Executive Summary

In the face of change and geopolitical scuffles, can Nvidia adapt to remain successful? This is what we aim to cover in this report through analysis of the Societal, Technological, Environmental, Economic and Political shifts in the landscape followed by a strategic analysis of how Nvidia can employ Adaptive frameworks to create value across business areas and increase its market share in the GPU manufacturing industry.

NVIDIA should seize opportunities in AI, Data Centers, and Autonomous Driving Amid Tech Advancements. In terms of a Strategic Alliance, NVIDIA should partner with car manufacturers like Toyota and Honda for vehicle autonomy as they have a larger audience than other manufacturers in the Asian and South American markets. This can also reduce the burden on the supply chain in North America. For AI applications, Nvidia's innovation in GPU architecture for AI applications has multiple use cases in healthcare, quantum computing, automation and finance. Nvidia should also work with the US government to manufacture and set up foundries in the US to potentially reduce costs and mitigate threats from sanctions.

Nvidia must also navigate Supply Chain Challenges and Competitive Pressures in the evolving Tech Landscape. If the supply chain gets disrupted due to a political situation such as political sanctions on the Netherlands or the China-Taiwan war. NVIDIA will lose its significance in the market, which will not only crash the company stocks but will also disrupt the advancement in the AI ecosystem. In response to the USA banning the export of some intellectual items to China, it has seen a surge of companies manufacturing GPUs and chips, offering competition in the semiconductor space. NVIDIA should look out for regulatory challenges like potential antitrust concerns. As adhering to evolving regulations while maintaining a competitive edge is a complex task, NVIDIA should remain focused on the change in regulations to eliminate hefty fines, which will affect the company's growth.

To conclude, Nvidia's opportunity lies in leveraging its core strengths, including its expertise in GPUs, commitment to cutting-edge research, technological advancements, leadership in gaming, and proficiency in data visualization. At the same time, Nvidia faces a range of threats, including intense competition, intellectual property disputes, and supply chain disruptions, all of which could impact its market dominance and overall success.
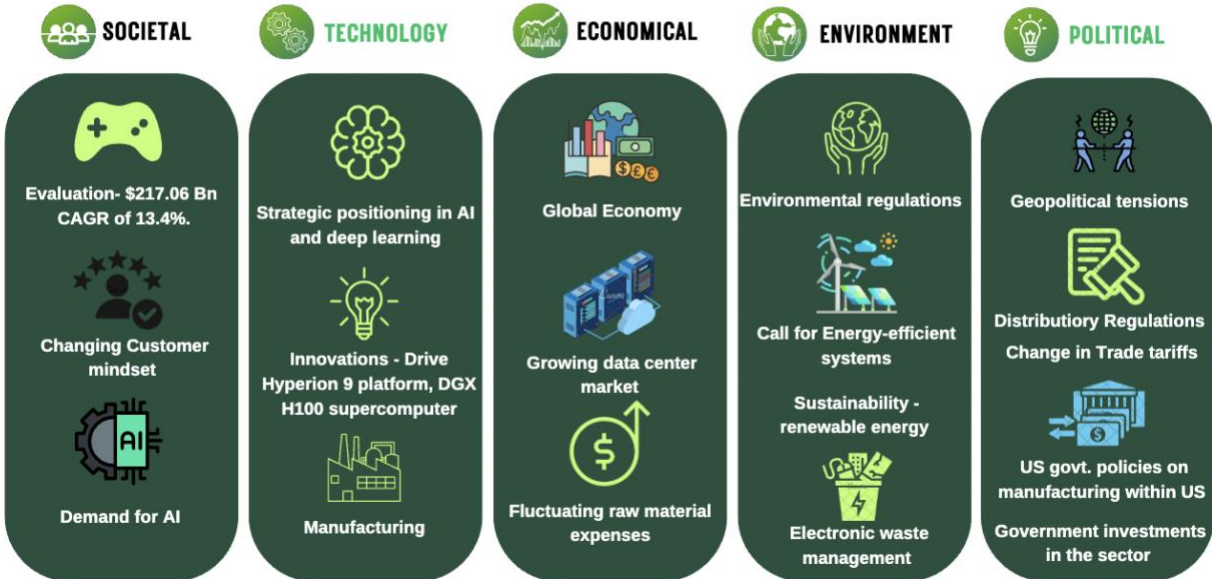
NVIDIA Strategy

Scenarios & Potential Outcomes

Competitors are unsuccessful in developing competitive GPUs

Re-shore or "no-more" Although NVIDIA has managed to keep market leadership ahead of Intel and other competitors, geopolitical tensions mean that NVIDIA must focus on bringing manufacturing to the US and Europe to avoid IP theft and supply chain disruptions.	**NVIDIA Soars** Despite huge competition from companies like Intel, NVIDIA retains GPU market leadership. Geopolitical tensions remain low, and NVIDIA can continue to leverage TSMC manufacturing in Taiwan without risk of supply chain disruption. NVIDIA is capable of sustaining growth without a notable change in their current strategy
No Foundry, No Technology, no NVIDIA US/China relations take a turn for the worse and NVIDIA is left unprepared. At the same time, Intel and other companies are prepared to deliver cutting-edge GPUs manufactured in the US and Europe. NVIDIA's value plummets as competitors consider acquiring the remaining IP at a heavy discount. value. NVIDIA must pivot to designing products for other companies prepared to manufacture in stable locations.	**NVIDIA loses their edge, competitors soar** Although geopolitical concerns are low and Taiwan remains a viable manufacturing location through partnership with TSMC, NVIDIA has lost their competitive edge to Intel. With leading-node technology, Intel can undercut NVIDIA in price due to their internal foundry model and drive a price war that significantly impacts margins for NVIDIA.

Geopolitical Tensions Erupt

Geopolitical Tensions Disperse

Competitors are Successful in delivering competitive GPUs

POLITICAL AND TECHNOLOGY ARE THE MOST INFLUTENIAL FACTORS

SOCIETAL
- Evaluation- $217.06 Bn CAGR of 13.4%.
- Changing Customer mindset
- Demand for AI

TECHNOLOGY
- Strategic positioning in AI and deep learning
- Innovations - Drive Hyperion 9 platform, DGX H100 supercomputer
- Manufacturing

ECONOMICAL
- Global Economy
- Growing data center market
- Fluctuating raw material expenses

ENVIRONMENT
- Environmental regulations
- Call for Energy-efficient systems
- Sustainability - renewable energy
- Electronic waste management

POLITICAL
- Geopolitical tensions
- Distributiory Regulations
- Change in Trade tariffs
- US govt. policies on manufacturing within US
- Government investments in the sector

Although there are a few points that could have been made more accurate or relevant, this STEEP does a great job in listing multiple points under each externality.

NVIDIA NEEDS TO ADAPT AND SHAPE QUICKLY TO KEEP THE LEADING POSITION

D — Drivers	O — Opportunities	T — Threats	S — Strategic Responses
• Political relationships • Demand for datacenters due to growing AI industry • Technological disruptions and new entrants	• Robust growth of AI and Machine Learning Markets • Reliance of data centers and cloud computing services on high-performance GPUs • Diverse demands in automation, healthcare, scientific research	• Export controls and sanction restrictions • Supply chain disruptions (TSMC) • New competitors entering market with better technology	• Diversify manufacturers and designers across different locations • Expand into EV and self-driving markets • Capture the $1 trillion data centre market • Multi-industry collaboration such as 5G/6G market or cloud infra.

Competitor Analysis

Insurgents: NVIDIA, known for its graphics processing units (GPUs) and AI-related technologies, has several direct competitors in various segments of its business: AMD, Intel, ARM, and Qualcomm.

Intel, the biggest competitor, competes with NVIDIA and is in the market for data center and artificial intelligence (AI) accelerators. Intel's Xe architecture, which includes GPUs and specialized AI accelerators like the Intel Nervana Neural Network Processors (NNP), directly competes with NVIDIA's data center GPUs, such as the NVIDIA A100.
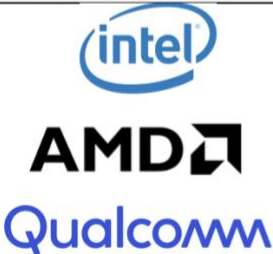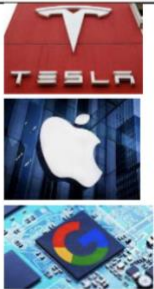
While NVIDIA's GPUs are more advanced, Intel is aggressively pursuing development in that sphere as well.

Incumbents: Nvidia faces formidable competition from established incumbents such as Samsung and IBM. Samsung, a powerhouse in semiconductor manufacturing, possesses the capacity to produce cutting-edge GPU components, putting it in direct competition with Nvidia's offerings. Furthermore, Samsung's expanding presence in AI and data center solutions presents a substantial challenge to

Nvidia's market dominance. In parallel, IBM, with its storied legacy in technology, excels in AI research and cloud computing. IBM's formidable POWER architecture, combined with its robust cloud platform, places it squarely in competition with Nvidia, particularly in the enterprise and high-performance computing sectors.

Adjancents: A lot of direct consumer-facing companies such as Apple, Tesla, and Google are on the path to creating their own chips. While at present these companies purchase their technology from NVIDIA for their technology capabilities such as AI, and graphics processing, the same companies are rapidly investing in their own R&D to reduce dependency on external companies such as NVIDIA and Intel. The tech capability to be independent is a far cry.

The launch of DRIVE Hyperion 9 Is " maj'r step forward for NVIDIA in the autonomous driving market. The platform is designed to power the next generation of autonomous vehicles and is equipped with NVIDIA's latest AI technologies. The supercomputer is the world's fastest, and it is powered by NVIDIA's new H100 GPU. This could make Eos a valuable tool for businesses, organizations, and researchers who are working on complex AI projects.

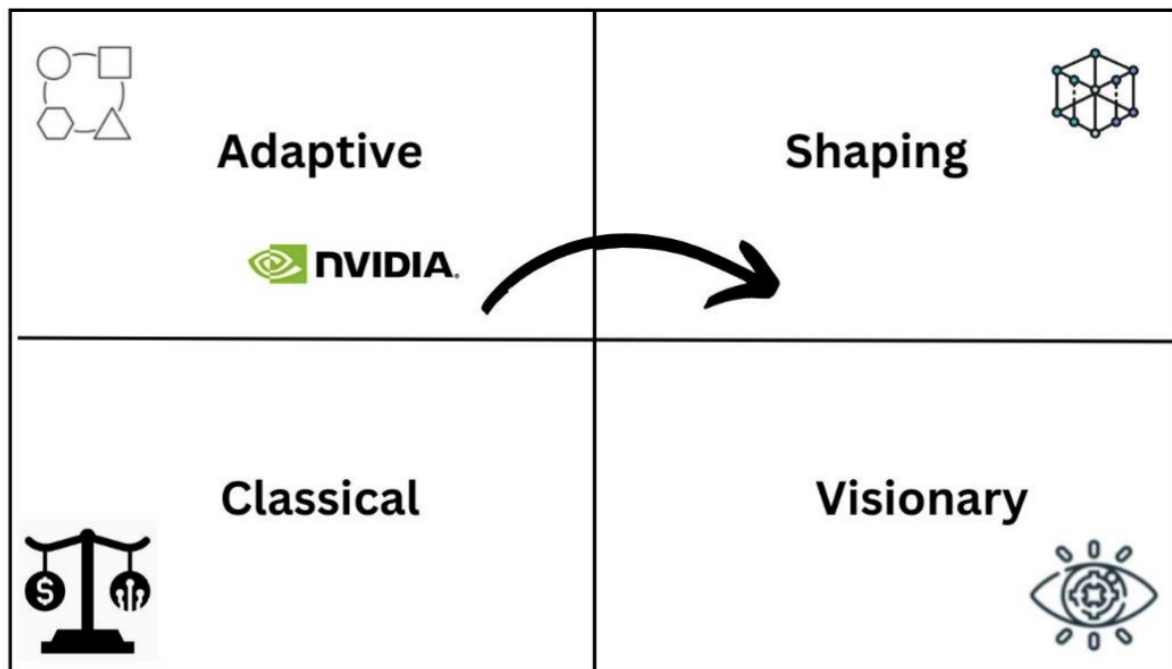| Insurgents	Incumbents	Adjacents
intel AMD Qualcomm	SAMSUNG IBM	TESLA Apple Google

7) **Strategy Palette**

Figure [3] *Adaptive → Shaping Strategy*

Nvidia's Current Adaptive Strategy

Nvidia is known for quickly adjusting to the tech world's changes. Originally, they were all about gaming graphics cards. But they saw how tech was changing and quickly shifted some of their focus. They're also big players in AI (Artificial Intelligence) and deep learning. They made tools like the CUDA platform, which lets people use Nvidia's products for many different AI tasks. This shows how Nvidia can spot a trend and quickly adapt to it. So, right now, they're not just sticking to what they know; they're always looking out for the next big thing and getting ready for it.

Transitioning to a Shaping Strategy

For Nvidia to lead and not just follow, they need to think bigger. Quantum computing is a field that's still young and has a lot of potential. Nvidia can dive into this, not just by making parts but by driving research and setting standards. In the world of AR (Augmented Reality) and VR (Virtual Reality), Nvidia can do more than just provide tech. Nvidia must envision and champion a collaborative tech ecosystem, transcending beyond its products. By fostering platforms that encourage co-creation, Nvidia can curate a community of developers, researchers, and partners, collectively shaping the future of graphics, AI, and computing. An exemplar move would be amplifying initiatives like Nvidia's NGC (Nvidia GPU Cloud), making it more inclusive and versatile.

3.1 Nvidia's Current Strategy - Visionary

- Nvidia being the first company to create and dominate high-performance GPU and SOC units, established itself as a visionary company, setting new industry standards. Across gaming, professional visualization, data center, and automotive sectors, Nvidia's innovative products have not only met but exceeded market demands, consistently delivering superior performance. For instance, Nvidia's gaming industry presence is characterized by its leading GTX and RTX series graphics cards, while the H100 Chips offer unmatched computational power, particularly for large language model training, further solidifying its visionary approach.
- In the past, the market of computation power was predictable.
  It was foreseeable that industries with high computational requirements, such as blockchain and AI, would experience substantial growth. As anticipated, the demand for parallel computing power is currently experiencing rapid expansion.
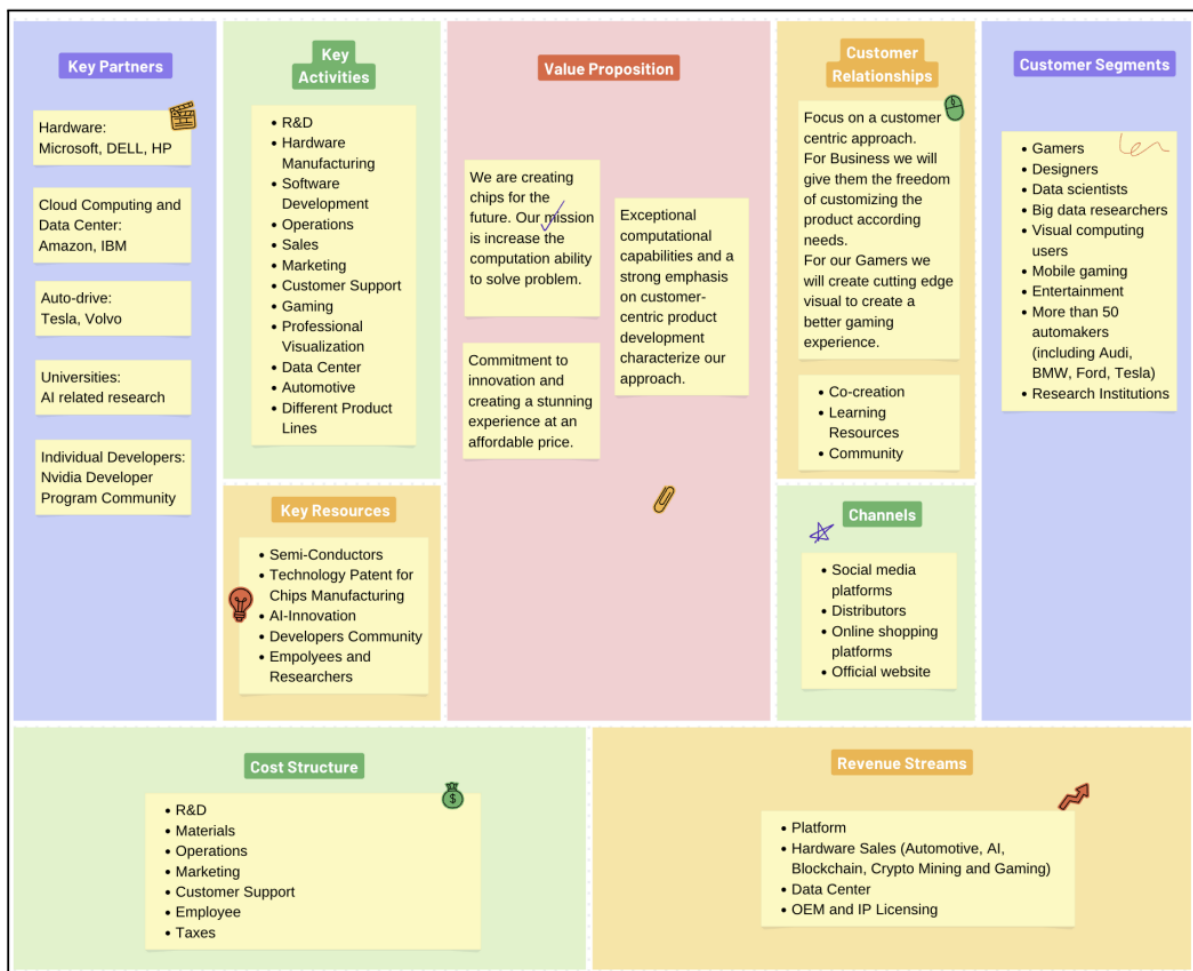
Figure 4: Business Model Canvas of Nvidia.

Key Partners

Hardware:
Microsoft, DELL, HP

Cloud Computing and
Data Center:
Amazon, IBM

Auto-drive:
Tesla, Volvo

Universities:
AI related research

Individual Developers:
Nvidia Developer
Program Community

Key Activities

- R&D
- Hardware Manufacturing
- Software Development
- Operations
- Sales
- Marketing
- Customer Support
- Gaming
- Professional Visualization
- Data Center
- Automotive
- Different Product Lines

Key Resources

- Semi-Conductors
- Technology Patent for Chips Manufacturing
- AI-Innovation
- Developers Community
- Empolyees and Researchers

Value Proposition

We are creating chips for the future. Our mission is increase the computation ability to solve problem.

Commitment to innovation and creating a stunning experience at an affordable price.

Exceptional computational capabilities and a strong emphasis on customer-centric product development characterize our approach.

Customer Relationships

Focus on a customer centric approach.
For Business we will give them the freedom of customizing the product according needs.
For our Gamers we will create cutting edge visual to create a better gaming experience.

- Co-creation
- Learning Resources
- Community

Channels

- Social media platforms
- Distributors
- Online shopping platforms
- Official website

Customer Segments

- Gamers
- Designers
- Data scientists
- Big data researchers
- Visual computing users
- Mobile gaming
- Entertainment
- More than 50 automakers (including Audi, BMW, Ford, Tesla)
- Research Institutions

Cost Structure

- R&D
- Materials
- Operations
- Marketing
- Customer Support
- Employee
- Taxes

Revenue Streams

- Platform
- Hardware Sales (Automotive, AI, Blockchain, Crypto Mining and Gaming)
- Data Center
- OEM and IP Licensing

- **Need for change :**

  Nvidia's current visionary strategy has led it to envision a promising future and diligently strive to be the pioneer in building it. However, if the company continues along this path without exploring the full potential of the market, it could expose itself to substantial risks, possibly even fatal ones. For instance, the emergence of Intel's computational devices or competitive alternatives from emerging companies may gradually erode Nvidia's market leadership. **Therefore, Nvidia must consider a strategic shift towards becoming a shaping company**, proactively driving market developments rather than merely responding to them, to secure a more resilient and forward-thinking position.

3.2 Nvidia's Future Strategy - Shaping

3.2.1 Rationale:

Numerous industries are emerging with increasingly high demands for computational power, including graphics calculations, digital world construction, autonomous driving, and healthcare simulations. It is a considerable challenge for Nvidia to shape multiple industries alone. Therefore, we recommend adopting the **'Shaping'** strategy to sustain leadership in these industries in the future.

Stage 1 – Seize the opportunity

Diversification is the key to flourishing in an ever-changing market. Our journey includes exploring new avenues, such as investments in data centers and autonomous capabilities. These ventures open up new frontiers for us, ensuring that we remain at the forefront of technological advancements. Nvidia should remain unwavering in its commitment to the core business. The meticulously built gaming ecosystem continues to stand as a source of pride and joy, showcasing the organization's dedication to delivering unparalleled experiences. As new territories are explored, the company ensures the core remains strong, unburdened, and well-fed.

Stage 2 – Evolve the model

Nvidia should envision the evolution of its business model by embracing 'Co-opetition' with industry leaders like ASML, Synopsys, TSMC, ARM, and potentially INTEL in the CPU sector. This strategic endeavor is set to drive increased revenue and enhanced profitability, particularly over the long term. This evolution holds immense promise, not only for Nvidia but also for the entire semiconductor sector. Through shared resources, joint research, and development efforts, the industry can anticipate groundbreaking advancements in chip design and production, pushing the boundaries of innovation to new heights.

Stage 3 – Lock In Leadership

The next phase involves securing our leadership position, generating value, and strategically moving into an ecosystem while monetizing and capturing value. This comprehensive approach is about strengthening our position, providing outstanding benefits to our stakeholders, and strategically moving into different areas while effectively taking advantage of new chances that come our way. It's also crucial that we expand our ecosystem while prioritizing sustainable growth

3.2.3 Ecosystem Evolution Points:

- ***Collaborate and cultivate with diverse semiconductor suppliers:***
  The potential imposition of Chinese sanctions on TSMC could elevate the Cost of Goods Sold (COGS), leading to substantial losses for this semiconductor giant. Also, there may be trade policies between China and the United States. These highlight the vulnerabilities in the supply chain. It is time to provide technical support and order support to chip companies, cultivate new suppliers from around the world, and maintain good relationships with them.

- ***Collaborate with different industry leaders for specific chip design:***
  Develop more efficient chip architectures aligned with the technology and requirements of leading companies in various industries, allowing these industry frontrunners to establish standardized chip formats or technical specifications for the entire sector.
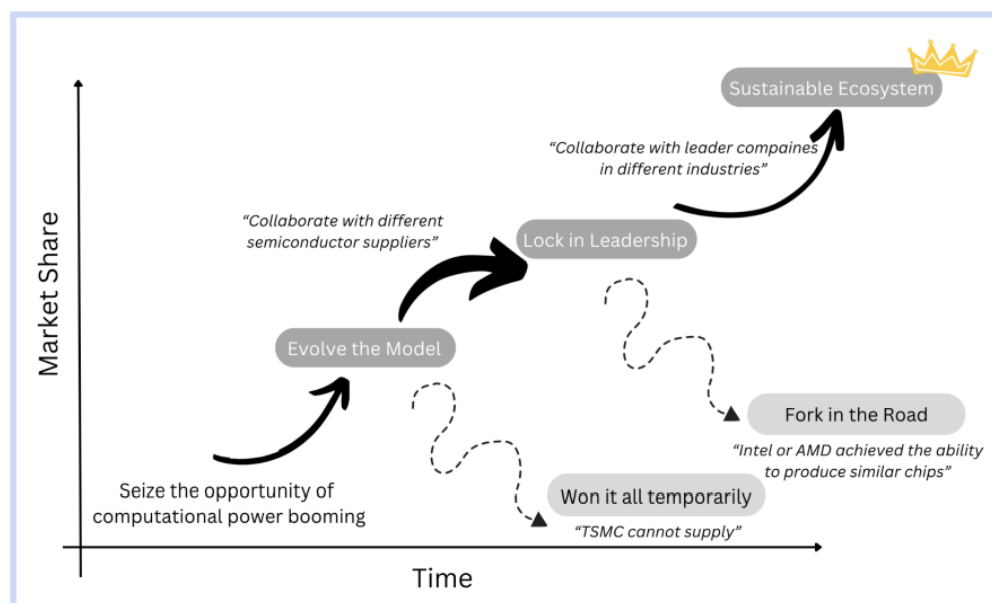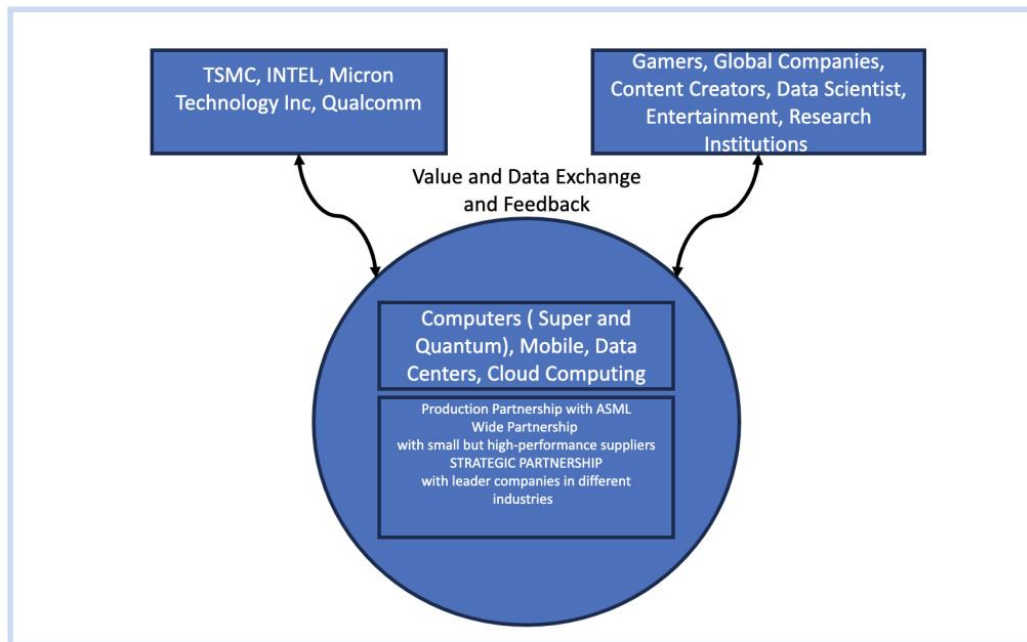

Figure 5: Ecosystem Evolution of Nvidia.

Figure 6: Platforms of Nvidia.

As shown in *"Figure 6"*, under the 'Shaping' strategy, Nvidia is going to place a greater emphasis on collaboration to build collective strengths among leading enterprises in various industries. Leveraging Nvidia's current technological expertise, it will collaborate with different businesses to steer the development of diverse industries and markets. Our goal is to collectively shape the unpredictable future markets, maintaining Nvidia's leadership.

4. Nvidia's strategy for the future (2030)

Recommendation   **Mission 2030**

Pioneering AI Acceleration: Shaping the Future of Automated Mobility
2027-2029

Charting New Horizons: Quantum Computing and Proprietary Chip Manufacturing
2029 onwards

Building Tomorrow's Foundation: A Data Center Infrastructure Vision
2023-2025

Synergy in Collaboration: Forging Strategic Alliances
2025-2027

Figure 7: Forecasted Evolution from 2023 to 2030

- **Recommendation 1:**

  Time frame: 2023-2025

  Brief overview - Pursue the data center business with greater market penetration in Enterprise GPU capabilities for the centers)

  - **We strongly recommend a proactive approach to expanding our presence in the data center industry.** This strategic move aligns with an ongoing trend, and we anticipate it will continue to unfold in the next five years. The reason behind this outlook is the projected surge in demand for data center graphics processing units (GPUs), which is expected to outpace the demand for gaming graphics cards by a significant margin.

According to Grand View Research, the market for data center accelerators is poised to experience robust growth, with an estimated annual growth rate of 23.5% from 2023 to 2030. This impressive growth rate surpasses the 15% annual growth rate forecasted for the gaming GPU market until 2028, as reported by Mordor Intelligence. This data underscores the lucrative opportunities in the data center sector, making it a promising avenue for our strategic endeavors in the coming years.

- **Our primary emphasis should be placed on the European region[2], given the anticipated growth rate of approximately 13% in the data center industry from 2023 to 2028.** While there is also potential in the South American region with an expected growth rate of approximately 9% during the same period, it is not of the highest priority and can be considered for removal if necessary.

■ **Recommendation 2:**

Time frame: 2025-2027

Brief Overview - Collaborating with different suppliers and leader companies to shape different industries together

- Engage in partnerships with diverse semiconductor and computing device suppliers, offering technical and order support to chip companies. Foster strategic alliances with global foundries, exemplified by STMicroelectronics and GlobalFoundries. **Shift our attention towards Western markets to decrease reliance on TSML (TSMC). This approach ensures a broader supplier base and enhances our market resilience.**
- **Collaborate with different industry leaders for specific chip design:** Forge partnerships and collaborate with a diverse array of industry leaders to tailor chip designs. Create streamlined chip architectures that align with the unique technological needs and specifications of prominent corporations across various sectors, including Tesla, IBM, and Meta. This collaborative approach empowers these influential companies within the semiconductor industry's value chain to set industry-wide standards for chip formats and technical specifications.
- **Building Self-Sufficiency:** Furthermore, our vision extends beyond relationship development. We aspire to establish the foundations of our in-house manufacturing capabilities, contributing to self-sufficiency and fostering innovation within the semiconductor industry. This strategic endeavor underscores our commitment to shaping the future of chip design and production.

- **Recommendation 3:**

  Time frame: 2027-2029

  Brief overview: Increase market penetration of "NVIDIA DRIVE", OMNIVERSE (their AI computing platforms)

  - **Entering the automobile sector is crucial. The International Energy Agency (IEA) predicts over 240 million electric vehicles (EVs) by 2023**, creating a substantial market opportunity for Nvidia. To seize this market share, Nvidia should prioritize the development of user-friendly AI chips tailored for automotive applications.[3][4]
  - **Strengthen strategic collaborations with leading automakers such as Tesla, Volvo, BYD, and GM.** This will enable the establishment of a comprehensive AI mobility infrastructure, catering to the evolving needs of the next generation of transportation.[5]

- **Recommendation 4 :**

  Time frame: 2029 onwards

  Brief Overview: Developing new technology that may substitute the existing technology in the field of AI innovation.

  - **Initiate investments in emerging technologies**, specifically Quantum Computing and Artificial Intelligence, to secure a substantial presence in these evolving markets. Notably, major tech giants such as Google, IBM, Microsoft, and Intel have already embarked on similar ventures. Consider acquiring small companies with cutting-edge technologies to leverage their expertise and accelerate our progress in these fields. This proactive strategy ensures we remain competitive and well-positioned for the future.

  - It is noteworthy that in the forthcoming quantum era, the conventional GPU and CPU chips may lose their conventional utility, further accentuating the wisdom of our investments in quantum computing and AI technologies.

Conclusion: As Nvidia persists in driving the AI revolution, its 2030 strategy is poised to firmly establish it as a dominant market force. Considering the recommendations for Nvidia's strategic outlook, GCI stands to benefit by investing in Nvidia to enhance its AI portfolio.