	US\$ (6)	-	US\$ 24,761
	FED HM LN PC Pool G61592	"	-	-	-	US\$ -	-	US\$ 45,987	-	US\$ 24,813	US\$ 24,527	US\$ 286	-	US\$ 21,507
	FED HM LN PC Pool G61654	"	-	-	-	US\$ -	-	US\$ 19,316	-	US\$ 651	US\$ 704	US\$ (53)	-	US\$ 18,555
	GNMA II Pool MA5468	"	-	-	-	US\$ -	-	US\$ 17,751	-	US\$ 112	US\$ 118	US\$ (6)	-	US\$ 17,490
	FNMA Pool BM4493	"	-	-	-	US\$ -	-	US\$ 18,362	-	US\$ 1,279	US\$ 1,325	US\$ (46)	-	US\$ 16,915
	Government National Mortgage Association	"	-	-	-	US\$ -	-	US\$ 16,433	-	US\$ 39	US\$ 39	US\$ -	-	US\$ 16,485
	FED HM LN PC Pool G61553	"	-	-	-	US\$ -	-	US\$ 15,372	-	US\$ 244	US\$ 255	US\$ (11)	-	US\$ 15,045
	FNMA Pool CA2169	"	-	-	-	US\$ -	-	US\$ 15,368	-	US\$ 1,406	US\$ 1,429	US\$ (23)	-	US\$ 13,859
	GNMA II Pool MA5332	"	-	-	-	US\$ -	-	US\$ 26,202	-	US\$ 13,285	US\$ 13,279	US\$ 6	-	US\$ 12,772
	GNMA II TBA 30 Yr 5	"	-	-	-	US\$ -	-	US\$ 61,268	-	US\$ 49,012	US\$ 49,046	US\$ (34)	-	US\$ 12,209
	Government National Mortgage Association	"	-	-	-	US\$ -	-	US\$ 10,494	-	US\$ -	US\$ -	US\$ -	-	US\$ 10,590
	GNMA II TBA 30 Yr 4	"	"	-	-	US\$ 2,378	-	US\$ 47,507	-	US\$ 47,743	US\$ 47,773	US\$ (30)	-	US\$ 2,129
	FNMA TBA 15 Yr 3.5	"	"	-	-	US\$ -	-	US\$ 42,360	-	US\$ 40,346	US\$ 40,350	US\$ (4)	-	US\$ 2,020
	GNMA II TBA 30 Yr 3.5	"	"	-	-	US\$ 145	-	US\$ 47,680	-	US\$ 46,609	US\$ 46,676	US\$ (67)	-	US\$ 1,157
	FED HM LN PC Pool G08799	"	"	-	-	US\$ -	-	US\$ 24,748	-	US\$ 24,846	US\$ 24,782	US\$ 64	-	US\$ -
	Federal Home Loan Bank Discount Notes	"	"	-	-	US\$ -	-	US\$ 29,498	-	US\$ 29,500	US\$ 29,499	US\$ 1	-	US\$ -
	FED HM LN PC Pool G60594	"	"	-	-	US\$ 11,599	-	US\$ -	-	US\$ 11,191	US\$ 11,711	US\$ (520)	-	US\$ -
	FNMA TBA 30 Yr 3.5	"	"	-	-	US\$ 2,866	-	US\$ 83,271	-	US\$ 86,356	US\$ 86,144	US\$ 212	-	US\$ -
	FNMA TBA 30 Yr 3	"	"	-	-	US\$ -	-	US\$ 198,586	-	US\$ 198,614	US\$ 198,586	US\$ 28	-	US\$ -
	FNMA TBA 15 Yr 3	"	"	-	-	US\$ 2,015	-	US\$ 65,931	-	US\$ 67,884	US\$ 67,949	US\$ (65)	-	US\$ -
	FNMA TBA 30 Yr 4.5	"	"	-	-	US\$ 15,758	-	US\$ 157,210	-	US\$ 172,818	US\$ 173,014	US\$ (196)	-	US\$ -
	FED HM LN PC Pool G08773	"	"	-	-	US\$ -	-	US\$ 10,380	-	US\$ 10,410	US\$ 10,380	US\$ 30	-	US\$ -
Asset-backed securities Citibank Credit Card Issuance Trust	Financial assets at fair value through other comprehensive income	-	-	-	US\$ 48,328	-	US\$ 40,865	-	US\$ 20,343	US\$ 20,346	US\$ (3)	-	US\$ 68,487	
Chase Issuance Trust	"	-	-	-	US\$ 39,211	-	US\$ 27,720	-	US\$ 23,176	US\$ 23,192	US\$ (16)	-	US\$ 43,604	
Discover Card Execution Note Trust	"	-	-	-	US\$ 45,722	-	US\$ 16,266	-	US\$ 24,230	US\$ 24,268	US\$ (38)	-	US\$ 37,495	
American Express Credit Account Master Trust	"	-	-	-	US\$ 12,805	-	US\$ 25,878	-	US\$ 11,239	US\$ 11,233	US\$ 6	-	US\$ 27,285	
Capital One Multi-Asset Execution Trust	"	-	-	-	US\$ 22,544	-	US\$ -	-	US\$ 15,223	US\$ 15,227	US\$ (4)	-	US\$ 7,304	
Structure product Bank of Tokyo-Mitsubishi UFJ	Financial assets at amortized cost	-	-	-	US\$ 50,000	-	US\$ -	-	US\$ 50,000	US\$ 50,000	US\$ -	-	US\$ -	

Note 1: The ending balance includes the amortization of premium/discount on bonds investments, share of profits/losses of investees and other related adjustment.

Note 2: To lower the hedging cost, in August 2018, the Board of Directors of TSMC approved to inject US\$2,000,000 thousand of capital into TSMC Global. This project was approved by the Investment Commission, Ministry of Economic Affairs, R.O.C. (MOEA). The prepayment for investment was US\$100,000 thousand as of December 31, 2018.

(Concluded)

TABLE 5

Taiwan Semiconductor Manufacturing Company Limited and Investees

ACQUISITION OF INDIVIDUAL REAL ESTATE PROPERTIES AT COSTS OF AT LEAST NT\$300 MILLION OR 20% OF THE PAID-IN CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	March 10, 2017 to January 25, 2018	\$ 303,592	Monthly settlement by the construction progress and acceptance	HSIEH KUN CO., LTD	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 17, 2017 to March 12, 2018	301,341	Monthly settlement by the construction progress and acceptance	Jer Yih Electrical Eng. Co.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 21, 2017 to August 6, 2018	607,800	Monthly settlement by the construction progress and acceptance	TRUSVAL TECHNOLOGY CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 10, 2017 to March 30, 2018	382,672	Monthly settlement by the construction progress and acceptance	M+W High Tech Project Taiwan Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 18, 2017 to June 4, 2018	1,334,403	Monthly settlement by the construction progress and acceptance	CHEN FULL INTERNATIONAL CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 20, 2017 to April 19, 2018	300,874	Monthly settlement by the construction progress and acceptance	Unique Station International Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 21, 2017 to June 12, 2018	1,841,951	Monthly settlement by the construction progress and acceptance	Organo Technology Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 25, 2017 to July 31, 2018	2,559,574	Monthly settlement by the construction progress and acceptance	YANKEY ENGINEERING CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	May 12, 2017 to May 10, 2018	413,901	Monthly settlement by the construction progress and acceptance	HUAN YU TECHNOLOGIES CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	May 25, 2017 to June 21, 2018	\$2,187,982	Monthly settlement by the construction progress and acceptance	MEGA UNION TECHNOLOGY INCORPORATED	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 11, 2017 to July 31, 2018	1,422,454	Monthly settlement by the construction progress and acceptance	TASA Construction Corporation	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 24, 2017 to June 21, 2018	347,431	Monthly settlement by the construction progress and acceptance	MandarTech Interiors Inc.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 28, 2017 to April 19, 2018	348,757	Monthly settlement by the construction progress and acceptance	J.J. PAN AND PARTNERS, ARCHITECTS AND PLANNERS	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	July 28, 2017 to May 8, 2018	574,621	Monthly settlement by the construction progress and acceptance	Trane Taiwan Distribution Limited	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 8, 2017 to June 28, 2018	337,069	Monthly settlement by the construction progress and acceptance	Lumax International Corp., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 16, 2017 to July 31, 2018	1,012,550	Monthly settlement by the construction progress and acceptance	Air Liquide Far Eastern	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	August 16, 2017 to July 31, 2018	617,447	Monthly settlement by the construction progress and acceptance	Kao Hsin Engineering Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	September 5, 2017 to June 1, 2018	1,224,738	Monthly settlement by the construction progress and acceptance	Uangyih-Tech Industrial Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	September 14, 2017 to March 22, 2018	784,003	Monthly settlement by the construction progress and acceptance	Siemens Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 9, 2017 to June 20, 2018	1,773,165	Monthly settlement by the construction progress and acceptance	MARKETECH INTERNATIONAL CORP.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	November 10, 2017 to May 24, 2018	\$ 305,783	Monthly settlement by the construction progress and acceptance	DESICCANT TECHNOLOGY CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 13, 2017 to August 13, 2018	948,048	Monthly settlement by the construction progress and acceptance	Chen Yuan International Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	November 14, 2017 to April 16, 2018	1,724,550	Monthly settlement by the construction progress and acceptance	PAN ASIA Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 5, 2017 to July 31, 2018	7,219,028	Monthly settlement by the construction progress and acceptance	UNITED INTEGRATED SERVICES CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 13, 2017 to July 23, 2018	2,457,695	Monthly settlement by the construction progress and acceptance	Taiwan Puritie Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 14, 2017 to May 23, 2018	305,566	Monthly settlement by the construction progress and acceptance	WHOLETECH SYSTEM HITECH LIMITED	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	December 26, 2017 to February 13, 2018	525,172	Monthly settlement by the construction progress and acceptance	ABB Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	January 4, 2018 to April 16, 2018	1,744,533	Monthly settlement by the construction progress and acceptance	KEDGE Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	January 5, 2018 to April 16, 2018	315,886	Monthly settlement by the construction progress and acceptance	Shihlin Electric & Engineering Corp. Tainan Branch	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 5, 2018 to July 31, 2018	2,564,709	Monthly settlement by the construction progress and acceptance	L&K ENGINEERING CO., LTD.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 6, 2018 to August 13, 2018	5,387,421	Monthly settlement by the construction progress and acceptance	Fu Tsu Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Continued)

Company Name	Types of Property	Transaction Date	Transaction Amount (Foreign Currencies in Thousands)	Payment Term	Counter-party	Nature of Relationships	Prior Transaction of Related Counter-party				Price Reference	Purpose of Acquisition	Other Terms
							Owner	Relationships	Transfer Date	Amount			
TSMC	Fab	February 12, 2018 to April 16, 2018	\$ 378,445	Monthly settlement by the construction progress and acceptance	AMPOWER INTERNATIONAL ENTERPRISE	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	February 13, 2018 to June 25, 2018	1,415,232	Monthly settlement by the construction progress and acceptance	Cica-Huntek Chemical Technology Taiwan Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 16, 2018 to August 2, 2018	1,068,243	Monthly settlement by the construction progress and acceptance	Chun Yuan Steel Industry Co., Ltd	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	March 16, 2018 to December 18, 2018	3,098,269	Monthly settlement by the construction progress and acceptance	China Steel Structure Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 13, 2018 to April 16, 2018	410,000	Monthly settlement by the construction progress and acceptance	Lead Fu Industrials Corp.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None
	Fab	April 16, 2018 to December 24, 2018	5,311,851	Monthly settlement by the construction progress and acceptance	DA CIN Construction Co., Ltd.	-	N/A	N/A	N/A	N/A	Price comparison and price negotiation	Manufacturing purpose	None

(Concluded)

TABLE 6

Taiwan Semiconductor Manufacturing Company Limited and Investees

**TOTAL PURCHASES FROM OR SALES TO RELATED PARTIES OF AT LEAST NT\$100 MILLION OR 20% OF THE PAID-IN CAPITAL
FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)**

Company Name	Related Party	Nature of Relationships	Transaction Details			Abnormal Transaction		Notes/Accounts Payable or Receivable		Note
			Purchases/ Sales	Amount (Foreign Currencies in Thousands)	% to Total	Payment Terms	Unit Price	Ending Balance (Foreign Currencies in Thousands)	% to Total	
TSMC	TSMC North America	Subsidiary	Sales	\$ 650,432,820	60	Net 30 days from invoice date (Note)	-	\$ 86,057,097	70	
	GUC	Associate	Sales	6,705,439	1	Net 30 days from the end of the month of when invoice is issued	-	375,184	-	
	TSMC China	Subsidiary	Purchases	18,089,003	19	Net 30 days from the end of the month of when invoice is issued	-	(1,299,072)	4	
	TSMC Nanjing	Subsidiary	Purchases	7,738,425	8	Net 30 days from the end of the month of when invoice is issued	-	(414,401)	1	
	WaferTech	Indirect subsidiary	Purchases	8,309,250	9	Net 30 days from the end of the month of when invoice is issued	-	(1,092,785)	3	
	VIS	Associate	Purchases	5,142,749	5	Net 30 days from the end of the month of when invoice is issued	-	(357,080)	1	
	SSMC	Associate	Purchases	3,666,645	4	Net 30 days from the end of the month of when invoice is issued	-	(362,564)	1	
TSMC North America	GUC	Associate of TSMC	Sales	1,664,555 (US\$ 55,492)	-	Net 30 days from invoice date	-	106,750 (US\$ 3,473)	-	
VisEra Tech	Xintec	Associate of TSMC	Sales	542,179	20	Net 30 days from the end of the month of when invoice is issued	-	102,478	20	

Note: The tenor is 30 days from TSMC's invoice date or determined by the payment terms granted to its clients by TSMC North America.

TABLE 7

Taiwan Semiconductor Manufacturing Company Limited and Investees

**RECEIVABLES FROM RELATED PARTIES AMOUNTING TO AT LEAST NT\$100 MILLION OR 20% OF THE PAID-IN CAPITAL
DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)**

Company Name	Related Party	Nature of Relationships	Ending Balance (Foreign Currencies in Thousands)	Turnover Days (Note 1)	Overdue		Amounts Received in Subsequent Period	Allowance for Bad Debts
					Amount	Action Taken		
TSMC	TSMC North America GUC	Subsidiary Associate	\$ 87,092,562 375,184	50 31	\$ 2,828,842 182,416	-	\$ 39,357,357 182,416	\$ -
TSMC China	TSMC Nanjing TSMC	The same parent company Parent company	30,986,047 (RMB 6,920,699) 1,299,072 (RMB 290,149)	Note 2 27	-	-	-	-
WaferTech	TSMC	The ultimate parent of the Company	1,092,785 (USD 35,549)	53	661,841 (USD 21,530)	-	661,841 (USD 21,530)	-
TSMC Nanjing	TSMC	Parent company	614,039 (RMB 137,146)	10	-	-	-	-
TSMC Technology	TSMC	The ultimate parent of the Company	218,347 (USD 7,103)	Note 2	-	-	-	-
TSMC North America	GUC	Associate of TSMC	106,750 (USD 3,473)	39	43,023 (USD 1,400)	-	43,023 (USD 1,400)	-
VisEra Tech	Xintec	Associate of TSMC	102,478	44	-	-	-	-

Note 1: The calculation of turnover days excludes other receivables from related parties.

Note 2: The ending balance is primarily consisted of other receivables, which is not applicable for the calculation of turnover days.

TABLE 8

Taiwan Semiconductor Manufacturing Company Limited and Investees

NAMES, LOCATIONS, AND RELATED INFORMATION OF INVESTEEES OVER WHICH THE COMPANY EXERCISES SIGNIFICANT INFLUENCE (EXCLUDING INFORMATION ON INVESTMENT IN MAINLAND CHINA)
FOR THE YEAR ENDED DECEMBER 31, 2018
(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Investor Company	Investee Company	Location	Main Businesses and Products	Original Investment Amount		Balance as of December 31, 2018		Net Income (Losses) of the Investee (Foreign Currencies in Thousands)	Share of Profits/Losses of Investee (Note 1) (Foreign Currencies in Thousands)	Note
				December 31, 2018 (Foreign Currencies in Thousands)	December 31, 2017 (Foreign Currencies in Thousands)	Shares (In Thousands)	Percentage of Ownership			
TSMC	TSMC Global	Tortola, British Virgin Islands	Investment activities	\$ 355,162,309 (Note 3)	\$ 292,890,229	11	100	\$ 9,271,602	\$ 9,271,602	Subsidiary
	TSMC Partners	Tortola, British Virgin Islands	Investing in companies involved in the design, manufacture, and other related business in the semiconductor industry and other investment activities	31,456,130	31,456,130	988,268	100	2,499,370	2,499,370	Subsidiary
	VIS	Hsin-Chu, Taiwan	Manufacturing, selling, packaging, testing and computer-aided design of integrated circuits and other semiconductor devices and the manufacturing and design service of masks	10,180,677	10,180,677	464,223	28	6,166,269	1,741,394	Associate
	SSMC	Singapore	Manufacturing and selling of integrated circuits and other semiconductor devices	5,120,028	5,120,028	314	39	3,919,068	1,520,207	Associate
	VisEra Tech	Hsin-Chu, Taiwan	Engaged in manufacturing electronic spare parts and in researching, developing, designing, manufacturing, selling, packaging and testing of color filter	5,005,171	5,005,171	253,120	87	412,283	358,421	Subsidiary
	TSMC North America	San Jose, California, U.S.A	Selling and marketing of integrated circuits and other semiconductor devices	333,718	333,718	11,000	100	117,948	117,948	Subsidiary
	Xintee	Taoyuan, Taiwan	Water level chip size packaging and wafer level post passivation interconnection service	1,988,317	1,988,317	111,282	41	(1,351,951)	(547,789)	Associate
	GUC	Hsin-Chu, Taiwan	Researching, developing, manufacturing, testing and marketing of integrated circuits	386,568	386,568	46,688	35	988,156	344,274	Associate
	TSMC Europe	Amsterdam, the Netherlands	Customer service and supporting activities	15,749	15,749	-	100	41,697	41,697	Subsidiary
	VTAF III	Cayman Islands	Investing in new start-up technology companies	1,308,244	1,318,885	-	98	(3,416)	(3,348)	Subsidiary
TSMC Partners	TSMC Japan	Yokohama, Japan	Customer service and supporting activities	83,760	83,760	6	100	4,035	4,035	Subsidiary
	VTAF II	Cayman Islands	Investing in new start-up technology companies	278,800	412,831	-	98	(3,726)	(3,652)	Subsidiary
	TSMC Korea	Seoul, Korea	Customer service and supporting activities	13,656	13,656	80	100	2,170	2,170	Subsidiary
	TSMC Solar Europe GmbH	Hamburg, Germany	Selling of solar related products and providing customer service	25,266	25,266	1	100	(21)	(21)	Subsidiary
	TSMC Development	Delaware, U.S.A	Investing in companies involved in the manufacturing related business in the semiconductor industry	18,042,499 (US\$ 586,939)	18,042,499 (US\$ 586,939)	-	100	1,863,196 (US\$ 61,803)	Note 2	Subsidiary
	TSMC Technology	Delaware, U.S.A	Engineering support activities	439,029	439,029	-	100	47,866 (US\$ 1,610)	Note 2	Subsidiary
	TSMC Canada	Ontario, Canada	Engineering support activities	14,282 (US\$ 70,702)	14,282 (US\$ 70,702)	2,300	100	32,224 (US\$ 1,069)	Note 2	Subsidiary
	ISDF	Cayman Islands	Investing in new start-up technology companies	(US\$ 2,300)	(US\$ 2,300)	583	97	-	Note 2	Subsidiary
	ISDF II	Cayman Islands	Investing in new start-up technology companies	14,607 (US\$ 475)	14,607 (US\$ 475)	9,299	97	(6,781) (US\$ 231)	Note 2	Subsidiary
	Growth Fund	Cayman Islands	Investing in new start-up technology companies	66,207 (US\$ 2,154)	66,207 (US\$ 2,154)	-	100	(597) (US\$ 20)	Note 2	Subsidiary
VTAF III	Mutual-Pak	New Taipei, Taiwan	Manufacturing of electronic parts, wholesaling and retailing of electronic materials, and researching, developing and testing of RFID	48,980 (US\$ 1,593)	48,980 (US\$ 1,593)	4,693	39	(1,846) (US\$ 72)	Note 2	Associate

(Continued)

Investor Company	Investee Company	Location	Main Businesses and Products	Original Investment Amount		Balance as of December 31, 2018			Net Income (Losses) of the Investee (Foreign Currencies in Thousands)	Share of Profits/Losses of Investee (Note 1) (Foreign Currencies in Thousands)	Note
				December 31, 2018 (Foreign Currencies in Thousands)	December 31, 2017 (Foreign Currencies in Thousands)	Shares (in Thousands)	Percentage of Ownership	Carrying Value (Foreign Currencies in Thousands)			
TSMC Development	WaferTech	Washington, U.S.A	Manufacturing, selling and testing of integrated circuits and other semiconductor devices	\$ -	\$ -	293,637	100	\$ 4,595,263 (US\$ 149,488)	\$ 1,473,555 (US\$ 48,918)	Note 2	Subsidiary

Note 1: The share of profits/losses of investee includes the effect of unrealized gross profits/losses on intercompany transactions.

Note 2: The share of profits/losses of the investee company is not reflected herein as such amount is already included in the share of profits/losses of the investor company.

Note 3: To lower the hedging cost, in August 2018, the Board of Directors of TSMC approved to inject US\$2,000,000 thousand of capital into TSMC Global. This project was approved by the Investment Commission, Ministry of Economic Affairs, R.O.C. (MOEA). The prepayment for investment was US\$100,000 thousand as of December 31, 2018.

(Concluded)

TABLE 9

Taiwan Semiconductor Manufacturing Company Limited and Investees

INFORMATION ON INVESTMENT IN MAINLAND CHINA
FOR YEAR ENDED DECEMBER 31, 2018

(Amounts in Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Investee Company	Main Businesses and Products	Total Amount of Paid-in Capital (RMB in Thousands)	Method of Investment	Accumulated Outflow of Investment from January 1, 2018 (US\$ in Thousands)	Investment Flows		Accumulated Outflow of Investment from Taiwan as of December 31, 2018 (US\$ in Thousands)	Net Income (Losses) of the Investee Company	Percentage of Ownership	Share of Profits/Losses	Carrying Amount as of December 31, 2018	Accumulated Inward Remittance of Earnings as of December 31, 2018
					Outflow (US\$ in Thousands)	Inflow						
TSMC China	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	\$ 18,939,667 (RMB 4,502,080)	Note 1	\$ 18,939,667 (US\$ 596,000)	\$ -	\$ -	\$ 18,939,667 (US\$ 596,000)	\$ 5,397,462	100%	\$ 5,364,578 (Note 2)	\$ 55,466,911	\$ -
TSMC Nanjing	Manufacturing, selling, testing and computer-aided design of integrated circuits and other semiconductor devices	30,521,412 (RMB 6,650,119)	Note 1	28,160,092 (US\$ 920,000)	2,361,320 (US\$ 80,000)	-	30,521,412 (US\$ 1,000,000)	(8,215,989)	100%	(8,200,927) (Note 2)	20,601,413	-

Accumulated Investment in Mainland China as of December, 2018 (US\$ in Thousands)	Investment Amounts Authorized by Investment Commission, MOEA (US\$ in Thousands)	Upper Limit on Investment
\$ 49,461,079 (US\$ 1,596,000)	\$ 119,412,667 (US\$ 3,596,000)	Note 3

Note 1: TSMC directly invested US\$596,000 thousand in TSMC China and US\$1,000,000 thousands in TSMC Nanjing.

Note 2: Amount was recognized based on the audited financial statements.

Note 3: As the Company has obtained the certificate of being qualified for operating headquarters issued by Industrial Development Bureau, MOEA on August 2016, the upper limit on investment in mainland China pursuant to "Principle of investment or Technical Cooperation in Mainland China" is not applicable.

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STATEMENT 1**Taiwan Semiconductor Manufacturing Company Limited****STATEMENT OF CASH AND CASH EQUIVALENTS****DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars, Unless Specified Otherwise)**

Item	Description	Amount
Cash		
Petty cash		\$ 280
Cash in banks		
Checking accounts and demand deposits		17,433,341
Foreign currency deposits	Including US\$389,998 thousand @30.74, JPY199,382 thousand @0.2783, EUR729 thousand @35.22 and RMB220 thousand @4.4773	12,070,686
Time deposits	From 2018.06.05 to 2019.10.31, interest rates at 0.17%-3.00%, including NT\$208,317,862 thousand and US\$21,200 thousand @30.74	208,969,550
Cash equivalents		
Repurchase agreements collateralized by corporate bonds	Expired by 2019.01.02, interest rates at 3.7%	1,229,600
Commercial paper	Expired by 2019.02.20, interest rates at 0.76%	<u>499,068</u>
Total		<u>\$ 240,202,525</u>

STATEMENT 2

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF NOTES AND ACCOUNTS RECEIVABLE, NET

DECEMBER 31, 2018

(In Thousands of New Taiwan Dollars)

Client Name	Amount
Client A	\$ 9,700,035
Client B	3,912,500
Client C	3,681,950
Client D	3,276,349
Others (Note 1)	<u>16,121,687</u>
	36,692,521
Less: Allowance for doubtful accounts	<u>(7,132)</u>
Total	<u>\$ 36,685,389</u>

Note 1: The amount of individual client included in others does not exceed 5% of the account balance.

Note 2: The accounts receivable past due over one year amounted to NT\$4 thousand for which the Company has recognized appropriate allowance for doubtful accounts.

STATEMENT 3

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF RECEIVABLES FROM RELATED PARTIES

DECEMBER 31, 2018

(In Thousands of New Taiwan Dollars)

Client Name	Amount
TSMC North America	\$ 86,057,097
Others (Note)	<u>395,487</u>
Total	<u>\$ 86,452,584</u>

Note: The amount of individual client included in others does not exceed 5% of the account balance.

STATEMENT 4**Taiwan Semiconductor Manufacturing Company Limited****STATEMENT OF INVENTORIES****DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars)**

Item	Amount	
	Cost	Net Realizable Value
Finished goods	\$ 10,920,351	\$ 24,537,764
Work in process	70,405,998	187,819,293
Raw materials	14,110,534	14,140,627
Supplies and spare parts	<u>2,651,277</u>	<u>2,758,051</u>
Total	<u>\$ 98,088,160</u>	<u>\$ 229,255,735</u>

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF CHANGES IN INVESTMENTS ACCOUNTED FOR USING EQUITY METHOD
FOR THE YEAR ENDED DECEMBER 31, 2018
(In Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Investees	Balance, January 1, 2018		Additions in Investment		Decrease in Investment		Increase (Decrease) in Using the Equity Method Amount (Note 2)	Balance, December 31, 2018		Market Value or Net Assets Value		Collateral	
	Shares (In Thousands)	Amount	Shares (In Thousands)	Amount	Shares (In Thousands)	Amount		Shares (In Thousands)	%	Amount	Unit Price (NT\$)		Total Amount
Stocks													
TSMC Global	9	\$ 309,211,877	2	\$ 62,272,080	-	\$ -	\$ 22,093,974	11	100	\$ 393,577,931		\$ 393,577,931	Nil
TSMC Partners	988,268	49,684,287	-	-	-	-	2,654,807	988,268	100	52,339,094		52,434,858	Nil
VIS	464,223	8,568,344	-	-	-	-	437,782	464,223	28	9,006,126	\$59.5 (Note 1)	27,621,298	Nil
SSMC	314	5,677,640	-	-	-	-	95,175	314	39	5,772,815		5,558,832	Nil
VisEra Tech	253,120	4,667,162	-	-	-	-	(135,233)	253,120	87	4,531,929		4,478,295	Nil
TSMC North America	11,000	4,001,003	-	-	-	-	268,390	11,000	100	4,269,393		4,269,393	Nil
Xintec	111,282	2,292,100	-	-	-	-	(527,493)	111,282	41	1,764,607	34 (Note 1)	3,783,585	Nil
GUC	46,688	1,300,194	-	-	-	-	(771)	46,688	35	1,299,423	206 (Note 1)	9,617,699	Nil
TSMC Europe	-	407,324	-	-	-	-	38,504	-	100	445,828		445,828	Nil
TSMC Japan	6	129,446	-	-	-	-	11,690	6	100	141,136		141,136	Nil
TSMC Korea	80	39,210	-	-	-	-	1,756	80	100	40,966		40,966	Nil
TSMC Solar Europe GmbH	1	(20,217)	-	-	-	-	111	1	100	(20,106)		(20,106)	Nil
Subtotal		385,958,370		62,272,080		-	24,938,692			473,169,142		501,949,715	
Capital													
TSMC China	-	51,060,885	-	-	-	-	4,406,026	-	100	55,466,911		55,586,818	Nil
TSMC Nanjing	-	26,493,740	-	2,361,320	-	-	(8,253,647)	-	100	20,601,413		20,837,480	Nil
VTAF III	-	152,836	-	-	-	(10,641)	52,465	-	98	194,660		171,491	Nil
VTAF II	-	320,533	-	-	-	(134,031)	(57,744)	-	98	128,758		122,512	Nil
Subtotal		78,027,994		2,361,320		(144,672)	(3,852,900)			76,391,742		76,718,301	
Total		\$463,986,364		\$ 64,633,400		\$ -	\$ 21,085,792			\$ 549,560,884		\$578,668,016	

Note 1: The unit price is calculated by closing price of Gre Tai Securities Market as of December 28, 2018 or by closing price of the Taiwan Stock Exchange as of December 28, 2018.

Note 2: Mainly including share of profit or loss of subsidiaries and associates, share of other comprehensive income of subsidiaries and associates, cash dividends received from subsidiaries and associates, etc.

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF SHORT-TERM LOANS
DECEMBER 31, 2018

(In Thousands of New Taiwan Dollars, Unless Specified Otherwise)

Type	Balance, End of Year	Contract Period	Range of Interest Rates (%)	Loan Commitments	Collateral	Remark
Unsecured loans						
Crédit Agricole CIB	\$ 15,831,100	2018.11.06-2019.01.08	2.89-3.22	US\$ 600,000	Nil	-
Bank Of America	13,218,200	2018.10.11-2019.01.18	2.75-2.94	US\$ 600,000	Nil	-
Megabank	10,144,200	2018.11.05-2019.01.11	2.75-3.00	TW\$ 12,000,000	Nil	-
The Bank Of Tokyo-Mitsubishi UFJ, Ltd.	8,914,600	2018.11.26-2019.01.25	2.94-2.99	US\$ 300,000	Nil	-
First Commercial Bank	6,762,800	2018.11.08-2019.01.09	2.79	TW\$ 8,000,000	Nil	-
DBS	5,705,640	2018.12.27-2019.01.30	0.10	US\$ 400,000	Nil	-
JPMorgan Chase Bank N.A.	5,533,200	2018.11.05-2019.01.07	2.80	US\$ 200,000	Nil	-
HSBC	4,918,400	2018.11.07-2019.01.09	2.98-3.00	US\$ 160,000	Nil	-
China Construction Bank	3,842,500	2018.12.03-2019.01.04	2.65	US\$ 500,000	Nil	-
Citibank Taiwan	3,381,400	2018.11.14-2019.01.16	2.82	US\$ 110,000	Nil	-
Taipeifubon Commercial Bank	2,817,600	2018.12.27-2019.01.25	0.01	US\$ 100,000	Nil	-
DB	2,766,600	2018.10.05-2019.01.04	2.68	US\$ 100,000	Nil	-
BNP Paribas Taiwan	2,151,800	2018.11.09-2019.01.09	2.99	US\$ 75,000	Nil	-
HSBC Taiwan	1,537,000	2018.11.09-2019.01.09	3.00	US\$ 65,000	Nil	-
Citibank Taipei	1,229,600	2018.11.14-2019.01.16	2.82	US\$ 484,000	Nil	-
Subtotal	88,754,640					
Related parties						
TSMC Global	3,227,700	2018.12.28-2019.04.19	2.53	US\$ 1,500,000	Nil	-
Total	\$ 91,982,340					

STATEMENT 7

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF ACCOUNTS PAYABLES

DECEMBER 31, 2018

(In Thousands of New Taiwan Dollars)

Vendor Name	Amount
Vendor A	\$ 1,625,875
Others (Note)	<u>28,846,417</u>
Total	<u>\$ 30,472,292</u>

Note: The amount of individual vendor in others does not exceed 5% of the account balance.

STATEMENT 8**Taiwan Semiconductor Manufacturing Company Limited****STATEMENT OF PAYABLES TO RELATED PARTIES****DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars)**

Vendor Name	Amount
TSMC China	\$ 1,299,072
WaferTech	1,092,785
Xintec	649,812
TSMC Nanjing	414,401
SSMC	362,564
VIS	357,080
Others (Note)	<u>371,038</u>
Total	<u>\$ 4,546,752</u>

Note: The amount of individual vendor in others does not exceed 5% of the account balance.

STATEMENT 9**Taiwan Semiconductor Manufacturing Company Limited****STATEMENT OF PAYABLES TO CONTRACTORS AND EQUIPMENT SUPPLIERS****DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars)**

Vendor Name	Amount
Vendor B	\$ 4,424,855
Vendor C	4,089,399
Vendor D	2,349,753
Others (Note)	<u>30,415,903</u>
Total	<u>\$ 41,279,910</u>

Note: The amount of individual vendor included in others does not exceed 5% of the account balance.

Taiwan Semiconductor Manufacturing Company Limited**STATEMENT OF ACCRUED EXPENSES AND OTHER CURRENT LIABILITIES****DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars)**

Item	Amount
Refund liability	\$ 21,199,032
Guarantee deposit	6,148,000
Receipts in advance	2,740,649
Others (Note)	<u>19,690,361</u>
Total	<u>\$ 49,778,042</u>

Note: The amount of each item in others does not exceed 5% of the account balance.

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF BONDS PAYABLE
DECEMBER 31, 2018
(In Thousands of New Taiwan Dollars)

Bonds Name	Trustee	Issuance Date	Interest Payment Date	Coupon Rate (%)	Amount				Collateral
					Total Amount	Repayment paid	Balance, End of Year	Unamortized Premiums (Discounts)	
Domestic unsecured bonds-100-1	Mega International Commercial Bank Co., Ltd.	2011.09.28	on 09.28 annually	1.63	\$ 7,500,000	\$ 7,500,000	\$ -	-	Nil
- B									Bullet repayment
Domestic unsecured bonds-100-2	Mega International Commercial Bank Co., Ltd.	2012.01.11	on 01.11 annually	1.46	7,000,000	-	7,000,000	-	Nil
- B									Bullet repayment
Domestic unsecured bonds-101-1	Mega International Commercial Bank Co., Ltd.	2012.08.02	on 08.02 annually	1.40	9,000,000	-	9,000,000	-	Nil
- B									Bullet repayment
Domestic unsecured bonds-101-2	Taipei Fubon Commercial Bank Co., Ltd.	2012.09.26	on 09.26 annually	1.39	9,000,000	-	9,000,000	-	Nil
- B									Bullet repayment
Domestic unsecured bonds-101-3	Taipei Fubon Commercial Bank Co., Ltd.	2012.10.09	on 10.09 annually	1.53	4,400,000	-	4,400,000	-	Nil
Domestic unsecured bonds-101-4	Taipei Fubon Commercial Bank Co., Ltd.	2013.01.04	on 01.04 annually	1.23	10,600,000	10,600,000	-	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-1	Taipei Fubon Commercial Bank Co., Ltd.	2013.01.04	on 01.04 annually	1.35	10,000,000	-	10,000,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-2	Taipei Fubon Commercial Bank Co., Ltd.	2013.02.06	on 02.06 annually	1.23	6,200,000	6,200,000	-	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-3	Taipei Fubon Commercial Bank Co., Ltd.	2013.02.06	on 02.06 annually	1.38	11,600,000	-	11,600,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-4	Taipei Fubon Commercial Bank Co., Ltd.	2013.07.16	on 07.16 annually	1.50	10,200,000	-	10,200,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-5	Taipei Fubon Commercial Bank Co., Ltd.	2013.07.16	on 07.16 annually	1.70	3,500,000	-	3,500,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-6	Taipei Fubon Commercial Bank Co., Ltd.	2013.08.09	on 08.09 annually	1.52	8,500,000	-	8,500,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-7	Taipei Fubon Commercial Bank Co., Ltd.	2013.09.25	on 09.25 annually	1.60	1,400,000	-	1,400,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-8	Taipei Fubon Commercial Bank Co., Ltd.	2013.09.25	on 09.25 annually	1.85	2,600,000	-	2,600,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-9	Taipei Fubon Commercial Bank Co., Ltd.	2013.09.25	on 09.25 annually	2.05	5,400,000	-	5,400,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
Domestic unsecured bonds-102-10	Taipei Fubon Commercial Bank Co., Ltd.	2013.09.25	on 09.25 annually	2.10	2,600,000	-	2,600,000	-	Nil
- A									Bullet repayment
- B									Bullet repayment
- C									Bullet repayment
TOTAL					<u>\$ 116,100,000</u>	<u>\$ 24,300,000</u>	<u>\$ 91,800,000</u>	-	
Less: current portion							<u>(34,900,000)</u>	-	
							<u>\$ 56,900,000</u>	<u>\$</u>	

STATEMENT 12**Taiwan Semiconductor Manufacturing Company Limited****STATEMENT OF NET REVENUE****FOR THE YEAR ENDED DECEMBER 31, 2018****(In Thousands of New Taiwan Dollars, Unless Specified Otherwise)**

Item	Shipments (Piece) (Note)	Amount
Wafer	10,751,552	\$ 906,992,422
Other		<u>116,933,291</u>
Net revenue		<u>\$ 1,023,925,713</u>

Note: 12-inch equivalent wafers.

Taiwan Semiconductor Manufacturing Company Limited
STATEMENT OF COST OF REVENUE
FOR THE YEAR ENDED DECEMBER 31, 2018
(In Thousands of New Taiwan Dollars)

Item	Amount
Raw materials used	
Balance, beginning of year	\$ 6,566,716
Raw material purchased	48,003,230
Raw materials, end of year	(14,110,534)
Transferred to manufacturing or operating expenses	(6,483,906)
Others	<u>(205,440)</u>
Subtotal	33,770,066
Direct labor	14,099,289
Manufacturing expenses	<u>474,764,387</u>
Manufacturing cost	522,633,742
Work in process, beginning of year	52,166,234
Work in process, end of year	(70,405,998)
Transferred to manufacturing or operating expenses	<u>(21,864,208)</u>
Cost of finished goods	482,529,770
Finished goods, beginning of year	9,596,837
Finished goods purchased	45,624,012
Finished goods, end of year	(10,920,351)
Transferred to manufacturing or operating expenses	(11,067,796)
Scrapped	<u>(103,647)</u>
Subtotal	515,658,825
Others	<u>15,202,341</u>
Total	<u>\$ 530,861,166</u>

Taiwan Semiconductor Manufacturing Company Limited
STATEMENT OF OPERATING EXPENSES
FOR THE YEAR ENDED DECEMBER 31, 2018
(In Thousands of New Taiwan Dollars)

Item	Research and Development Expenses	General and Administrative Expenses	Selling Expenses
Payroll and related expense	\$ 28,608,138	\$ 7,541,827	\$ 2,121,253
Depreciation expense	22,154,406	822,877	42,835
Consumables	21,022,083	235,779	3,050
Repair and maintenance expense	3,624,661	1,266,629	596
Moving expense	271,117	986,379	600
Service fee	75,840	1,290,476	12,050
Patents	-	1,558,487	-
Management fees of the Science Park Administration	-	2,014,270	-
Commission	-	-	866,068
Others (Note)	<u>9,188,216</u>	<u>3,396,574</u>	<u>155,218</u>
Total	<u>\$ 84,944,461</u>	<u>\$ 19,113,298</u>	<u>\$ 3,201,670</u>

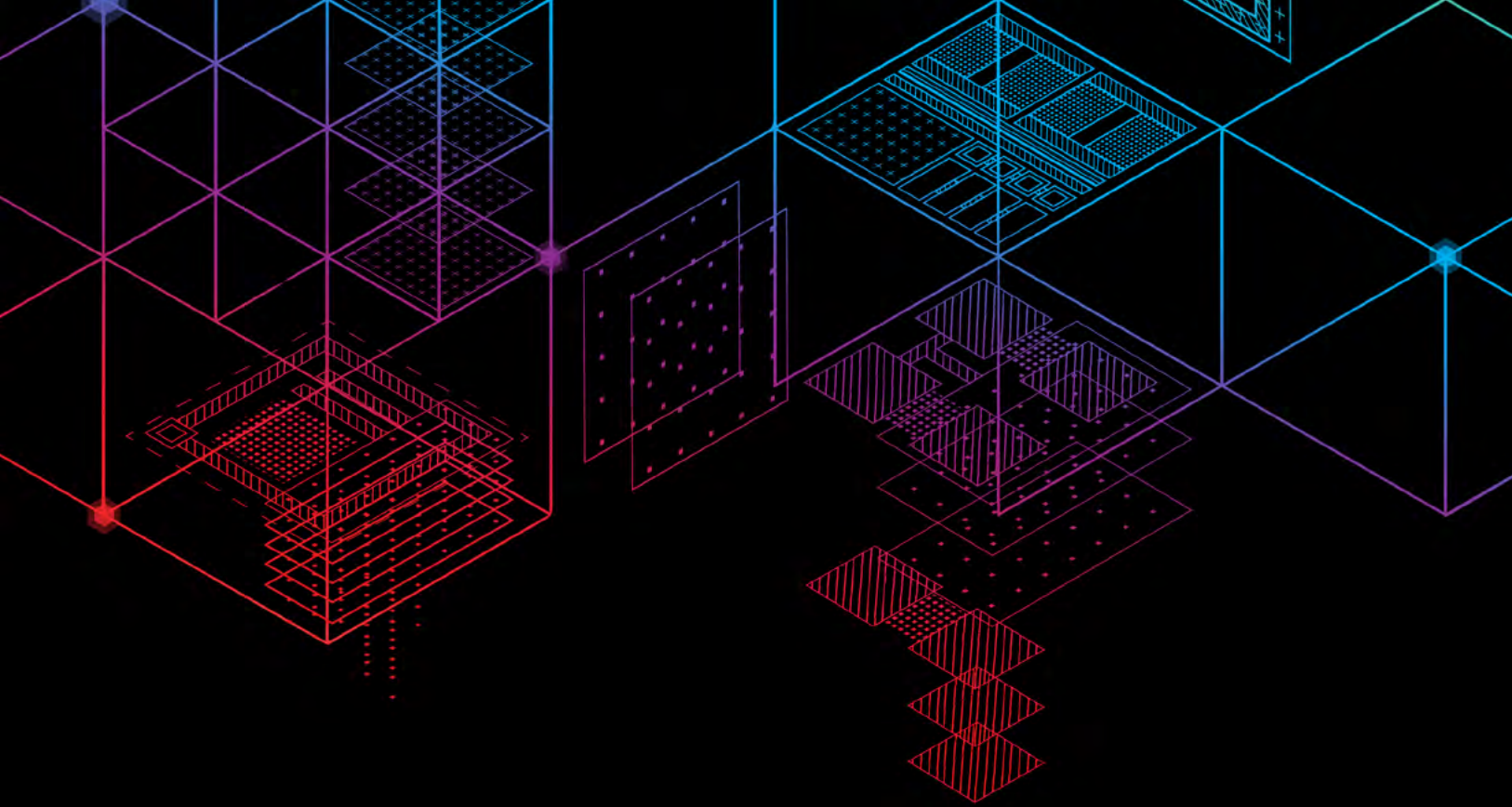
Note: The amount of each item in others does not exceed 5% of the account balance.

Taiwan Semiconductor Manufacturing Company Limited

STATEMENT OF LABOR, DEPRECIATION AND AMORTIZATION BY FUNCTION
FOR THE YEAR ENDED DECEMBER 31, 2018 AND 2017
(In Thousands of New Taiwan Dollars, Unless Specified Otherwise)

	Year Ended December 31, 2018				Year Ended December 31, 2017			
	Classified as		Other		Classified as		Other	
	Cost of Revenue	Classified as Operating Expenses	Operating Income and Expenses	Total	Cost of Revenue	Classified as Operating Expenses	Operating Income and Expenses	Total
Labor cost (Note)								
Salary and bonus	\$ 51,980,310	\$ 34,454,020	\$ -	\$ 86,434,330	\$ 50,157,890	\$ 33,221,701	\$ -	\$ 83,379,591
Labor and health insurance	2,610,200	1,708,463	-	4,399,663	2,628,261	1,589,597	-	4,217,858
Pension	1,457,996	852,315	-	2,310,311	1,405,941	770,262	-	2,176,203
Board compensation	-	378,092	-	378,092	-	412,422	-	412,422
Others	1,604,091	878,328	-	2,482,419	1,710,785	891,612	-	2,602,397
	<u>\$ 57,733,597</u>	<u>\$ 38,271,218</u>	<u>\$ -</u>	<u>\$ 96,004,815</u>	<u>\$ 55,902,877</u>	<u>\$ 36,885,594</u>	<u>\$ -</u>	<u>\$ 92,788,471</u>
Depreciation	\$ 251,292,565	\$ 23,020,118	\$ 27,857	\$ 274,340,540	\$ 231,042,615	\$ 19,490,010	\$ 64,510	\$ 250,597,135
Amortization	<u>\$ 2,018,702</u>	<u>\$ 2,334,145</u>	<u>\$ -</u>	<u>\$ 4,352,847</u>	<u>\$ 2,119,899</u>	<u>\$ 2,205,129</u>	<u>\$ -</u>	<u>\$ 4,325,028</u>

Note: As of December 31, 2018 and 2017, the Company had 43,228 and 43,139 employees, respectively. There were 8 non-employee directors for both years.



Taiwan Semiconductor Manufacturing Company, Ltd.

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Taiwan Semiconductor Manufacturing Company, Ltd.



Mark Liu, Chairman