



03

## Value Co-Creation

- Research, Development, and Design
- Intellectual Property Protection

- Customer Service

2024 Goals and Achievements

Goals

1. Continue integrating driver ICs and timing controllers to deliver comprehensive solutions to customers.
2. Expand the AMOLED and automotive driver IC product portfolios and broaden application coverage.
3. Further integrate driver ICs and touch controllers to enhance product value, improve touch performance, and support customers in accelerating mass production.
4. Continuously enhance core IP performance while reducing power consumption.
5. Advance the development of emerging display technologies such as mini LED and micro LED.

Achievements

1. Launched integrated solutions comprising driver ICs, timing controllers, and power management ICs for notebook, monitor, and automotive applications, with mass production progressively underway.
2. Continued to expand the OLED and automotive driver IC product lines and application coverage. In the smartphone segment, products supporting high resolution, foldable displays, and new panel technologies have entered mass production. Integrated OLED driver ICs for automotive applications have also been adopted by panel makers. In addition, new automotive solutions — such as bridge ICs and driver ICs featuring Local Dimming — are gradually being ramped into mass production.
3. Next-generation flexible OLED TDDI for wearables featuring ultra-low power consumption and optimized performance has been successfully launched. Automotive TDDI integrates advanced features such as Local Dimming and Cascade, and related products have also entered mass production. Meanwhile, LTDI stylus and active pen controller ICs have been adopted in notebook applications and are being deployed by customers.
4. Developed LVDS IP supporting up to 200 MHz in response to the growing demand for high refresh rate monitors. Continued to optimize OLED Demura technology to improve low-brightness visual effects, partial screen updates, triple-fold displays, and zone-by-zone compensation. Low-power circuit design was implemented to further reduce total power consumption.
5. Successfully developed new driver ICs tailored for Micro LED display technology, which have been adopted in wearable and AR applications. Development is also underway for next-generation Micro LED driver ICs for automotive use.

Sustainability Policy

Value Co-Creation Topic of Concern: R&D and Product Design Products and Services

Impact on Raydium: R&D strategy and product design are critical to both customer and company competitiveness. By continuously investing in R&D resources, Raydium aims to deliver market-leading products with enhanced competitiveness, thereby creating greater value for both customers and the company.

Current Management Approach	Future Initiatives and Strategic Directions	Management Policy
<ol style="list-style-type: none"> <li>1. Extensively gather market intelligence and engage in technical discussions with customers to develop technology and product roadmaps.</li> <li>2. Establish industry-academia collaboration programs with major domestic universities to leverage academic R&amp;D capabilities, accelerating and expanding innovation outcomes.</li> <li>3. Intellectual property protection: R&amp;D outputs are reviewed by the company's internal committee and protected through patent applications or trade secret mechanisms.</li> </ol>	<p>R&amp;D activities require substantial investment in manpower, resources, and time. To respond to rapidly evolving market dynamics, it is essential to stay closely attuned to market trends and promptly adjust R&amp;D directions and product planning to maintain technological and product competitiveness. In addition, early deployment of intellectual property strategies in emerging and innovative technologies is critical to establishing technical barriers and enhancing corporate competitiveness.</p>	<ol style="list-style-type: none"> <li>1. Conduct regular technical exchanges with customers and end-brand clients to gather broad market insights and allocate R&amp;D resources from the early development stage.</li> <li>2. Strengthen technical collaboration with major domestic universities to promote shared R&amp;D outcomes.</li> <li>3. Encourage innovation and invention, and reinforce intellectual property deployment and capabilities.</li> <li>4. Allocate 15% to 20% of annual revenue to R&amp;D activities each year.</li> </ol>
2025 Goals	Mid-Term Goals (Within 3 Years)	Long-Term Goals (Within 5 Years)
<ol style="list-style-type: none"> <li>1. Continue integrating high-efficiency power management ICs, driver ICs, and timing controllers to deliver comprehensive solutions to customers.</li> <li>2. Further expand the AMOLED and automotive driver IC product lines and their application scope.</li> <li>3. Continue integrating driver ICs with touch controllers to enhance product value, improve touch performance, and support customers in accelerating mass production.</li> <li>4. Continuously improve core IP performance and reduce power consumption.</li> <li>5. Advance the development of emerging display technologies such as mini LED and micro LED.</li> <li>6. Develop next-generation energy-efficient display technologies.</li> </ol>	<ol style="list-style-type: none"> <li>1. Expand AMOLED and automotive driver IC product portfolios and broaden application coverage.</li> <li>2. Continuously reduce product power consumption through process and design optimization.</li> <li>3. Enhance image processing algorithms to improve display quality.</li> <li>4. Strengthen touch processing algorithms to improve touch performance and support customers in accelerating mass production.</li> </ol>	<p>Continue to pursue technological innovation and co-create value with customers, with a commitment to becoming a global leader in display-related integrated circuit solutions.</p>

2024 Goals and Achievements

Goals

Achieve a customer satisfaction score of 9.0.

Achievements

The average customer satisfaction survey score in 2024 was 8.9, falling short of the original target. In response to the feedback collected through the survey, three improvement actions have been formulated and implemented:

- (1) enhance the speed and quality of technical support;
- (2) shorten the product development cycle to improve responsiveness; and
- (3) strengthen product quality.

Sustainability Policy

Value Co-Creation Topic of Concern: Customer Satisfaction

Impact on Raydium: "Customer First" and "Value Co-Creation with Customers" are core elements of Raydium’s sustainability culture. We place strong emphasis on listening to our customers, gaining deep insights into their needs, and responding with fast and precise products and services — creating win-win value and driving long-term growth together.

Current Management Approach	Future Initiatives and Strategic Directions	Management Policy
<ol style="list-style-type: none"> <li>1. Conduct annual customer satisfaction surveys to ensure alignment between customer perception and internal understanding.</li> <li>2. Review customer feedback on a quarterly basis to continuously improve service quality.</li> <li>3. Establish localized sales and technical support teams.</li> <li>4. Host regular quarterly technical exchange meetings to enhance collaboration with customers.</li> <li>5. Periodically exchange market intelligence with customers to maintain strong market awareness.</li> <li>6. Conduct weekly reviews of customer complaint handling to ensure timely resolution.</li> <li>7. Address customer issues arising from ongoing projects in real time to safeguard customer satisfaction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Establish a customer-oriented quality system and management philosophy, utilizing objective evaluation methods to comprehensively assess customer satisfaction across product development, quality, and services, followed by internal review and continuous improvement.</li> <li>2. Provide responsive and tailored services for customers in each region by deploying experienced on-site technical support personnel and forming dedicated sales and technical support teams for key accounts.</li> <li>3. Increase the degree of product customization and maintain robust, multidirectional communication channels to gain deeper insights into customer needs.</li> </ol>	<p>Continue to strengthen technological capabilities, product quality, services, and overall competitiveness to enhance customer satisfaction.</p>
2025 Goals	Mid-Term Goals (Within 3 Years)	Long-Term Goals (Within 5 Years)
Achieve a customer satisfaction score of 9.0	Achieve a customer satisfaction score of 9.0	Achieve a customer satisfaction score of 9.0

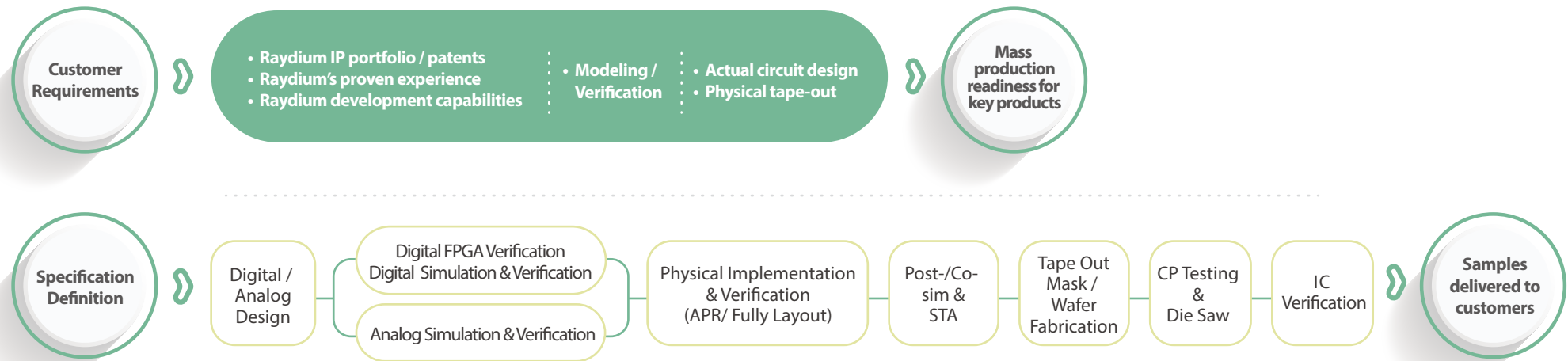
From the perspective of global and domestic industry trends, semiconductor IC design companies are increasingly moving toward high-end specifications and advanced technological innovation. As vertical and horizontal integration intensifies across the industry value chain, overall competitiveness is improving — but so are competitive pressures and threats. As such, talent cultivation, core technology development, and strategic industry consolidation have become critical to enhancing Taiwan’s semiconductor industry competitiveness.

Raydium places strong emphasis on medium- and long-term development strategies and continues to collaborate closely with upstream and downstream partners to drive technological advancement. We prioritize early-stage development investment to gain a lead in both profitability and market share, while proactively cultivating talent and advancing next-generation product development. These efforts aim to secure a first-mover advantage and support synchronized growth with the broader industry.

### 3.1 Research, Development, and Design

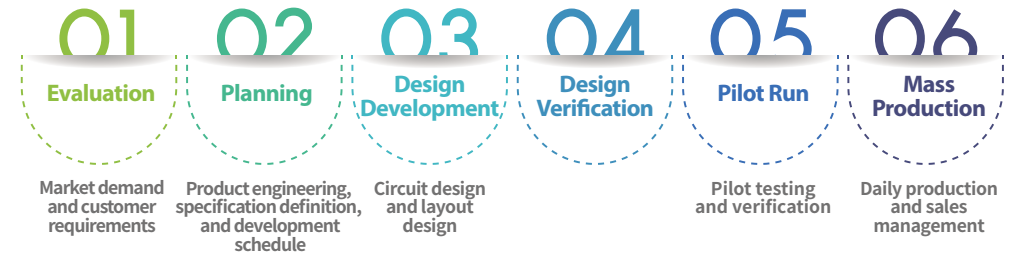
#### 3.1.1 Raydium IC Design Flow

In 2024, Raydium's consolidated R&D expenditure totaled NT\$3,957.835 million, accounting for approximately 16% of its revenue. The product development team has extensive experience in the development of display driver ICs, mixed-signal ICs, and system control ICs.



### 3.1.2 Project Development Management Procedure

To deliver products that meet customer expectations, Raydium has established a project development management procedure in accordance with its quality management system. This process ensures that all data and documentation generated during the development cycle are properly recorded, allowing us to fully meet customer requirements and preserve valuable project experience for continuous improvement.



### 3.1.3 Recent R&D Achievements

Raydium’s R&D team adheres to the principle of technological independence and has long focused on the development and integration of analog circuit design, mixed-signal circuit design, and touch system technologies. By cultivating top talent across various domains and accumulating solid R&D experience, we have continued to develop a wide range of driver ICs, touch controller ICs, timing controller ICs, and power management ICs with diverse functions and specifications. In parallel, we are proactively advancing integrated solutions — including TDDI (Touch with Display Driver Integration), TED (Touch Embedded Driver), and LTDI (Low Temperature Display Integration) — as well as next-generation technologies such as Micro LED and Mini LED, aiming to maintain our leading position in the industry.

The following technologies have been developed and implemented in mass production over the past five years:

Year	R&D Results throughout the Years	Applied Fields
	AMOLED display driver IC supporting LTPO flexible display and Multi-frame rate switching function	Mobile phone
2022	AMOLED pixel base Overdrive display driver IC	Mobile phone
2022	AMOLED full screen De-Burn-in display driver IC	Mobile phone
2022	AMOLED display driver IC for laptops	NB
	Micro LED knob display driver IC for vehicles	Automotive
	Micro LED wearable display driver IC with low power consumption	Wearable

Year	R&D Results throughout the Years	Applied Fields
	AMOLED touch controller IC for foldable mobile phone with integrated active stylus	Mobile phone
	AMOLED touch controller IC for laptops and tablets with integrated active stylus	NB / Tablet
2020	Scan type LED driver IC for local dimming LED backlight	Automotive
2022	Up to 1000 zones local dimming bridge IC with eDP interface for large size and high resolution application	Automotive
	Integrated TCON and touch control driver IC (TDDI) for in-cell touch panels	NB
	High-precision 4ch LED driver IC for local dimming	MNT/NB

Year	R&D Results throughout the Years	Applied Fields
	LTDI that supports multiple active stylus protocols	NB
	High-speed P2P interface driver IC for gaming notebooks	NB
	Ultra-high-speed (4 Gbps) low power consumption display driver IC for TV	TV
	AMOLED RAM-less display driver IC	Mobile phone
2	LTPO AMOLED ultra-low power consumption (1Hz) display driver IC	Mobile phone
0	AMOLED WQHD display driver IC	Mobile phone
2	AMOLED high pin count display driver IC	Mobile phone
3	AMOLED multi-frame overdrive compensating technology for delayed luminescence panel	Mobile phone
	AMOLED wearable TDDI with ultra-low power consumption	Wearable
	High-resolution bridge IC with eDP interface and 1,600 zones local dimming for automotive display	Automotive
	Level Shifter IC for Touch-Enabled Laptops	NB
	Touch Controller IC (MCU) Supporting Multiple Active Pen Protocols	NB
2	Timing Controller and Driver IC (TED) Supporting Overdrive (OD) Compensation	NB
0		
2		
4	High-Speed Point-to-Point Interface Driver IC with Multi-Level Delay Compensation	TV/MNT

Year	R&D Results throughout the Years	Applied Fields
	AMOLED Tri-Fold Display Compensation by Display Region and Refresh Rate	Mobile phone
	AMOLED RAM-less (Mux1:1 @ 144Hz) Display Driver IC	Mobile phone
	AMOLED LTPO RAM-less (Mux1:2) Display Driver IC	Mobile phone
	AMOLED WQHD Display Driver IC	Mobile phone
	AMOLED eDP Interface Display Driver IC	Mobile phone
	AMOLED Display Driver IC for Wearables with Tandem and PLC Applications	Wearable
2	AMOLED LVDS Interface TED Automotive Display Driver IC	Automotive
0	Automotive Low-Power Touch and Display Integration Driver IC (TDDI)	Automotive
2		
4	Touch and Display Integration Driver IC (TDDI) with Integrated Local Dimming	Automotive
	Display Driver IC (DDI) with Integrated Local Dimming	Automotive
	Timing Controller (TCON) IC with Integrated De-Mura Function	Automotive
	HUD Data Transparency Detection Technology	Automotive
	Low-Power Display Driver IC for Laptops	NB
	Bistable LCD Display Driver IC	EPD
	Timing Controller (TCON) IC for Bistable LCD Displays	EPD

### 3.1.4 Product Technology Recognition

Raydium was honored with the Gold Panel Award 2024 in the “Materials and Components” category at Touch Taiwan 2024 – Smart Display Exhibition. The award recognized our bistable cholesteric liquid crystal data/scanning driver and timing controller IC solution (CH-LCD Driver IC/TCON). Hosted by the Taiwan Display Union Association (TDUA), this award aims to encourage display industry players to develop innovative and competitive component and product technologies that elevate the industry’s image and global competitiveness.

The awarded solution represents Raydium’s comprehensive offering for cholesteric liquid crystal displays (CH-LCD), providing high-resolution and fast refresh performance essential to the advancement of color electronic paper technology. It delivers outstanding image quality and supports a variety of application scenarios, including partial image updates, multi-directional scan timing, and handwriting input, delivering a paper-like user experience. This solution ultimately stood out to receive the Outstanding Product Technology Award.

A key innovation of cholesteric liquid crystal technology lies in its ultra-low power consumption. Unlike conventional displays, CH-LCDs do not require backlighting and instead rely on ambient light reflection to achieve full-color display. The bistable nature of the material allows images to remain visible without continuous power supply, significantly reducing energy consumption. This technological breakthrough aligns with ESG goals by promoting sustainability, energy efficiency, and carbon reduction.

In addition to our strong presence in the LCD and AMOLED driver IC markets, Raydium continues to invest in next-generation energy-saving display technologies. We remain committed to driving innovation, delivering high-quality products and services to our customers, and working alongside industry partners to achieve shared ESG objectives.



### 3.1.5 Industry-Academia Collaboration Projects

To accelerate innovation in forward-looking technologies, Raydium has established collaborative research projects with leading domestic universities. By leveraging academic research capabilities, we aim to enhance and expand the outcomes of our R&D efforts.

Partner University	Project Title	Project Duration
National Yang Ming Chiao Tung University	Establishment of LED-display Burn-in Models and Digital Compensation Circuit to DeBurn-in Professor Chun-Wei Su	2023/09/01 ~ 2025/02/28
National Yang Ming Chiao Tung University	Development of Low-Parasitic Capacitance Electrostatic Discharge (ESD) Protection Circuit Design	2023/09/01 ~ 2025/02/28
National Cheng Kung University	Design of CMOS Micro-LED Pixel and Gate Driver Circuit with Leakage Prevention Mechanism on Silicon Substrate /Professor Chih-Lung Lin	2022/08/01 ~ 2025/08/31
National Taiwan University	Design of 8.1Gbps Equalizer and Clock and Data Recovery Circuit for eDP Applications Professor Shen-Yuan Liu	2023/10/01 ~ 2025/09/30

### 3.1.6 Participation in Industry Associations

To stay ahead in a fast-evolving technological landscape and highly competitive market, Raydium actively engages with domestic and international professional organizations. Through close collaboration and knowledge exchange with industry peers, we are able to swiftly grasp emerging technology trends and market dynamics, thereby continuously enhancing our competitiveness.

Association	Year Joined	Association	Year Joined
VESA (Interface Standards for the Display Industry)	2021	AI on Chip Taiwan Alliance (AITA)	2021
Taiwan Advanced Automotive Technology Development Association (TADA)	2021	SoC Center, National Taiwan University System	2021
TOSIA – Smart Display and MicroLED Special Interest Group (SIG)	2021	MIPI Alliance	2021
Society for Information Display (SID)	2019		

## 3.2 Intellectual Property Protection

To strengthen intellectual property (IP) protection and ensure close integration with product development and technological innovation, Raydium has established internal IP management regulations aimed at maximizing the value of its technologies and products. The Company conducts regular reviews and oversight of technology development and product planning to enhance the quality of its IP portfolio and proactively prepare for potential risks and challenges.

### 3.2.1 Management and Incentive Mechanisms

In addition to stipulations outlined in employment and confidentiality agreements, Raydium has established Intellectual Property Proposal and Review Guidelines, as well as an employee IP incentive program. These mechanisms aim to safeguard the Company’s rights and R&D achievements, foster innovation, and support long-term development and technological leadership. Key measures include:

#### 1. Patent Management

In accordance with the Company’s “Intellectual Property Proposal and Review Guidelines,” a structured review mechanism has been established and integrated with a digital patent management system to enhance the efficiency and transparency of IP administration. The system covers the full lifecycle of patent management.

#### 2. Trade Secret Protection

Trade secret protection is a shared responsibility across the Company. Raydium requires all employees to sign an Employment Agreement that clearly defines intellectual property ownership and confidentiality obligations. For collaborations with external parties — including industry, government, and academia — Confidentiality Agreements are executed to ensure proper protection of proprietary information. Commercial secrets, technical know-how, and R&D results are all safeguarded in accordance with reasonable protection standards.

#### 3. Trademark Registration

To protect intellectual property creations, Raydium registers trademarks in accordance with applicable government regulations for marks that reflect the superiority, uniqueness, or specific purpose of the Company’s products.

#### 4. External Publication of Copyrighted Works

When employees intend to publish works related to their job responsibilities, such materials must first be submitted for internal review. The decision to proceed with external publication is made based on the outcome of the review process.



### 3.2.2 Implementation Results

Intellectual property-related matters were reported to the Board of Directors on August 6, 2024.

Key actions carried out in recent years include:

1. Establishment of the Intellectual Property Management Guidelines, aligned closely with business objectives.
2. Completion of electronic document management and archival system in 2022.
3. Implementation of a dynamic patent portfolio monitoring mechanism in 2022.
4. Inclusion of intellectual property training in new employee onboarding programs.
5. As of the end of December 2024, the following results have been achieved:
  - (1) Valid patents granted in various countries: 333 cases; patents pending: 72 cases.
  - (2) Trademark registrations across multiple countries: 11 cases.

#### Number of Valid Patents and New Applications

Number of Cases	TW	CN	US	Total
Cumulative Valid Patents	162	89	82	333
Patents Granted in 2024	18	12	1	31
Patent Applications Filed in 2024	8	5	1	14

#### Annual Patent Incentives

2022	2023	2024
\$1,162,368	\$952,166	\$674,000
Amount (NTD)		

## 3.3 Customer Service

### 3.3.1 Ensuring Product Quality

Raydium enforces strict requirements for the selection of raw materials and adheres to internationally recognized environmental and quality standards to prevent the use of substances that may be harmful to human health or the environment.

Guided by a customer-oriented approach and risk-based thinking, Raydium has established a comprehensive quality management system and obtained ISO 9001 certification in 2006. Internal audits are conducted annually, and management review meetings are held to report system performance to the Company's senior leadership, ensuring the effectiveness and suitability of the system.

In 2012, Raydium further obtained ISO 14001 certification for its environmental management system. During the product development and evaluation stage, the Company requires the use of eco-friendly materials that comply with RoHS, halogen-free, REACH, and China VOC regulations to minimize environmental impact and protect customer health.

In 2020, Raydium achieved ISO 26262 process certification. For automotive products, the Company follows the ISO 26262 functional safety standard for IC design and development and conducts related reliability testing in accordance with the AEC-Q100 standard to reinforce product liability assurance.

Raydium is committed to continuous improvement and excellence, striving to build a high-quality and high-efficiency service system that meets the diverse needs of our customers.



### 3.3.2 Enhancing Customer Satisfaction

Raydium has established a customer-oriented quality system and management philosophy. Through objective testing and evaluation mechanisms, the Company conducts comprehensive analyses of customer satisfaction with its products and services. These insights help identify gaps between customer expectations and actual performance, serving as a basis for operational decision-making and supporting the Company’s goal of sustainable development.

We place great importance on customer feedback. Each year, every business unit conducts customer satisfaction surveys targeting all or key customers, focusing on three core dimensions: product development, service, and quality.

To gain deeper insights into customer needs and expectations, we redesigned the questionnaire in 2024 to gather more comprehensive and targeted feedback. The average customer satisfaction score for the year was 8.9. While this did not meet our internal target of 9.0, it demonstrates tangible progress in critical areas.

As global market competition intensifies, customer expectations for IC feature integration, quality, technical support, and cost efficiency continue to rise — posing an ongoing challenge for us. To maintain our competitive edge, we are committed to driving product innovation, enhancing integration and functionality, and meeting evolving customer needs.

We will also continue to strengthen our quality management system to ensure every product meets stringent quality standards. At the same time, we aim to expand technical support capabilities and provide customers with more comprehensive and professional solutions to technical challenges. Through flexible cost control strategies, we seek to create win-win outcomes for both parties.

In this rapidly changing market environment, we will continue to adjust our strategies based on customer feedback and expectations, with a focus on improving service quality. Through these efforts, we aim to further increase customer satisfaction and become the most trusted partner for our customers.

**Note: Key customers refer to the top three customers or those with significant potential for strategic collaboration.**

