

A Financial Analysis and Valuation of NVIDIA

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Abstract: This paper analyzes the financial performance and strategic positioning of NVIDIA, a leading player in the semiconductor industry. NVIDIA's market value has surged in recent years, largely driven by advancements in artificial intelligence (AI) and the increasing demand for high-performance computing. The company's data center division has experienced substantial revenue growth year-on-year, fueled by the widespread adoption of AI-driven applications, cloud computing, and machine learning technologies. However, NVIDIA faces several challenges, including intense competition from industry rivals such as AMD and Intel, geopolitical risks—particularly concerning trade tensions with China—and regulatory scrutiny over its attempted acquisition of ARM. To assess NVIDIA's competitive landscape, this paper employs both SWOT and PESTLE analyses. The SWOT analysis highlights the company's strong brand reputation, technological leadership, and innovation capabilities while also identifying weaknesses such as its heavy reliance on GPU sales and supply chain vulnerabilities. The PESTLE analysis further examines external factors shaping NVIDIA's operations, including regulatory developments, economic shifts, and environmental considerations. This comprehensive evaluation provides insight into NVIDIA's market positioning and future growth potential in a rapidly evolving industry.

Keywords: Financial Performance, Strategic Positioning, Semiconductor Industry.

1. Introduction

Nvidia, a company that develops smart chips, has seen tremendous growth over the past year due to the rise of the artificial intelligence industry. Its stock price has soared 240%, and its market value reached \$2 trillion last month, making it the third largest technology company in the United States, second only to Apple and Microsoft [1]. But Nvidia's development has also been hindered by many obstacles, especially in terms of government policies. On December 9, 2024, China has launched an investigation into US computer chip maker Nvidia, accusing it of violating antitrust laws. These two events have had an impact on Nvidia's market value and stock price in different ways. AI is one of the hottest topics in recent years, so it is a good choice to choose Nvidia as the research object of this paper.

According to Nvidia's 2023 financial report, Nvidia has three main markets, namely the data centre market, the gaming market and the automotive market. For the data centre market, Nvidia provides customers with hardware such as Graphics Processing Unit (GPU) and (Data Processing Unit) DPU to meet the needs of reasoning and training generative AI models, automated data analysis, etc. It is also the fastest growing market among Nvidia's three markets. In 2024, the data centre business revenue reached US\$47.5 billion, a year-on-year increase of 217%. The second is the gaming market,

where NVIDIA has always played an important role, especially through its GeForce GPU series. With the rise of high-end games and e-sports, the demand for GPUs has continued to grow. In mid-2024, the gaming business revenue was US\$10.4 billion, a year-on-year increase of 15%. Compared with the slow growth of the data centre market, it is still one of Nvidia's main businesses. Finally, there is Nvidia's automotive market, which provides hardware and software support for autonomous driving systems and smart in-vehicle infotainment. In 2024, the automotive business revenue was US\$1.1 billion, a year-on-year increase of 21%. With innovations in the field of smart cars, Nvidia also has great potential in this market.

In the market segmentation, NVIDIA has divided into four different markets, namely Compute & Networking, Graphics, Professional Visualization, and Automotive. In Compute & Networking, NVIDIA's accelerator products such as GPUs and DPUs are mainly used in data centres, AI training and reasoning, supercomputing and other fields. With the development and application of AI technology, this market segment has strong potential. In 2024, the revenue of this segment is 47.4 billion US dollars, a year-on-year increase of 215%. For the Graphics market segment, NVIDIA is committed to the production and development of graphics cards for games, professional visualization and virtual reality. GeForce graphics cards are the core of this segment and are widely used in PC games, content creation and virtual reality [2]. Its revenue in 2024 is 13.5 billion US dollars, an increase of 14%. In Professional Visualization, this market segment mainly targets professionals such as engineers and designers, providing high-performance workstation GPUs (such as the Quadro series). In 2024, the revenue is 1.6 billion US dollars, an increase of 1%, indicating that the market is approaching saturation. In Automotive, it mainly provides autonomous driving platforms and in-vehicle infotainment systems. Its revenue in 2024 is \$1.1 billion, up 21%.

2. Internal Environment Analysis based on SWOT Framework

SWOT stands for strengths, weaknesses, opportunities, and threats. It is usually used to analyze the strategic situation and development potential of an organization. In this section, we will conduct a SWOT analysis of NVIDIA.

2.1. Strengths

Nvidia's first advantage is its strong brand and market recognition, especially in the high-end gaming and professional visualization markets. This means they have a large number of customers, so they can achieve economies of scale in production. In other words, they can produce more products and sell them to more customers, which reduces their production costs per product. From another perspective, Nvidia is more competitive because their costs are lower. If they engage in a price war with their competitors, they can use lower prices to win.

At the same time, NVIDIA also has certain advantages in technology. Especially in terms of AI reasoning performance [3]. NVIDIA provides comprehensive innovations covering chips, systems, and software, optimizing AI reasoning to make it faster, more efficient, and more scalable. For example, NVIDIA's Triton reasoning server, NVIDIA has developed a unified open-source platform that can simplify AI reasoning deployment and improve the efficiency and scalability of different AI models and frameworks. These technical advantages can help NVIDIA conduct monopoly pricing because only NVIDIA has this technology in the market. Therefore, NVIDIA can obtain higher profits in the short term.

2.2. Weakness

In terms of weakness, although NVIDIA has many market segments that can help them make profits, its main profits currently come from GPU and data centre products. Therefore, its revenue will be

greatly affected when facing market demand fluctuations. Secondly, in order to maintain its leading position in the field of technology, NVIDIA may spend a lot of money on product research and development. These high R&D costs may affect profit margins, especially when market competition intensifies.

2.3. Opportunities

For Opportunities, with the development and popularization of AI, especially in the fields of generative AI, deep learning and data analysis, NVIDIA's GPU is expected to continue to gain broad market demand. In addition, with the smart car market, NVIDIA's DRIVE platform, which provides an autonomous driving platform and in-vehicle infotainment system for smart cars, is also likely to expand its market share and revenue in the future.

In addition, NVIDIA acquired ARM, a British semiconductor design company in 2020. ARM's products are known for their low power consumption and high efficiency. Therefore, after NVIDIA's acquisition, it will bring huge strategic opportunities to NVIDIA, helping the company expand its market share, enhance its technological capabilities and accelerate innovation. Especially in the fields of AI computing, smart devices and autonomous driving, NVIDIA will have more opportunities to promote its technological development and increase its revenue [4].

2.4. Threats

For Threats, NVIDIA needs to face pressure from competitors such as AMD, Intel and other companies. In particular, AMD's recent rise in the GPU market, especially its advantages in price and performance, may threaten NVIDIA's market share in the GPU market. Secondly, NVIDIA also faces risks in geopolitics, especially the recent intensification of the Sino-US trade war, which has led to NVIDIA facing antitrust review by the Chinese government. Therefore, NVIDIA's international business may face stricter supervision and market access barriers, especially in key markets such as China.

3. External Environment Analysis

When analyzing the external environment of an enterprise, PESTLE is usually used. In PESTLE, P represents the impact of political factors on the enterprise, E represents the impact of economic factors on the enterprise, S represents the impact of social factors on the enterprise, T represents the impact of technological factors on the enterprise, L represents the impact of legal factors on the enterprise, and E represents the impact of environmental factors on the enterprise. These six points will be discussed in this section.

3.1. Political Factor

On October 17, 2023, United States government announced measures to prevent China from purchasing high-end artificial intelligence chips designed by companies such as NVIDIA, especially those high-performance chips used for AI training and reasoning. [5]. The United States' move is to prevent China from using these high-performance chips to achieve technological breakthroughs in the field of artificial intelligence, especially in the fields of deep learning, image processing, and language processing. Because the US government believes that these technologies may be used in the military field to affect US national security. For NVIDIA, this policy may affect its revenue in the Chinese market, especially China is one of NVIDIA's important markets. Therefore, export restrictions may lead to a reduction in its market share, and competitors such as AMD may take the

opportunity to affect its market position. So, NVIDIA needs to find a suitable way to reduce the impact of this policy on it.

At the same time, in order to counter the US policy of banning chip exports, the Chinese government has begun an antitrust investigation into NVIDIA, especially because of its leadership in the AI chip and data market [6]. In this case, China's antitrust investigation may cause NVIDIA's sales in China to encounter more obstacles, and it is possible that NVIDIA will need to provide more transparent market behavior reports to the Chinese government and may even need to make market adjustments or pay fines in some cases, which may cause NVIDIA to face stricter supervision and affect its growth rate in China.

Politically, NVIDIA is subject to export restrictions from the United States and antitrust investigations from China, which has forced NVIDIA to find a balance between the two countries, complying with their respective laws and regulations while protecting its interests in the global market to ensure its position in the global technology competition.

3.2. Economic Factor

On the economic level, a global economic slowdown or recession could affect consumer demand for NVIDIA's products. Most of NVIDIA's sales come from high-end markets such as the gaming market, which is significantly affected by economic cycle fluctuations. Therefore, if an economic recession occurs, it may lead to a decrease in product demand.

Secondly, since NVIDIA is a multinational company, its revenue will be affected by the exchange rate between different currencies. Take NVIDIA and its largest supplier TSMC as an example. TSMC is located in Taiwan and therefore uses the New Taiwan Dollar for transactions, but NVIDIA, as an American company, uses the US dollar for transactions. If the exchange rate of the Taiwan dollar against the US dollar changes when the two companies are trading, it may lead to different situations. For example, when the Taiwan dollar depreciates, the price of the products provided by TSMC to NVIDIA is relatively low when denominated in US dollars, which is beneficial to NVIDIA because it reduces their procurement costs. However, according to NVIDIA's 2024 annual report, foreign exchange trading gains and losses did not have a significant impact on net income in fiscal 2024 and fiscal 2023. In addition, NVIDIA has also reduced the risk of being directly affected by exchange rate fluctuations by pricing and paying in US dollars. But exchange rate changes remain a potential influencing factor. The appreciation of the US dollar may make the products sold by Nvidia more expensive in the global market, thus affecting its competitiveness.

3.3. Social Factor

Social factors have a profound impact on its product demand and market expansion. For example, NVIDIA's 2024 financial report mentioned that the gaming industry has become the world's largest entertainment industry and major popular games are based on computers. At the same time, the rise of game anchors has further promoted the expansion of the global gaming market. This trend has promoted the demand for NVIDIA GeForce RTX graphics cards, especially in gaming, video streaming, creators and developer communities. This phenomenon shows that as gaming culture continues to develop, NVIDIA ensures its market leadership worldwide through technological innovation and market expansion. At the same time, social and cultural changes and the preferences of young consumers have also enabled NVIDIA's products to continue to innovate, adapt to market demand, and further consolidate its dominant position in the gaming industry.

In addition to the popularity of video game culture in society, whether companies are sustainable is also a focus of social attention, especially in the fields of carbon emissions, energy consumption and resource utilization. Taking the EU countries as an example, they formulated the European Green

Deal in 2019 with the goal of achieving carbon neutrality by 2025. The agreement includes a series of measures to reduce greenhouse gas emissions and increase the use of renewable energy. These measures include carbon border taxes, which are carbon taxes on goods imported from high-emission countries, as well as improvements in waste management, circular economy and biodiversity [7]. Therefore, Nvidia may need to take measures in its product design and production processes to reduce environmental impact. Especially in regions such as the EU where there are clear legal provisions, if Nvidia does not make changes, its products may not be compliant in the region, resulting in higher taxes or prohibition of sales in this region.

3.4. Technical Factor

As a technology company, any technological advancement or change in the world will have a significant impact on NVIDIA's development and strategy. In recent years, the rise of artificial intelligence (AI) and deep learning has had an impact on NVIDIA that cannot be ignored. In response to this trend, NVIDIA has established its own AI platform to conduct research in AI. According to Liu's paper on physical AI, NVIDIA's research in the field of AI is demonstrated, especially through its Cosmos World Foundation Models (WFM), which shows how NVIDIA promotes the development of AI technology [8]. WFM is designed for physical AI systems and uses advanced video tagging, planning of massive video data, and transformer architecture to build models that can simulate and predict the behavior of the physical world. This shows that advances in technologies such as deep learning models, video processing, and large-scale data processing are crucial to NVIDIA's AI technology.

In addition, the advantages of 5G networks also affect many aspects of NVIDIA. In particular, the low latency and high bandwidth characteristics of 5G can help bring computing power close to the edge of the device, whether it is the sensors of autonomous vehicles, IoT devices for smart manufacturing, medical equipment, or video surveillance systems for smart cities. The low latency and high speed provided by 5G will support real-time AI data processing and promote a new round of digital transformation. If it is combined with NVIDIA's existing technologies such as its EGX platform and AI inference technology, it can provide efficient real-time data analysis in multiple fields such as the Internet of Things, smart manufacturing, and smart cities. This enables NVIDIA to promote more innovative applications while enhancing the digital transformation of various industries. Ultimately, NVIDIA can expand its market and gain a leading position.

3.5. Legal Factor

Legally, as a multinational company, NVIDIA not only needs to comply with the laws of its own country, but also the relevant laws of other countries to ensure that it can sell services and goods in different countries and operate for a long time. For example, in the European Union, there is the General Data Protection Regulation (GDPR), which is a regulation on protecting user privacy. Therefore, when operating in the European Union, NVIDIA needs to ensure that its products and services comply with the GDPR regulations, especially when processing user data. These regulations involve data storage, access control, data transmission and user consent, ensuring that the privacy of EU users is protected. If NVIDIA fails to comply with the relevant regulations, it may face a fine of up to 20 million euros or 4% of global revenue [9].

There are also different laws in the United States that constrain NVIDIA's business practices. For example, in the early years, NVIDIA wanted to acquire ARM, but the acquisition faced strict scrutiny from multiple regulators around the world. Among them, the US Federal Trade Commission (FTC) played a leading role. According to the Sherman Act of the United States, it prohibits any contract, combination or conspiracy that restrains trade, as well as any monopoly, attempted monopoly,

conspiracy or joint monopoly [10]. Therefore, in 2021, the FTC launched an antitrust review of Nvidia. In the end, the transaction failed to pass the review of the regulator, and in 2022, NVIDIA and ARM announced that they would abandon the acquisition plan. In short, the impact of legal factors on Nvidia cannot be ignored.

3.6. Environmental Factor

Environmental factors have a significant impact on NVIDIA, especially in terms of global environmental requirements, energy efficiency and carbon footprint management. As a leading semiconductor company in the world, NVIDIA must comply with environmental regulations in various countries and regions to ensure that its business operations have minimal negative impact on the environment. The RoHS directive is implemented in the European Union, which reduces or prohibits the use of some hazardous substances such as lead, cadmium, and mercury in electronic products [11]. Therefore, when NVIDIA designs its GPUs and other electronic products. In order to ensure that its products can enter the EU market, NVIDIA must follow these environmental regulations, design products that meet RoHS standards, and reduce the use of hazardous substances.

At the same time, in the United States, the U.S. Environmental Protection Agency (EPA) has a voluntary program called Energy Star. Equipment and products certified by Energy Star are more efficient in energy saving than ordinary products and reduce energy consumption. These certified devices will have an energy star logo, so products that have obtained Energy Star certification are usually more competitive in the market because consumers are increasingly concerned about energy-saving and environmentally friendly products. In addition, companies can use this to enhance their brand image and demonstrate their commitment to environmental protection and sustainable development. If most of NVIDIA's products meet the Energy Star standards, it will not only improve the market competitiveness of its products, but also promote sustainable development and environmental protection.

4. Conclusion

NVIDIA has demonstrated remarkable financial growth, particularly in its data centre business, driven by the rise of AI technologies. The company's strengths in market recognition and technological innovation in AI and GPU products position it as a dominant player in multiple sectors, including gaming, professional visualization, and automotive. However, the company must address significant risks, such as increased competition, regulatory challenges, and geopolitical factors that could hinder its future growth. The SWOT and PESTLE analyses indicate that while NVIDIA's technological leadership and diversified market segments provide ample opportunities for growth, external factors, such as regulatory scrutiny and economic conditions, pose substantial risks. To maintain its competitive edge, NVIDIA must continue to innovate, navigate complex regulatory landscapes, and adapt to shifting global market conditions.

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