Intel's Acquisition of Tower Semiconductor: Will Foundry be the Future of Intel

Ruixin Shen

School of Asian Studies, Beijing Foreign Studies University, Beijing, 100089, China

20080042@bfsu.edu.cn

Abstract. Under the background that the semiconductor industry receive attention due to the fierce international competition, this paper analyzes the event of Intel's acquisition of Tower Semiconductor, lists the development situation and acquisition objectives of Intel, and analyzes the impact of this acquisition through SWOT. Although this acquisition is in line with Intel's IDM2.0 strategy of developing foundry business and improving manufacturing capacity, due to the limitations of technology, market share and other factors, Intel cannot rely on foundry business for future development and should still take technological innovation as the top priority. At present, there is no paper on the systematic analysis of Intel's acquisition, so the purpose of this paper is to clarify the significance of this acquisition and try to put forward suggestions for Intel's leaders. For Intel, it needs to take technological innovation as the development orientation and further integrate its internal industrial layout in order to stand out in the fierce competition in the semiconductor industry.

Keywords: Intel, Foundry, Acquisition, Semiconductor Industry.

1. Introduction

Semiconductor is the core of information technology industry, as well as the strategic, basic and leading industry that supports economic and social development and guarantees national security. Its development and technical level have become one of the important symbols to measure a country's industrial competitiveness and comprehensive national power.

Semiconductor products are mainly used in computer, household appliances, digital electronics, transportation, aerospace and many other fields. In recent years, with the continuous expansion of the semiconductor application field along with the progress of science and technology, emerging fields such as 5G, artificial intelligence, cloud computing and drones are booming, bringing new opportunities for the semiconductor industry. As the semiconductor industry develops more advanced products and process technologies to be applied to the terminal industry, the industrial intelligence software used in the industry has also developed rapidly.

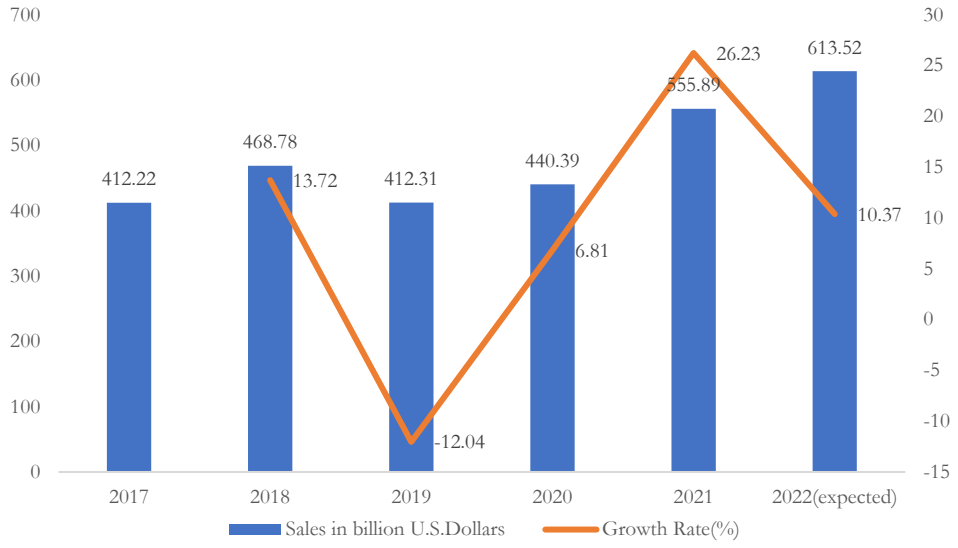


Figure 1. Semiconductor industry sales worldwide

Photo credit: Original

Data source: Data in this figure comes from Statistia [1].

Intel, an American technology company founded in 1968, is the world's largest semiconductor chip manufacturer by revenue and also conducts semiconductor research and development. Most of its business is in the PC market, as many personal computers have Intel Core processors. In 1971, Intel developed the first microprocessor, bringing a revolution in computing that has changed the world. It was known all over the world in 1981 when its chips were used in the first PC produced by IBM. But as the technology updates, Intel is facing fierce competition from other chipmakers and has seen its market share plunge. After years of failing to enter the mobile market, Intel has given up on mobile but to focus on data centers and the 5G era. In 2017, Intel acquired Mobileye to expand its autonomous driving business. In 2021, Intel announced IDM 2.0 strategy to build its own semiconductor foundry services. Although Intel is trying to innovate in several areas, due to the decline in demand for PC, its revenue and profit continued to decline in the first three quarters of 2022. In the third quarter, Intel's revenue was only $15.338 billion, down 20% from the same period last year [2].

Tower Semiconductor, founded in Israel in 1993 and later listed on the Nasdaq, is a semiconductor contract manufacturer that produces advanced analog integrated circuits and provides integrated circuit (IC) manufacturing platforms for growing markets including industrial, automotive, mobile devices, medical, aerospace and defense. It has manufacturing facilities in Israel, California, Texas and Japan. With a rich history, Tower has established a range of analog foundry solutions based on deep customer relationships, developing global manufacturing capabilities.

On February 15, 2022, Intel and Tower Semiconductor announced a definitive agreement under which Intel will acquire Tower for $53 per share in cash, with a total enterprise value of approximately $5.4 billion [3]. The transaction is expected to be immediately accretive to Intel's non-GAAP earnings per share, so Intel intends to fund the acquisition with cash from its balance sheet. The acquisition greatly advances Intel's IDM 2.0 strategy, as the company further expands its manufacturing capabilities, global markets and technical capabilities to meet industry needs. Tower's technology and manufacturing experience is highly complementary to Intel's capabilities in leading-edge processes, enabling the combined company to offer a wider range of products to customers at scale. With the addition of Tower, Intel is strongly positioned to bring even more value to customers in the foundry market.

On April 25, 2022, Tower shareholders approved Intel's acquisition of Tower at the extraordinary general meeting [4]. The acquisition is a Reverse Triangle Merger. Under the merger agreement, Intel's newly formed Merger Sub in Israel will merge into Tower. Following the merger, Merger Sub is thus terminated and will no longer exist, and Tower will continue to exist as a wholly owned subsidiary of Intel. After the deal, which is expected to close in the first quarter of 2023, Intel's goal is for the two companies to form a fully integrated foundry business.

This article will analyze the acquisition of Tower Semiconductor by Intel, and clarify the possible impact of this acquisition on the company and the industry by sorting out the purpose of the acquisition and the development situation of Intel.

The rest of this paper is organized as follows: Part 2 is about the objectives of this acquisition, Part 3 uses SWOT to analyze the potential strengths, weaknesses, opportunities and threats of Intel's acquisition of Tower, and Part 4 is about conclusion and suggestions for the company's leaders.

2. Objectives of the Acquisition

2.1. Advance Intel's IDM2.0 Strategy

At present, the entire semiconductor manufacturing industry is centered in Asia, 87% of which are concentrated in Taiwan, Chinese Mainland and South Korea, 7% in the United States and 6% in other countries. As a result, Intel plans to build a manufacturing network based on the United States and Europe through IDM2.0 strategy to reduce the entire industrial chain's dependence on Asia.

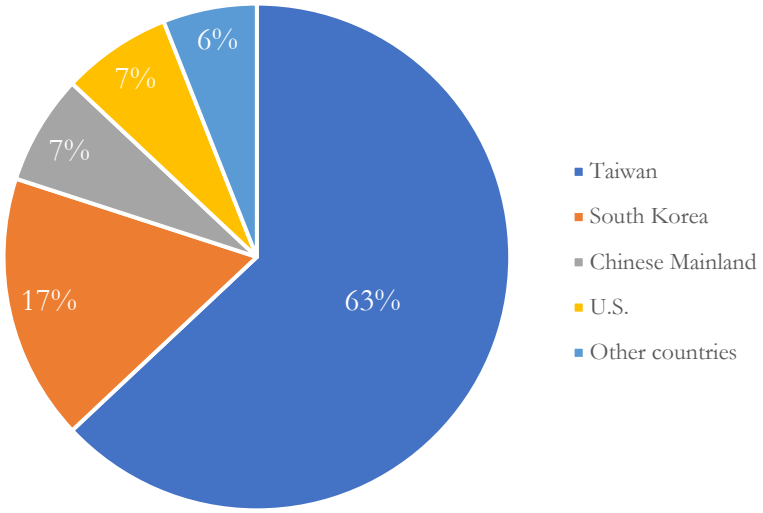


Figure 2. Global foundry market share

Photo credit: Original

Data source: Data in this figure come from Visual Capitalist [5].

Under the IDM2.0 strategy, Intel is required to strengthen internal manufacturing and expand the proportion of foundry business. For now, Intel has third-party suppliers for its communications and graphics chipsets. However, further integration and cooperation is needed, and the scale of the cooperation is expected to be expanded to cover the production of a variety of wafers with advanced process technologies at the core. It also needs to optimize product cost, performance and supply capacity to bring higher and larger scale products to the market to meet the global semiconductor demand. In the future, Intel plans to manufacture most of its products internally, so it will have more independent control over product development and mass production and delivery, and further improve its supply capacity and revenue. In addition, Intel will build a globally connected internal factory to ensure the leading position in the process by accelerating the mass production of EUV technology and 7nm semiconductors. Another advantage in technology is that Intel has the world's leading differentiated packaging technology. In the semiconductor market, customization and differentiation are also a big selling point of products, which is more conducive to establish a leading position.

As the target company of the acquisition, Tower Semiconductor has technical advantages in RF, SiGe and industrial sensors, with more than 100 in-house patents [6]. Tower Semiconductor mainly serves the mobile, automotive and power markets, providing cross-regional foundry business, and its facilities throughout the United States and Asia, for fabless companies and IDM companies to provide services. Also, it has rich experience in foundry manufacturing and accumulated a wide range of customers over the years of operation. Buying Tower will help boost Intel's manufacturing capacity and make most of its products in-house, rather than subcontracting them to other factories. This change allows Intel to control product development and delivery and further increase revenue and supply. With the implementation of IDM2.0, Intel can successfully improve its competitiveness and establish a leading position in the industry.

2.2. Gain Market Attention and Win More Investment

At present, the whole semiconductor industry pattern has undergone a significant change. The competition of the semiconductor and technology industry in China and the United States has intensified, and the rapid rise of wafer foundries in Taiwan, Japan and South Korea has led to the "Matthew effect" of the whole semiconductor industry becoming more and more serious. The

powerful companies seize the opportunity in the new process changes, and the weaker ones lose the opportunity and will only be crowded out of the market. In chipmaking and advanced technology, Intel is not only being caught up in the consumer market, it is also losing market share in the capital markets. Even Apple is abandoning Intel and preparing to develop its own chips. In addition, the US government is significantly adjusting the layout of the global value chain, changing the past concept of global industrial division of labor that subcontracts the manufacturing and only keeps the core and advanced technologies and the high-profit links in the US.

The US government discovered that technology was not the only way to maintain its semiconductor advantage, and that faster technological innovation was possible wherever manufacturing was located. Manufacturing can become the power to control the entire industry chain, as the production crisis in Taiwan Semiconductor Manufacturing Co. Therefore, the United States is giving more resources to local chip manufacturers politically and economically to reverse the current situation of domestic manufacturing shortage. Especially after Congress passed the America's Chip Act in July, which is about a $280 billion dollar spending package and includes $39 billion in tax benefits and other incentives to encourage American companies to build new chip manufacturing plants in the US [7].

Therefore, Intel quickly acquired Tower, announced capacity expansion in Arizona and New Mexico, and planned to build a large new plant in Ohio, which immediately demonstrated the execution power of capacity expansion to the US government, the public and the industry. The expansion of production can excite the public who are worried about the advantages of the United States, and provide the public with a pleasant feeling that the United States is recovering its national power. Only in this way can the American society and the American industry immediately increase the confidence and support for the local chip manufacturers, and can the government pour more resources into Intel.

3. Analysis of the Acquisition

3.1. Strengths

3.1.1 Leading Technology in the Industry

Intel is the only leading company with both R&D and manufacturing in the United States. It not only holds the most cutting-edge technology, but also sets the standard in the chip industry, spending a lot of budgets on R&D and innovation every year. AMD, Intel's rival in the chip industry, has grabbed some of the market by cost performance advantage, but its chip technology is still a little behind Intel and has not yet developed enough to challenge Intel's position. The target company of the acquisition, Tower Semiconductor, also has rich knowledge and patents in related fields, which will help Intel to improve its technology.

3.1.2 Improvement of OEM Services

Intel, which has a solid background in software, chip manufacturing, packaging and many other aspects, bought Tower Semiconductor because of the companies and products it works with. The customer group, technology and production experience accumulated by Tower Semiconductor over the years are necessary for Intel to develop foundry industry. This is exactly the intent of Intel's new IFS division to expand third-party foundry capacity. In addition, Tower has a considerable share of military business. After the acquisition, Intel can obtain more military orders and even more supporting government resources.

3.1.3 Synergies of M&A

Intel has done a lot of mergers and acquisitions over the past decade, and while that has taken a bite out of its cash flow, the synergies will come through. Intel is also showing its competitiveness in smartwatches and artificial driving. With the acquisition of Tower Semiconductor, Intel has taken an

important step in the field of OEM, making the business operation more comprehensive and the industrial chain more perfect.

3.2. Weaknesses

3.2.1 With Premium Acquisition, the Cost is Difficult to Recover

There is a large gap between the current revenue and profit of Tower Semiconductor and Intel. This acquisition cannot greatly improve the share price and market value of Intel, and even lead to the overall profit margin reduction in the short period. It is difficult to predict the contribution to the performance in the future.

3.2.2 Manufacturing Technology is Still Relatively Backward

At present, 5nm and 7nm products with the highest level of wafer foundry have been the main products of TSMC, and 3nm and 2nm products are also in preparation for mass production. However, Intel has not been able to manufacture products below 3nm, and the manufacturing technology level is far lower than that of TSMC. Therefore, it is completely unable to compete with TSMC in the high-end market. With a market share of less than 2%, Tower Semiconductor is no match for TSMC's 50% and plays a limited role in helping Intel compete in the contract manufacturing industry [5].

3.3. Opportunities

3.3.1 Changes of Semiconductor Industry Chain

Tight capacity is one of the most frequent words across the semiconductor industry these days, and supply is far less than demand is likely to be for years to come. So, the timing is right for Intel to launch the wafer foundry service. Now is the time node of the whole industry transformation and the global economic turmoil under the epidemic has severely strained the upstream and downstream capacity of wafer. At this time, opening foundry service can not only relieve part of the capacity pressure, but also increase the internal revenue and business model, and improve the manufacturing process at the same time.

3.3.2 Localization of American Manufacturing Industry

After the United States realized the linkage role of high-end manufacturing and technological progress, as well as the importance of high-end manufacturing for supply chain security, the global semiconductor supply chain was divided into several sections by region. Whereas many American and European chip design firms used to place their orders in Asia, the American government is keen to reduce its reliance on Asian supply chains by making the manufacturing locally. This means that the semiconductor industry has become more regionalized with production capacity as its core. So, with strong government support, Intel not only completed its acquisition of tower semiconductors to add capacity, but also invested $20 billion to build a wafer processing plant in Ohio, expected to open in 2025, to compete with TSMC [8].

3.4. Threats

3.4.1 Competitive Advantage is Under Threat

Intel, while still a leader in the industry, was under increasing competitive pressure from outside and threatened to decline. In the third quarter of 2022, Intel faced revenue losses in its two core businesses, client computing and data center artificial intelligence. And the foundry business is not progressing smoothly at present, either. The expected 7nm products using EUV technology have not made progress, the technology and yield have suffered certain doubts, and even the relevant business leader has resigned. If these problems cannot be effectively solved after the acquisition, Intel's foundry business will face a crisis of loss.

3.4.2 Lower Demand from Upstream Customers

The demand of PC, mobile phone and other upstream customers is declining and many wafer foundry orders are reduced. As a result, the "Matthew effect" is intensified, and customers are concentrated in the industry leaders, which will undoubtedly have a negative impact on the new companies such as Intel.

3.4.3 Followers Increase

Intel responded to the U.S. government's call to increase manufacturing capacity through acquisitions and received government subsidies. Other companies can follow Intel's acquisition strategy, leading to the concentration of the foundries in the United States, resulting in monopoly and more intense competition.

4. Conclusion

Under the background that the semiconductor industry has attracted much attention due to the fierce international competition, this paper analyzes the event that Intel announced to acquire Tower Semiconductor at $53 per share on February 15, 2022, sorts out the development situation and acquisition objectives of Intel, and analyzes the advantages, disadvantages, opportunities and threats brought by the acquisition through SWOT. It can be analyzed that Intel's acquisition of Tower Semiconductor is in line with Intel's current IDM2.0 strategy of developing foundry business and improving its manufacturing capacity. And Tower's expertise, location and deep customer relationships will help expand Intel's foundry products and shift Intel's business model toward a greater emphasis on manufacturing. The deal will allow Intel to open up new opportunities with current and future customers at a time of unprecedented demand for semiconductors. However, due to the limitations of technology, market share and other factors, Intel cannot compete with the industry leader TSMC in the OEM industry, and the OEM industry will not become the main source of revenue for Intel. Therefore, Intel's future development should still be guided by its long-standing technological innovation. The significance of developing OEM business is to enable Intel to form an independent industrial chain and help it realize independent design and manufacturing.

For company leaders, they should recognize the gap with other competitors, make it clear that the core content of semiconductor industry competition is technology, and strengthen the shortcomings of Intel. Even with government support, Intel cannot quickly become the dominant player in the semiconductor industry with a single acquisition and must develop innovation steadily. When the acquisition of Tower Semiconductor is officially completed in the first quarter of 2023, Intel is supposed to further integrate its internal industrial layout and clarify its development direction to achieve better results in the future competition in the semiconductor industry.

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