

The CHIPs and Science Act's Impact on Qualcomm ✓

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1. Executive Summary

In August of 2022, the \$280 billion Chips and Science Act became public policy. Its passage marked a commitment by the U.S. government to re-shore the production of semiconductors (Johnson, 2022 ✓). To drive economic growth and address national security concerns, the bill dedicates \$52 billion to subsidize semiconductor manufacturing with another \$24 billion in tax breaks for semiconductor manufacturing equipment (Badlam et al., 2022) ✓. With the passage of this legislation, U.S.-based Qualcomm is poised to benefit from its impact on the industry.

Using a qualitative and quantitative approach, the report will analyze the impact of the Chips and Science Act on Qualcomm and offer recommendations. Utilizing concepts from Peng's institution-based view (Peng, 2021 ✓) and Porter's Diamond of National Advantage (Porter, 1990) ✓, the report will discuss how the Chips and Science Act will improve the four factors of national advantage (factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry) within the U.S semiconductor industry, and how these improvements will impact Qualcomm's organizational culture and business strategy.

The analysis shows that as each of the four factors of national advantage improves, Qualcomm should be positively impacted. Improvements in skilled labor, increases in industry competition, increases in related/supported industries competition, and the re-shoring of domestic rivalries will all benefit Qualcomm's business strategy.

To take advantage of Chips and Science Act, this report recommends that Qualcomm 1) leverage its brand reputation as a U.S.-based semiconductor company, 2) play an active role in the implementation of the Chips and Science Act, and 3) embrace domestic market competition.

2. Introduction

On August 9, 2022, President Biden signed into law HR 4346, the Chips and Science Act, which will provide \$52 billion in funds to encourage semiconductor production and research in the U.S. President Biden stated during the billing signing ceremony that U.S. semiconductor supply chain shortages were responsible for a third of core inflation in 2021, yet the driving factor behind bipartisan support was that increasing domestic production of semiconductors was critical to U.S. national security (Johnson ✓). Private businesses have earmarked approximately another \$100 billion to fund new US semiconductor manufacturing facilities and research which includes Qualcomm's \$4.2 billion investment to expand production in New York (Paul, 2022) ✓.

Using an institution-based view as developed by Dr. Peng and Porter's Diamond model of Determinants of National Competitive Advantage, this report will analyze the Chips and Science Act, analyze the impact on Qualcomm's culture and strategy, and provide recommendations on how Qualcomm can maximize the impact of the Chips and Science Act.

3. Methodology

This report uses a qualitative content analysis methodology and a quantitative analysis methodology. The qualitative content analysis involved studying the data and excerpting relevant concepts presented in news articles, academic journals, and US government documents. The quantitative analysis involved data collected via a survey for a business analytics project for

IST 6620 at California State University, San Bernardino, investigating whether Qualcomm's brand recognition as a US-based semiconductor company was a competitive advantage. The questionnaire was created and distributed to members of the public via the CSUSB Qualtrics survey system (Marich et al., 2022 ✓).

4. Findings & Impacts of the Chips and Science Act on Qualcomm

The US Department of Commerce considers semiconductors a strategic resource, and they find that domestic semiconductor production is critical to national defense and economic prosperity (Department of Commerce, 2022 ✓). It is projected that the semiconductor shortage during the COVID-19 pandemic accounted for the loss of one percentage point of the GDP growth in 2021, impacting one in five U.S. workers. Demand for semiconductors increased by 17 percent between 2019 and 2021. The U.S. Commerce Department also describes microelectronics as the primary differentiator for asymmetric technology over potential adversaries (Department of Commerce) ✓. Taiwan produces 60% of the world's semiconductors and 90% of the advanced semiconductors (Economist, 2023), while the US produces no advanced semiconductors.

With the dual purpose of driving economic growth and addressing national security concerns, HR 4346, the Chips and Science Act was passed by Congress with bipartisan support and signed into law by President Biden on August 9, 2022. The act directs \$280 billion to be spent over the next 10 years on a wide range of leading-edge technologies like artificial intelligence, clean energy, and quantum computing along with supporting more inclusion, education, and training in the STEM (science, technology, engineering, and math) workforce. To support growth within the domestic semiconductor industry, \$52.7 billion is to be spent on

subsidizing U.S. semiconductor manufacturing with another \$24 billion dollars of tax credits for semiconductor manufacturing and processing equipment (Badlam et al.).

To take advantage of the Chips Act, Qualcomm concurrently announced that it will be investing an additional \$4 billion with its long-standing supplier of domestic semiconductors, GlobalFoundries. This will expand production in Malta, New York, through 2028, increasing Qualcomm's total investment in the region to \$7.2 billion (Business Today, 2022 ✓).

As a U.S.-based company, Qualcomm has skillfully negotiated the institutional framework that it operates within as the patent owner of the world's most advanced wireless semiconductor technologies specifically 5G connectivity. Based on a Treasury Department investigation spurred on by Qualcomm, President Trump issued an executive order blocking the takeover of Qualcomm by Singapore-based Broadcom on March 12, 2018, because of national security concerns. At that moment Qualcomm became a formally protected US-based company whose continued existence as a US-based company was declared critical to US national security (Leiter et al., 2018 ✓). This action impacted Qualcomm's organizational culture. Peng's institution-based view "focuses on the dynamic interaction between institutions and firms, and considers strategic choices as the outcome of such interaction (Peng, 2021, p. 91 ✓)." This new relationship with the U.S. government has impacted Qualcomm's future strategic choices, consequently, Qualcomm is uniquely positioned to take advantage of the Chips and Science Act.

This report will analyze the Chips and Science Act's impact on the US semiconductor industry and Qualcomm's business strategy through Michael Porter's Diamond of National Advantage model, (Porter). Porter states, "A nation's competitiveness depends on the capacity of its industry to innovate and upgrade." He argues that global competition has made nations more

important and that industries succeed within a nation because they are “the most forward-looking, dynamic, and challenging (Porter).” There are four attributes in Porter’s diamond model that determine national advantage within a specific industry: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry.

Factor Conditions

Factor conditions are production factors that are important to compete within an industry such as skilled labor and infrastructure. Porter points out that competitive advantage lies in the creation of specialized factors that are consistently upgraded. The US has a skilled labor force and infrastructure, yet as Porter points out US consumer-electronics firms moved production to Asia to save on labor costs instead of upgrading their advantage through innovation.

Qualcomm should benefit as factor conditions begin to improve. The Chips Act authorizes \$174 billion dollars to be appropriated over the next five years to several federal science agencies to invest in STEM education and workforce development with \$80 million going to the National Science Foundation to support innovation through partnerships between industry and academia (National Science Foundation, 2023 ✓). As a U.S.-based company, Qualcomm will be positively impacted by these government investments in skilled labor and innovation. The Chips Act will enhance the factor condition of a skilled workforce to support domestic manufacturing.

Demand Conditions

Demand conditions are the nature of demand for an industry’s product or service domestically (Porter). A large domestic market provides a nation with a competitive advantage because a competitive market pressures companies to respond to buyer demands and

expectations quickly. Domestic buyers tend to be mature and demanding ✓ , putting pressure on companies to innovate faster and meet higher standards. These domestic demand conditions create an environment where companies develop a competitive advantage within the industry that is hard for foreign competitors to match. With demand from sophisticated customers (i.e., IoT and Automotive) growing, demand conditions should continue to improve in the U.S.

Qualcomm has benefited from U.S. demand conditions, and the passage of the Chips Act should have a positive impact on business strategy. The U.S. consumer in general is technologically mature, and Qualcomm continues to respond to the pressure of the domestic market through innovation that produces semiconductors that are smaller, faster, and consume less power. The Chips Act will give Qualcomm the opportunity to work with academic institutions, government agencies, and private consortiums to further improve U.S. demand conditions.

Related and Supporting Industries

Related and supporting industries also benefit from the pressure to compete, which is the third point in Porter's Diamond model. When suppliers and end-users are clustered, companies can benefit from communicating information, ideas, and innovations easily and quickly. The Chips Act will spur supplier clustering in the domestic semiconductor industry. Arizona is becoming a semiconductor industry cluster as companies like Intel and TSMC plan to construct facilities to build semiconductors for Apple, Nvidia, and Qualcomm (Caballar, 2023) ✓ .

The benefits of related and supporting industries clustering within the U.S. as a result of the Chips Act will positively impact Qualcomm. The increasing number of domestic semiconductor foundries gives Qualcomm more suppliers to choose from. Currently,

Qualcomm's business strategy involves most of its high-end semiconductors being produced by one company in Taiwan, TSMC. As the reshoring of the semiconductor industry progresses, Qualcomm's business strategy can take advantage of the clustering of domestic suppliers and end-users (IoT and automotive market) as it shifts portions of its supply chain to the U.S. market.

Firm Strategy, Structure, and Rivalry

This fourth determinant considers how the nation impacts a firm's strategy, corporate structure, and competition between industry rivals. In mature US industries, a firm's business strategies are focused on share price and quarterly earnings that push against long-term return-on-investment strategies, while newer industries like high-tech benefit from a large pool of equity funding that feeds domestic competition (Porter). Regarding structure, globalization efforts to produce goods in lower-cost labor markets alongside the need to maintain expertise within the US, especially in the semiconductor industry has resulted in US companies with vulnerable supply chain structures. Further, as we discussed earlier, strong rivalries within an industry spur innovation because of the pressure to compete.

Although the semiconductor industry may seem mature, the industry benefits from constant technological advances in processing speed, smaller semiconductor sizes, and sophisticated customer demand. The Chips and Science Act funding is not only tied to public and private innovation efforts but influences firms' strategy to take on long-term capital investments. The Chips Act has already begun to impact Qualcomm's corporate structure as it begins to re-shore resources and create domestic partnerships to address institutional influences to establish a secure, domestic U.S. semiconductor manufacturing industry. The rivalry component of this determinant factor will benefit Qualcomm as the domestic semiconductor industry competition creates pressure to innovate and upgrade. The benefits of vigorous competition as presented

throughout the four factors of Porter's diamond model and shows how the model is a system where the advantages or disadvantages of one factor can also impact other factors.

5. Recommendations

Within the context of the four factors of Porter's Diamond of National Advantage, this report has shown how the US Chips and Science Act will positively impact Qualcomm's business strategy. To maximize the impact of the Chips and Science Act on Qualcomm's business strategy, the following recommendations are advised.

1) Leverage Brand Reputation as a U.S.-Based Semiconductor Company ✓

Although Qualcomm's business model is a 'fabless' semiconductor company ✓ that hires international foundries to produce its semiconductors based on its proprietary technology, it has benefited from being a U.S.-based semiconductor company that is trusted and important to national security. Qualcomm should, therefore, make the most of its informal and formal relationships with U.S. institutions. In a survey, conducted in October of 2022, respondents that answered 'yes' to a willingness to pay more for US-based semiconductor products were willing to pay an average of 31% more than the sales price, and 24% over the sales price for those who answered 'maybe (Appendix A ✓).' This suggests that domestic demand is sophisticated enough to see value in Qualcomm's brand as a U.S.-based company. This value can be realized throughout the supply chain; therefore, it is recommended that Qualcomm focus efforts to increase its brand recognition as a U.S.-based semiconductor company to leverage this competitive advantage as it invests in domestic semiconductor production and processing.

2) Play an Active Role in the Implementation of the Chips and Science Act ✓

Porter considers it a company's responsibility to actively participate in developing a country's national advantage by helping to form industry clusters while helping suppliers and buyers innovate and build on their competitive advantage (Porter). It is recommended that Qualcomm actively participate in the development of semiconductor industry clusters by working to create partnerships with the newly established domestic semiconductor foundries. Here the advantage of being a U.S.-based company gives Qualcomm the benefits of quick and easy information flow between domestic suppliers and end-users that can help spur innovation. In addition, Qualcomm should participate in helping implement factor conditions (skilled labor and infrastructure) that are slated for funding by the Chips and Science Act. Their active participation in the academic and public organizations tasked with building a skilled labor force and upgrading infrastructure will increase innovation throughout the industry to Qualcomm's benefit.

3) Embrace Domestic Market Competition ✓

As Porter points out innovation and competitive advantage are created by a vigorous domestic rivalry (Porter), because healthy competition within an industry and related industries puts pressure on companies to increase the rate of innovation to maintain their competitive advantage. Qualcomm has thrived as an innovator in developing semiconductor technologies that are often two to three years ahead of the commercial market. As the Chips Act and Science Act of August 2022 begins to create national advantages that will increase clustering and domestic competition, Qualcomm should embrace the challenge of a more competitive domestic market by creating a business strategy that actively participates in the development of domestic supply chain partnerships, develops new innovations to maintain competitive advantage, and embraces

its role as a leading industry innovator of semiconductor technologies in the United States and the world.

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EXCELLENT PAPER:

Well-analyzed using an important piece of recent legislation as linked to Qualcom

Impeccable, clear, concise writing

Cited in accordance with academic standards

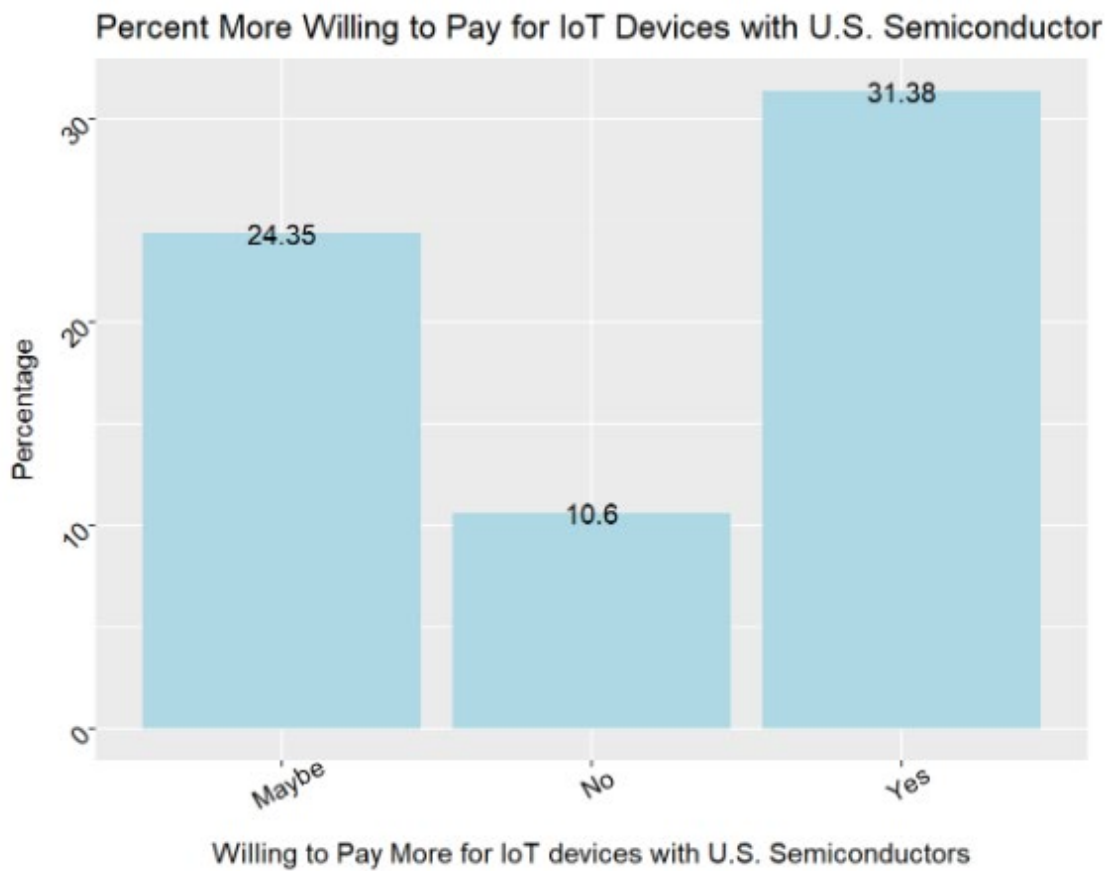
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Appendix A - Qualcomm Brand Analysis ✓

31.38

Average Percentage More Willing to Pay Above Sales Price Who Answered Yes to more willing to Pay for IoT Devices with US made Semiconductors



Source: (Marich et al., 2022)