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Operation Overview

A. Business Activities

(A) Scope of business

1. Main business activities

- F601010 Intellectual Property (IP)
- I301010 Software Design Services
- I301020 Data Processing Services
- I301030 Digital Information Supply Services
- I199990 Other Consultancy
- IZ99990 Other Industry and Commerce Services Not Elsewhere Classified
- CZ99990 Other Industrial Products Manufacturing Not Elsewhere Classified
- ZZ99999 All business items that are not prohibited or restricted by law, except those that are subject to special approval

2. Revenue composition: unit NT$ thousand

<table>
<thead>
<tr>
<th>Revenue Streams</th>
<th>Year</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Net Revenue</td>
<td>Revenue contribution</td>
<td>Net Revenue</td>
</tr>
<tr>
<td>License Fee</td>
<td>686,267</td>
<td>89.88%</td>
<td>787,641</td>
</tr>
<tr>
<td>Royalty</td>
<td>77,283</td>
<td>10.12%</td>
<td>81,436</td>
</tr>
<tr>
<td>Total</td>
<td>763,550</td>
<td>100.00%</td>
<td>869,077</td>
</tr>
</tbody>
</table>

3. Products and services as of now

<table>
<thead>
<tr>
<th>Product</th>
<th>Service and Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation IP</td>
<td>Foundation IPs mainly serve the demand of foundries and IC design houses. Various Foundation IPs, including Standard Cell Library,</td>
</tr>
<tr>
<td>Product</td>
<td>Service and Applications</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Memory Compilers, and I/O, are available corresponding to different processes, offering the design, development, and licensing of low-power high-density memory compilers and cell library IPs. The main applications of the current developed IPs include Microcontroller IC, Smart-Card IC, Power Management IC, Display Driver IC, Sensor IC, etc.</td>
</tr>
<tr>
<td>High-Speed Interface IP</td>
<td>High-Speed Interface IPs mainly serve the demand of IC design houses, offering the design, development, and licensing of products with the following interface specifications: USB: USB 1.1/2.0/3.0/3.1/3.2 PCIe: PCI ExpressG2/G3/G4 SATA: SATA 2/3 MIPI: M-PHY, C-PHY, and D-PHY DisplayPort: DP TX These IPs are widely applied to portable devices, storage devices, Automotive Electronics, AI, IoT, and other products related to high-speed computing applications.</td>
</tr>
<tr>
<td>Analog IP</td>
<td>Analog IPs mainly serve the demand of IC design houses, offering the design, development, and licensing of products include ADC, PLL, PVT Sensor and LDO. These IPs are mainly applied to IoT and wearable devices in the early years.</td>
</tr>
</tbody>
</table>

4. New product (service) development plan
   (1) USB 4.0, PCIe 5.0, MIPI M PHY V4.0, 20G SerDes: The latest high-speed interface transmission specifications meeting future computing device requirements for a faster interface bandwidth
   (2) 7nm 12-Track Standard Cell Library, High Performance SRAM: The high performance computing Foundation IPs on the latest advanced process developed in response to high-end computing IC requirements
(3) MRAM Compiler: The emerging non-volatile memory compiler
(4) HDMI · Display Port: Multimedia transmission interface
(5) OnFi 4.1 · eMMC 5.0: The new generation Flash memory IO interface

(B) Industry overview

1. Current status and future development of the industry
The trend in the global IP market can be observed from the larger semiconductor IC industry, which is itself a part of an even larger market of electronics systems. For 2019, the sales are estimated to be around USD 1.7 Trillion for electronics systems and around USD 430 Billion for semiconductor IC. According to the report from ITRI (Industrial Technology Research Institute), in 2023, the terminal market of electronics system is expected to reach USD 2.4 Trillion, in which industrial and automotive electronics show a high growth potential; moreover, the market scope of semiconductor IC is expected to reach USD 537 Billion, in which high-speed computing and communication ICs take the largest portion, while industrial and automotive ICs show the highest growth momentum. The main component in electronics systems is IC, the key technology in IC design is IP. Therefore, whether being self-developed or licensed from third parties, IP is one of the most crucial technology in the industry overall.

Regarding the process node roadmap in the recent decade, from 65nm, 40nm, 28nm, 16nm, to 7nm, and even to TSMC 5nm process which is about to be mass-production this year, the process nodes shrink, leading to IC designs with higher computing speed and lower power consumption.

Furthermore, in regard to consumer electronics, the development goes from desktop computers in the early period to laptops, tablets, and mobile phones. The popularity of the internet, portable devices, and the revolutionary innovation in wireless transmission (from 2G,
3G, 4G, up to 5G), all lead to a growth in emerging applications of AI, IoT, automotive electronics, and high-performance computing. In fact, these new applications are related to digital data. The generation, transmission, storage, integration, and analysis of data are, from the perspective of electronic design, equivalent to computing, transmitting, receiving, storing and displaying a series of digital information. M31 high-speed interface IPs are integrated on SoC functioning as a data transmission interface, whether from die to die in advanced packaging, chip to chip on PCB, or device to device through wired connection. Led by 5G, wireless transmission enables the fast exchange of massive data produced by high-speed computing mobile devices. The booming development of AI, IoT, automotive-electronics, and high-performance-computing drastically boosts the demand of high-speed interface IPs. On top of that, it also drives the demand of the peripheral functional ICs such as Power Management ICs, Storage Control ICs, Display Driver ICs, and so on, which motivates the growth of M31 Foundation IPs on various process technologies.
2. Semiconductor industry supply chain

M31 operates in the most upstream of the semiconductor industry as an IP developer. Since IC designs highly integrate multiple functions into one single system-on-chip (SoC), utilizing verified IP on SoCs becomes unavoidable to reduce the product development cycle and production costs, leading to the emergence of specialized IP vendors. The midstream industry is IC manufacturing. Wafer foundries manufacture wafers based on the designs offered by design houses, continuously improving process technologies to attract more wafer orders from IC suppliers. Thus wafer foundries also provide customers with IPs used in IC designs through IP vendors, assisting customers in having a smooth flow covering from design to manufacturing. The downstream industry encompasses IC packaging and testing. The processed wafers will go through probing test, dicing, bonding, packaging, and final test at professional assembly/testing houses. Afterward, the final product IC will be sold to system houses to build electronics products. Different from the Integrated Device Manufacturer, (which have a supply chain vertically integrated from design, manufacturing, packaging, to testing), the IC suppliers develop a horizontal collaboration system, in which each company specializes in different steps of production. Taiwan’s semiconductor industry ranks first in the world in wafer manufacturing and second in IC design, becoming the most important supply chain in the global semiconductor industry.
3. Megatrend in IC industry

The application markets related to M31 IP products are listed as follow:

(1) Artificial Intelligence

AI development has three aspects in general: Cloud (the infrastructure), Networking (the middleware on the technical aspect), and Edge (end-user application field), covering a global market from the technical level (in silicon chips, high-speed computing platforms, algorithms, deep learning, speech recognition, and big data analysis), to the applications level (in financial technology, smart manufacturing, smart healthcare, intelligent transportation etc.).

The global market is at a pivotal stage of technological transformation, in which Artificial intelligence, machine learning, and automation are closely related to every aspect of daily life. The technology evolution will depend on the ability to collect, manage, analyze, and transmit big data. 5G wireless transmission is the crucial technology to enable real-time management and data processing. The popularity of 5G, fiber network, and cameras will bring an inevitable rise in AI applications, particularly in edge computing. M31 High-Speed Interface IPs, including PCIe, USB, MIPI, SerDes, function in the fast transmission of mass data. High-Speed memory (High-Speed SRAM) and High-Performance standard cell library (12-Track Library) offer the fundamental components for AI high-speed computing engine. In 2019, AI-related projects took about 25% of M31 High-Speed Interface IP design-in projects. This percentage is expected to keep growing in 2020.

(2) Automotive Electronics

The maturity of 5G technologies and the rapid deployment of infrastructures will accelerate the development of the Internet of Vehicles, auto-pilot, ADAS, and intelligent transportation systems, creating tremendous business opportunities. In 2020, tens of new
electric vehicles are launched by Tesla, BYD, Volvo, VW, Audi, Honda, and Hyundai. Meanwhile, improved battery technology enables fast battery charging, thereby relieving consumers’ concern about using electric vehicles. Back in 2010, electronics usually took approximately 35% of the total cost of an automobile. However, with technology innovations, this percentage is estimated to rise to 50% in the next twenty years. Without a doubt, this rapid growth of automotive electronics has become a trend in the IC industry. Distinct from consumer electronics, automotive electronics require elevated levels of safety and reliability. In 2019, all M31 automotive IP products, including MIPI M PHY, MIPI D PHY, PCIe PHY, SRAM Compiler, and GPIO, have received ISO 26262 Certifications and been adopted by IC designs of European and American automotive electronics industries. At the same time, M31 distributes IPs to worldwide automobile industries in a wide range of applications, as on the Internet of Vehicles, security systems, and electrical power systems, further increasing the penetration rate and market share of IP products.

(3) Internet of Things
IoT generally covers MCU (ALU+ RAM+ embedded Flash), wireless transmission interface (4G/5G, Wi-Fi, Bluetooth), and sensor (MEMS, sensor). Wi-Fi 6 (also known as IEEE 802.11ax) was introduced to the market in 2019. Devices which support Wi-Fi 6 will increase significantly in 2020. Bluetooth Low Energy (BLE) v5.2 is another revolutionary technology showing a function of audio sharing. IoT devices need to detect information, be connected to the internet, then analyze, manage, and store data. Therefore, multiple ICs and components will be required to meet specific requirements and stringent specifications. Low power consumption, compact size, and cost-effectiveness are the essential elements of IoT devices. M31’s
solutions for low power consumption include “Green Memory,” “Low-VCCMIN Memory,” “Low-Power Standard Cell Library,” “Ultra-Low Power Fractional PLL” (ULFPLL), and “Low-Power Interface IP” such as USB 2.0 and USB 1.1.

- M31’s “Green memory” provides low power modes, including standby, nap, retention, and power shutdown.

- “Low-VCCMIN Memory” supports low voltage operation to reduce power leakage and dynamic power consumption directly. “Low-Power Standard Cell Library” further provides the basic logic gates required for low-power SoC.

- “Ultra-Low Power Fractional PLL” (ULFPLL) works with a very low voltage (0.7V) for power-saving and offers a reliable clock source for SoC.

- “Low-Power USB 2.0 and USB 1.1” IP is optimized for IoT applications to save more than 30% operating current and 70% stand-by current.

M31’s low-power consumption and compact size IP designs provide customers with highly competitive solutions in the new era of interconnection.

In 2019, IoT-related projects took about 14% of M31 high-speed interface IP design-in projects. This percentage is expected to raise with comprehensive product portfolio of high-speed interface IP, low power consumption Foundation IP library, and Analog IP (ADC, PLL, LDO, etc).

(4) Digital Storage

Digital storage devices are used for the data exchange/storage of images, videos, and files. It is still strongly demanded by the global market due to the growth in handheld and portable devices. To transfer massive data and be connected to various devices, digital storage devices require interfaces with various specifications. Whether Pen Drive, SSD, SD card, eMMC, or UFS, M31 has
developed a series of silicon-proven IPs for a wide range of storage application ICs. These IPs have the advantages of compact size, high-speed transmission, and low power consumption, covering important process nodes of major foundries to meet market requirements with the optimal cost-performance ratio. The storage and management of massive data become crucial with the emergence of larger system infrastructure and more massive business data environment. The next-generation storage offers effective, faster, and reliable solutions for the demand of a large amount of data, supporting data storage for various end-users (including IT companies, financial industry, and data center), continuously expanding along with the amount of massive and unstructured data.

According to the research from Markets And Markets, the market of next-generation data storage is estimated to grow from USD 56.8 billion in 2019 to USD 102.2 billion in 2024, with a Compound Annual Growth Rate of 12.48%. The growth of this market can be attributed to the rapid increase of massive data, the widely use of mobile devices (smartphones, laptops, and tablets), the expanding of the IoT market, and an enhancement in the penetration rate of high-end cloud computing.

M31 has business opportunities in the market of next-generation data storage with an increased data transmission speed in storage devices. The PCIe interface has evolved from Gen 2, Gen 3, to the well-developed Gen 4 in 2019 and the developing Gen 5 in 2020. Similarly, USB has evolved from 1.1, 1.2, to 3.2 and the future 4.0. PCIe and USB continuously evolve towards high-speed operations through frequent upgrades of specs, showing that future computing chips, along with data storage devices, have an urgent demand for interface bandwidth.
(5) Power Management IC

Power management IC (PMIC) mainly functions to control electrical voltage, current, and flow direction meeting electronics system requirements. PMIC selects among multiple power sources (such as external DC power, batteries, and USB power) by which distributes power to each part of the system for use, such as offering power supplies in various voltages and charging the internal battery. Since PMIC is mostly applied to battery supplied systems, designs with high converting efficiency are mainly adopted to reduce power loss.

Analog ICs can be classified into three types by functions: Power ICs (PMIC, LDO, DC/DC), Signal Chain ICs (Comparator, Amplifier), and Digital-Analog Converter ICs (ADC/DAC). According to the statistics from IC Insights, Power Management IC is estimated to take 21% of the total shipment volume of analog IC in 2019, ranking the first among all types of IC. In the future, the growth of Power Management chips will be driven by: emergent applications within the communication industry such as 5G smartphones and base stations; consumer electronics industries as in TWS (True Wireless Stereo) Bluetooth headsets; AIoT (Internet of Things with AI) industry; and automotive electronics industry as in electric vehicles and charging stations. BCD (Bipolar-CMOS-DMOS) process is usually adopted in the manufacturing of PMIC wafers. The technology trends of BCD technology focus on the voltage capability, the switching speed of power MOS transistor, and the high integration of logic CMOS for SoC solutions requiring high-voltage devices.

BCD technology offers low-voltage logic CMOS transistors, high-voltage CMOS transistors, bipolar transistors, resistors, capacitors, diode, and power LDMOS (Lateral Double-diffused MOS) transistors in the same process. Usually, the BCD process has parasitic bipolar transistors that enable to design analog circuits conveniently, like Bandgap Reference. Moreover, since DMOS functions on the switch of the main power supply, on-resistance is essential for the reduction
in power consumption and chip size. M31 supplies comprehensive Foundation IP solutions ranging from 90nm to 180nm technology nodes in BCD process technology for major foundries such as TSMC and Global Foundry, providing customers with a competitive edge in the cost-oriented market with high-performing products as the standard.

(6) Display Driver IC

Driver ICs are used to operate various display panels by converting the display data received from the processors into analog voltage signals. Since smartphones, televisions, and other electronics have an increasing demand for LCD panels, the market of display driver ICs is estimated to have a rapid growth; the momentum comes from higher resolution, faster data transmission, and increased average selling price. According to the report from Transparent Market Research, the global market is estimated to grow from USD 4.5 billion in 2019 to USD 6.8 billion in 2027.

High Voltage processes are usually adopted in the manufacturing of Display Driver ICs, whether the IC is applied in mobile devices, ePaper displays, large-size panel, or TDDI (touch and display driver integration).

M31’s comprehensive foundation IPs applied to high-voltage processes, including Standard Cell, GPIO, and SRAM compiler, offer fundamental components for the high-quality panel images, nonetheless reducing power consumption of designs in televisions, smartphones, tablets, smartwatches, and other portable electronics. M31’s collaborating foundries include TSMC, Global Foundry, Nexchip, and PSMC, ranging from 28nm to 150nm technology nodes. In addition to continuous developing Foundation IP on foundries’ advanced high-voltage processes, M31 further licenses IP products to Driver IC design houses all around the world.
4. Competition
Since the future demand for Silicon IP increases day by day, the global IP industry becomes more concentrated after a wave of international M&A activities. The main competitors in the IP industry at present are European and U.S. companies (such as Synopsys, Arm Artisan, and Cadence).

Whether regarding revenue indicator or market influence, in terms of Foundation IP and High-Speed Interface IP, M31 has become the best and the most influential IP provider in Asia. Facing future competition, M31 has not only geographic advantages (close to most foundries) and high-quality human resources but also long-accumulated abilities to highly master technologies, including foundries’ process technology specifications (has case experiences with more than 16 foundries in total) and IC designs’ circuit specifications (more than 200 customers in total). These long-accumulated R&D abilities and customers’ trusts are exactly M31’s most significant strengths to confront future competition. In recent years, M31 even creates a new service style in the IP industry, aiming to be the best technology partner of customers to achieve a win-win future in the highly competitive semiconductor industry.

(C) Technology and R&D Outlook
1. Roadmap of Technology, R&D and Services in business operations
(1) IP Solutions on Advanced Logic Process Technology
Following the technology development progress of the leading manufacturer TSMC, M31 has developed High-Speed Interface IP and Foundation IP of 12nm, 16nm, 22nm, and 28nm advanced processes on the TSMC technology platforms. 7nm/5nm products will also be launched one after another since 2020. Generally speaking, a more advanced IP has a relatively higher technology threshold,
oligopolistic degree, license fee, gross profit, and a better profit basis. Observe from TSMC’s income, the processes (28nm and below) generate almost 70% revenue, which is expected to keep growing in the future. For M31, advance processes (28nm and below) respectively take about 32% and 60% of the revenue in 2018 and 2019. It is expected to maintain growth in 2020.

(2) Comprehensive Foundation IP Solutions on Specialty Processes
In addition to the logic-based processes, M31 also has deployed the Foundation IP library of specialty processes in crucial foundries like TSMC, including the High-Voltage process for Display Driver IC, the BCD process for Power Management IC, and the embedded Flash process for Microcontroller IC (MCU). With the advantages of low-cost and high-performance, M31 further expands client pool, IP adoption rate, and IP penetration rate. As customers' design projects accumulate and increase year by year, M31 royalty income is expected to grow accordingly.

(3) Customization Service
Due to the diversified characteristics of applications, customers' demand for IP customization is increasing. Under such circumstance,
modifying products based on customers’ requirements and finding the optimal trade-off in various conditions are necessary. In addition to High-Speed Interface IP, demands for customized Foundation IP are needed as well. Before, customers asked for such service from foundries at first because it is more related to foundry process. Now, they will directly seek support from IP providers like M31 since they want to modify the standard IP specifications for differentiated designs. This change has brought extra workload to IP suppliers as more human resources have to be invested in research and development, but it has brought new opportunities as well. M31’s ability in customized IP design becomes one of the competitive advantages with a well-experienced engineering team, which completes customization-related tasks with “high efficiency”, “design differentiation”, and “shortening development processes”.

2. Education of R & D Staff

<table>
<thead>
<tr>
<th>Education</th>
<th>Year Item</th>
<th>2019</th>
<th>2020 (As of March 31)</th>
</tr>
</thead>
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<td>Ph.D.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Masters</td>
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<tr>
<td></td>
<td>Bachelor’s Degree</td>
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<td></td>
<td>Associate Degree</td>
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<td>4</td>
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<tr>
<td></td>
<td>High School and Below</td>
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<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>151</td>
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<tr>
<td>Average Years of Service</td>
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<td>3.45</td>
<td>3.56</td>
</tr>
</tbody>
</table>
3. Successfully developed technology or product

<table>
<thead>
<tr>
<th>Year</th>
<th>Technology or Product</th>
</tr>
</thead>
</table>
| 2013 | - 40nm Green Memory Compilers  
      | - 40nm STD-Cell PMK  
      | - 5LP BCK USB3.0 PHY IP  
      | - 55LP PCIe2.0 and SATA3.0 PHY IP |
| 2014 | - 55ULP Memory Compilers  
      | - 55ULP STD-cell libraries  
      | - 55LP MIPI M-PHY v3.0 IP  
      | - 40LP USB3.0 PHY IP  
      | - 28HPM USB3.0 PHY IP  
      | - 28HPM M-PHY v3.0 IP |
| 2015 | - 28nm ULL SRAM Compilers  
      | - 152BCD Memory Compilers  
      | - 152BCD STD-Cell libraries  
      | - 130BCD Low Leakage STD-cell library  
      | - 40LP MIPI M-PHY v3.0 IP  
      | - 40LP MIPI D-PHY v1.2 IP  
      | - 40LP PCIe3.0 PHY IP  
      | - 28HPC+ PCIe3.0 PHY IP  
      | - 28HPC+ USB3.0/2.0 PHY IP |
| 2016 | - 16nm/FinFET 12-Track Ultra-High Speed STD-Cell library  
      | - 40ULP Memory Compilers  
      | - 40ULP STD-Cell libraries  
      | - 40ULP MIPI D-PHY v1.1 IP  
      | - 28nm USB3.1 PHY IP  
      | - 28nm MIPI C/D-PHY IP  
<pre><code>  | - 16nm USB2.0 PHY IP |
</code></pre>
<table>
<thead>
<tr>
<th>Year</th>
<th>Technology or Product</th>
</tr>
</thead>
</table>
| 2017 | - 180BCD Memory compilers  
- 150BCD Memory compilers  
- 130BCD Memory compilers  
- 28LPSe Memory compilers  
- 28LPSe STD-Cell libraries  
- 40HV Memory compilers  
- 40HV STD-Cell libraries  
- 16nm M-PHY v3.0 PHY IP  
- 16nm USB3.1 Gen2 PHY IP  
- 28nm M-PHY v3.0 PHY IP  
- 28nm PCIe2.0 PHY IP (New)  
- 28nm 10G SerDes IP  
- 40nm ULP BCK-USB2.0 PHY IP |
| 2018 | - 150MCU Memory compiler  
- 110 HV Memory compiler  
- 90NVM Memory compiler  
- 150S STD cell library  
- 90BCD STD cell library  
- 40LP STD cell library  
- 40HV STD cell library  
- 110Y STD cell library  
- 28HPC+ ONFI I/O library  
- 40LP ONFI I/O library  
- 110HV GPIO library  
- 12nm USB3.1 Gen2 PHY IP  
- 12nm MIPI D-PHY IP  
- 12nm PCIe2.0 PHY IP |
<table>
<thead>
<tr>
<th>Year</th>
<th>Technology or Product</th>
</tr>
</thead>
</table>
| 2019 | - 90BCD+ STD cell library  
       - 150BCD STD cell library  
       - 22ULL STD cell library  
       - 28HPC+ STD cell library  
       - 16FFC/28HPC+/40nm ONFI I/O library  
       - 22ULP/ULL eMMC IO  
       - 28HPC+/40LP eMMC IO  
       - 28nm/50nm LPDDR3 IO  
       - 28ESF3 Memory compiler  
       - 14nm Memory compiler  
       - 28nm HKC+ Memory compiler  
       - 28nm HV Memory compiler  
       - 180nm Memory compiler  
       - 28nm USB3.2 Gen1 PHY IP  
       - 12nm PCIe 4.0/3.0 PHY OP  
       - 16nm PCIe 4.0/3.0 PHY IP  
       - 28nm USB3.2 Gen1 PHY IP  
       - 16nm D-PHY IP  
       - 22ULL D-PHY  
       - 28FDSOI PCIe3  
       - 28HPC+ PLL |

(D) Short and long term business development plan

1. Short-term
   (1) Continuously expand client pool and increase product popularity through existing products and sales channels.
   (2) Strengthen client connection and marketing campaigns through IP platforms of wafer foundry partners.
   (3) Adjust sales and marketing strategies to adapt to the changing international situations, such as the outbreak of trade wars and Novel Coronavirus.
   (4) Utilize the internet, social media, and professional newspapers/
magazines to gain popularity and technical expertise through releasing new technologies and applications.

(5) Proactively participate in technology symposiums of foundries and IC design service companies to increase visibility and strengthen connections with the clients.

2. Long-term
(1) Establish local offices of technical service and sales worldwide to improve operating effectiveness and quality.
(2) Establish a complete M31 IP platform to provide customers with comprehensive and diverse IP choices.
(3) Develop applications with high added-value and high technical threshold to explore new Blue Ocean Markets.
(4) Increase the sales rate of advanced process products and develop new applications targeting products with higher ASP to enhance future company growth opportunities and momentum.
(5) Collaborate in development with advanced wafer foundries through strategic alliances to strengthen global competitiveness.

B. Market and Sales Overview
(A) Market analysis
1. Main geographic regions for sales of products (services)

<table>
<thead>
<tr>
<th>Geographic regions</th>
<th>Year</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amount</td>
<td>Amount</td>
</tr>
<tr>
<td>Domestic(Taiwan)</td>
<td></td>
<td>197,286</td>
<td>218,340</td>
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<tr>
<td>Export</td>
<td></td>
<td>566,264</td>
<td>650,737</td>
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<td></td>
<td></td>
<td>763,550</td>
<td>869,077</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>277,573</td>
<td>402,487</td>
</tr>
<tr>
<td></td>
<td></td>
<td>46.31%</td>
<td>46.31%</td>
</tr>
<tr>
<td>U.S.</td>
<td></td>
<td>218,149</td>
<td>180,331</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28.57%</td>
<td>20.75%</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>70,542</td>
<td>67,919</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.24%</td>
<td>7.82%</td>
</tr>
<tr>
<td>Export sub-total</td>
<td></td>
<td>566,264</td>
<td>650,737</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.16%</td>
<td>74.88%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>763,550</td>
<td>869,077</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Unit: NTD thousands; %
2. Market share

According to the statistics compiled by an international research institute TechNavio with the forecast, the semiconductor IP market in 2019 is estimated to be about USD 5.480 billion, in which Physical IP takes USD 1.78 billion. M31 had revenue in 2019 of NTD 869,077 thousand (USD 28,115 thousand, with an exchange rate of 30.912 NTD per 1 USD), or at 1.60% of the total Physical IP market. To increase market share in the global Physical IP market, M31 has been proactively collaborating in development with major foundries worldwide, deploying Foundation IPs on advanced processes, continuously offering diverse new-specification High-Speed Interface IPs and customized IPs with higher cost-effectiveness. Provide customers with comprehensive, unique, and high added-value IP solutions.

3. Market supply/demand and growth in the future
   (1) Future market supply and demand

   IP market grows with SoC integration and advanced processes demand, covering applications in mobile communication, consumer electronics, industrial electronics, automotive electronics etc. M31 has researched and developed a series of IPs used in AI application ICs, IoT integration ICs, Storage Device Control ICs, Microcontroller ICs, LCD panel Driver ICs, OLED Driver ICs, Power Management ICs, Fingerprint ICs, Battery Management ICs, and various automotive ICs. From M31’s perspective, the market supply and demand shows a rapid growth of mobile devices, wearable devices, AIoT applications, and automotive electronics in recent years, which will keep contributing to the revenue.

   (2) Market growth potentials
With high integration of System-on-Chip (SoC), one single chip performing multiple functions with more IP blocks becomes a mainstream IC technology. Factors including “an increasing proportion of design outsourcing”, “the rising cost of advanced technology R&D along with photo masks”, and “IC complexity resulting in longer cycle time”, all make Silicon IP the critical component to accelerate SoC development. Under the division of specialization labor in semiconductor industry, leveraging IPs for SoC designs is able to reduce designers’ burdens, lower design risks, and shorten development time. Thereby enhance the competitive advantage in terms of time-to-market. Several market research reports show that the IP market will be at growth in the next few years.

4. Competitive advantages

(1) Strong R&D team and comprehensive technical services.
M31 has a strong R&D and service team of well-experienced engineers in IP development, IC design, and design automation. M31’s two main product lines, Foundation IP and High-Speed Interface IP, serve wafer foundries along with IC design houses. In close collaboration with major semiconductor corporates worldwide, M31 proactively invests in IP development and validation on advanced processes, and further collaborates with IC design service companies, providing verified IP products to reduce design risks and costs. In addition to assisting customers in product design and subsequent mass production, M31 further offers full-service meeting customers’ needs, including the extended technical service of IC testing and product certification.

(2) Unique patented technologies
“IP licensing and service” is categorized into high-tech knowledge-intensive industry. With unique patented technologies, M31 assists
customers in product development by lowering IC design risks, enhancing product specifications, reducing testing costs, increasing competitiveness, and accelerating the time-to-market. Therefore, in addition to providing R&D staff with professional training on IP development and offering various benefits to retain talents, M31 also recruits staffs with potentials, to carry on the knowledge, experience, and technology upgrades, which are essential for the sustainable operation of professional IP suppliers.

(3) Long-term partnership with leading foundries
The business of foundries is affected by crucial factors as process technologies, yield rate, delivery cycle time, and manufacturing costs. Leading process technology gives the foundry a competitive edge over others. Consequently, foundries will continuously compete on process technologies to attract orders from IC design houses. M31 completes the design and validation of core technologies at foundries, while foundries use M31 verified IPs to upgrade technology platforms, providing IC designers with comprehensive technology resources. This strategic alliance results in a mutually-dependent relationship between M31 and foundries, increasing M31’s IP penetration rate among foundries, IC design houses, and IC products, influencing the enhancement of sales and the expansion of market share.

5. Favorable and unfavorable factors for corporate development
(1) Favorable factors
i. Complicated SoC designs
IC designs become more difficult and complicated as electronic products are getting lighter, slimmer, and smaller with diverse functions, high-performance, low power consumption, and low cost. As a result, the market demand for innovative,
differentiated IP solutions increases day by day, bringing more challenges to M31 along with more opportunities as well.

ii. Excellent team with comprehensive technical services
M31 has an excellent R&D and supporting team of well-experienced engineers in Silicon IP, IC design, and design automation. In addition to assisting customers in product design and the production afterward, M31 offers IP product testing and the assistance in product certification.

iii. Geographic advantage
The majority of foundries are mainly located in East Asia, particularly in Taiwan, Mainland China, Korea, and Singapore. The market of IC design and sales has moved closer to Asia gradually, offering M31 a competitive edge over US and European competitors.

(2) Unfavorable factors and responding measures
i. The industry is promising, leading to the increasing number of competitors
● With the increasing complexity of IC designs, utilizing licensed IPs for IC designs has become the market trend, leading to a highly competitive IP industry in the future. Besides, in recent years, Mainland China is proactive in building local electronic supply chains, in which the semiconductor industry is a significant focus, bringing predictable competition pressures on Taiwan’s related supply chains.
● Responding measures
- Develop high value-added design service technologies; assist customers in the enhancement of product performance and competitiveness.
- Offer diverse services such as certification support; mass
production optimized test design; the discussion, estimation, and execution of customized technologies; solve technical issues for customers to build trust and recognition.

- Strengthen partnership with global clients by leveraging competitive advantages from high-end designs on advanced processes, differentiating from other competitors to reduce negative competition effects.
- Continuously develop the international market to increase the global market share.

ii. Low brand visibility
- Due to short-time incorporation, M31 has a compact company size with fewer product lines compared to European and American competitors.
- Responding measures
  - Continuously develop new product lines highly related to existing products, expanding current product lines, and then launch a variety of IP product portfolios. Thereby enhance product flexibility in sales, increase market share and penetration rate.
  - Utilize the internet, social media, and professional newspapers/magazines to gain popularity and technical expertise through releasing new technologies and applications.
  - Proactively participate in technology symposiums of foundries and IC design service companies to strengthen the visibility and connections with the client base.

(B) Main product licensing and production flows
1. Main products licensing flows
   (1) Foundation IP product line
      This product line offers Foundation IPs used in IC designs, including
Standard Cell Library, Memory Compilers, and I/O. Two business models are mainly adopted catering to different types of customers. One is serving wafer foundries, in which M31 assists foundries in new technology development for foundries' clients design use. The other is serving IC design houses directly, in which M31 supplies customized designs, meeting specific technology demand for specifications different from those usually offered by foundries.

(2) High-Speed Interface IP product line
This product line offers functional IPs operating as a data transmission interface, including USB 1.1/2.0/3.0/3.1/3.2, SATA 2/3, PCI Express G2/G3/G4, and MIPI M-PHY, MIPI C-PHY, and MIPI D-PHY.
When the aforementioned high-speed interface IP specifications are required in the developing project, M31 provides customers with relevant information for research studies, and further offers an “Evaluation Verification Board” enabling the evaluation of actual circuit performance. If everything goes well, the IP(s) will then be integrated into IC design, performing one of multiple functions.

2. Main products production flow
M31 is an IP provider without offering physical products. The scope of IP services is conducted by M31 R&D staff on the design, verification and revision. Relevant functional tests are generated by test chips to confirm the quality and integrity of all IPs.

(C) Supply of key materials
M31 is a professional Silicon IP developer. The principal business does not require supply of materials.

C. Human resources in the last two years, as of March 31st 2020
<table>
<thead>
<tr>
<th>Item</th>
<th>Year</th>
<th>2018</th>
<th>2019</th>
<th>2020 (As of March 31)</th>
</tr>
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<tbody>
<tr>
<td><strong>Number of Employees</strong></td>
<td>R&amp;D</td>
<td>135</td>
<td>152</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>Sales and Administrator</td>
<td>21</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>156</td>
<td>173</td>
<td>171</td>
</tr>
<tr>
<td><strong>Average Age</strong></td>
<td></td>
<td>38.28</td>
<td>37.97</td>
<td>36.42</td>
</tr>
<tr>
<td><strong>Average Years of Service</strong></td>
<td></td>
<td>3.45</td>
<td>3.61</td>
<td>3.71</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Ph.D.</td>
<td>4.50</td>
<td>2.89</td>
<td>2.92</td>
</tr>
<tr>
<td></td>
<td>Masters</td>
<td>64.10</td>
<td>66.48</td>
<td>65.5</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s Degree</td>
<td>26.92</td>
<td>26.01</td>
<td>26.32</td>
</tr>
<tr>
<td></td>
<td>Associate Degree</td>
<td>2.56</td>
<td>2.31</td>
<td>2.92</td>
</tr>
<tr>
<td></td>
<td>High School Diploma</td>
<td>1.92</td>
<td>2.31</td>
<td>2.34</td>
</tr>
<tr>
<td></td>
<td>Below Senior High School</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Unit: Person; %