

Forum: The Second General Assembly

Issue: Measures To Mitigate The Risks Of The China-Taiwan Conflict On The Semiconductor Industry

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Introduction

Semiconductors are at the forefront of technological advancements. These minuscule inventions can conduct and insulate a current simultaneously; the most common semiconductor in use is Silicon. Semiconductors are essential components of electronic devices, enabling advances in communications, computing, healthcare, military systems, transportation, clean energy, and countless other applications. The semiconductor crisis, however, is a shortage of chips that has caused a disruption in numerous sectors of the economy from consumer electronics to the automotive industry. COVID-19 was the leading cause of this issue, disrupting the supply chains and production of microchips due to the proliferation of demand for products like personal computers and smartphones.

The first period during which the production of semiconductors accelerated was during World War II. Battles were won by the side that was first to spot enemy airplanes, ships, or submarines. To give the Allies an edge, British and American scientists developed radar technology to "see" for hundreds of miles, even at night. The research that went into improving the radar technology, which relied on semiconductor crystals, helped set the stage for post-war research into the transistor.

This pattern has been relayed into the present. With long-rising tensions between China and Taiwan, this semiconductor industry reaps the direct consequences of the

conflict. Due to the increased importance of the industry, the repercussions are on a global scale.

Taiwan plays a pivotal role in the semiconductor industry, providing 60% of the world's supply and 90% of the most advanced ones. In contrast, China is one of the largest consumers of microchips, representing high demand due to its burgeoning technological aspirations. However, the intricate balance between supply and demand has become more fragile due to China and Taiwan's complex and sensitive relationship. China's ruling Communist Party claims the democratic island of Taiwan as its territory.

Taiwan has been independent since 1947, but Beijing believes it should be reunited with China - possibly by force. As of April 2023, China has conducted extensive military drills near Taiwan that serve as stern warnings to the collusion of 'Taiwan independence' separatists with foreign elements and their provocations, as said by Shi Yi, spokesperson for the Eastern Theater Command. This now begs the question of how the conflict between the two key players could affect the semiconductor industry. A Taiwanese invasion would halt the availability of the advanced chips used in satellites, stealth jets, and supercomputers. China's ambition of having a "fully modern" military by 2027, and its Made in China 2025 plan, to boost manufacturing, both hold semiconductor capabilities at the core.

Definition of Key Terms

Semiconductor

A solid substance that has a conductivity between that of an insulator and that of most metals, either due to the addition of an impurity or because of temperature effects. Devices made of semiconductors, notably silicon, are essential components of most electronic circuits.

Transistor

A transistor is a miniature semiconductor that regulates or controls current or voltage flow in addition to amplifying and generating these electrical signals and acting as a switch/gate for them. Typically, transistors consist of three layers, or terminals, of a semiconductor material, each of which can carry a current.

Silicon

A nonmetallic chemical element in the carbon family. It is the second most abundant element in the crust, being surpassed only by oxygen.

Supply chains

The sequence of processes involved in the production and distribution of a commodity.

Supply chain disruption

Any event or circumstance that interrupts or hinders the normal flow of goods and services within a supply chain, potentially causing delays or shortages.

Supply chain resilience

The ability of a supply chain to adapt and recover quickly from disruptions while maintaining its core functions.

Trade Dependency

The degree to which a country or industry relies on international trade for goods and services.

Global Economy

The interconnected system of economic activity that spans the entire world, including international trade, finance, and investment.

Intellectual property rights (IPR)

Legal rights that protect inventions, designs, and creative works, including semiconductor designs and processes.

Collusion

A secretive and often illegal agreement or cooperation between individuals, groups, or entities to deceive others for the purpose of gaining an unfair advantage or financial benefit. Collusion can occur in various contexts, such as business, politics, or competition, and typically involves parties working together to achieve objectives that may be harmful or against the best interests of others, often at the expense of fair competition and transparency. It is considered unethical and, in many cases, a violation of antitrust or competition laws.

Separatists

Separatists are individuals or groups who advocate for the secession of a specific region or territory from a larger political entity, such as a nation-state or a country. Separatist movements can be based on culture, history, or political differences. These movements seek to establish their own autonomous or sovereign state, distinct from the existing government or authority. The goals and methods of separatist movements can vary widely, ranging from peaceful political campaigns for autonomy to armed struggles for independence.

Nationalism

Nationalism is a belief or ideology that emphasizes the interests, unity, and identity of a particular nation or a group of people who share common cultural, historical, linguistic, or geographical characteristics. It often involves a strong sense of loyalty and attachment to one's own nation.

Sovereignty

Sovereignty is the authority and power of a state or political entity to govern itself, make and enforce laws, and make decisions regarding its domestic and foreign affairs without external interference.

Key Issues

Long-standing geopolitical tensions

The political dispute between China and Taiwan, dating back to the Chinese Civil War from 1945 to 1949, is at the core of the semiconductor shortage. Due to Taiwan's significant role in the industry, this conflict not only affects the political landscape but the industry as a whole. Taiwan is officially known as the Republic of China (ROC) but operates as a self-governing identity. However, it will continue to be referred to as ROC as long as its civil constitution in force is the Constitution of the Republic of China, thus leaving this dispute unresolved.

The One-China Policy makes this a matter of greater importance. When the United States moved to recognize the People's Republic of China (PRC) and de-recognize the Republic of China (ROC) in 1979, the United States stated that the government of the People's Republic of China was "the sole legal Government of China." Sole, meaning the PRC was and is the only China, with no consideration of the ROC as a separate sovereign entity.

Export controls and other downward pressures on countries working with China firms have meant that even when Taiwan Semiconductor Manufacturing Company Limited (TSMC) is at capacity, additional supply cannot come from Chinese manufacturers. Under current chip war conditions, low supply is likely to continue, which leads to an increase in prices as well as product delays. The military response to an invasion of Taiwan could see manufacturing of semiconductors halted overnight.

National Security Implications and Cybersecurity Concerns

The reduction in semiconductor supply would affect the national security context that is shaping its production. As semiconductors are integral to the functioning of advanced military technologies, including communication systems, radar, navigation, and control systems for weapons, a shortage in semiconductor supply can potentially hinder the development and maintenance of these critical defense technologies. Furthermore, as nations become more reliant on digital infrastructure, the shortage of semiconductors may impact the production of secure and resilient hardware for communication and cybersecurity purposes. Vulnerabilities in critical systems could be exploited by malicious actors, posing a threat to national security. It doesn't end there. The ability to produce and innovate in semiconductor technology is closely tied to a nation's economic competitiveness. A shortage could result in decreased competitiveness, affecting industries that rely on advanced technologies for innovation and global market presence.

The U.S. has a strategic interest in the Asia-Pacific region, and any military conflict or crisis in the Taiwan Strait could draw in not only Taiwan and China but also other regional powers. A Taiwanese invasion would, therefore, result in a lack of availability of advanced chips in satellites, super-computers, and stealth jets.

Economic sanctions and export controls

Geopolitical tensions can lead to the imposition of economic sanctions and export controls. For example, in the semiconductor industry, the U.S. has imposed restrictions on certain technologies that can be sold to Chinese companies due to national security concerns. These controls have far-reaching effects on the global supply chain. The Chinese tech industry, once a magnet for U.S. venture capital,

has already seen a drastic decline in U.S. investment amid intensifying geopolitical tension.

Last year, total U.S.-based venture-capital investment in China plummeted to \$9.7 billion from \$32.9 billion in 2021, according to PitchBook data. This year so far, U.S. V.C. investors only put \$1.2 billion into Chinese tech startups.

Furthermore, geopolitical tensions can exacerbate cybersecurity concerns. It's not uncommon for state-sponsored cyberattacks to be suspected of originating from countries involved in geopolitical conflicts. These cybersecurity threats can affect the semiconductor industry by targeting critical infrastructure or intellectual property. Take the Russia-Ukraine conflict as an example- organizations in Ukraine have faced threats including massive distributed denial-of-service (DDoS) attacks, increased malware activity, targeted and persistent phishing attacks, disinformation campaigns, and attacks on cyber-physical systems.

By any measure, the use of sanctions and export controls reached critical mass following Russia's 2022 invasion of Ukraine. In its wake, governments implemented sweeping multilateral policies designed to severely restrict Russia's influence on the world stage and immobilize its war efforts. As an example of how this was achieved in a global economy, US regulators promoted policies aimed at achieving international implementation and enforcement. The result was a previously unthinkable united front in cross-agency, multinational collaboration, leading to the most robust sanctions and export controls regime ever imposed on the modern supply chain. The depth of international cooperation achieved in responding to the invasion of Ukraine sets a strong precedent for nations increasingly turning to sanctions and export controls to address foreign conflicts and crises. For example, the recent efforts by countries to withhold advanced technology from China are emblematic of this new approach to trade policy, under

which national security interests rather than traditional market forces appear to be the predominant guiding principles.

Global Supply Chains

The semiconductor supply chain is complex and often relies on various components and manufacturing processes that span different countries. Any disruption in this chain, due to conflict or other factors, can have cascading effects on the global tech industry- disruptions can lead to supply shortages, leading to increased prices for electronic devices, and potential economic downturns, affecting businesses and consumers worldwide.

Many countries and industries heavily depend on semiconductor imports, making them vulnerable to supply chain disruptions. This issue highlights the need to diversify and secure supply sources.

Humanitarian factors

Local, national and global supply chains are all heavily affected by a variety of factors concerning human welfare. Unsustainable practices throughout the supply chain, such as deforestation, pollution, and water overuse, can have devastating consequences for local communities and ecosystems, disrupting production and leading to legal ramifications. When communities lack access to essential resources like clean water, healthcare, and education, it can lead to poverty, malnutrition, and disease, impacting the workforce and disrupting operations. Forced labor, child labor, and discrimination in the workplace can lead to serious human rights violations, causing social unrest and negative publicity for companies involved. Additionally, the semiconductor industry's reliance on specific locations for production can make it vulnerable to natural disasters, impacting supply chains and causing disruptions in communities. Investing in disaster preparedness and resilience measures is crucial. Pandemics like

COVID-19 have shown the interconnectedness of global supply chains and the potential for disruptions to workforce availability and transportation, impacting the semiconductor industry's production and delivery.

Economic and social factors

Social and economic factors include factors such as income, education, employment, community safety and social support. Economic recessions and booms cause fluctuations in demand for semiconductors, leading to production disruptions and potential shortages or gluts. Lack of development in transportation infrastructure, particularly in developing countries, can hinder the efficient movement of goods and materials, impacting the semiconductor industry's global reach. Changing consumer preferences for more sophisticated and personalized electronics can drive demand for specific types of semiconductors, influencing production strategies and resource allocation. Lack of access to quality education and training programs in developing countries can hinder their ability to develop the skilled workforce needed for a competitive semiconductor industry.

Bilateral relations

Bilateral relations, or the diplomatic and economic ties between two specific countries, can have significant implications for global supply chains. The interconnected nature of the modern global economy means that disruptions or changes in the relationships between countries can reverberate throughout supply chains.

The nature of trade agreements and policies between two countries can affect the ease and cost of doing business. Trade agreements that facilitate the movement of goods and services, reduce tariffs, and eliminate trade barriers contribute to smoother supply chain operations. Conversely, the imposition of tariffs or trade restrictions can disrupt supply chains and increase costs. Bilateral relations often

influence the imposition of taxes, tariffs, and other such trade barriers to regulate the effects of a dispute. Disputes such as trade practices, intellectual property, or geopolitical issues can lead to the imposition of tariffs, creating additional costs and uncertainties for businesses operating within those supply chains.

More significantly, Bilateral relations can influence currency exchange rates, affecting the cost of goods and services in global supply chains. Fluctuations in exchange rates may impact the competitiveness of products and alter cost structures for businesses operating across borders.

Therefore, the diplomatic and trade relationships between specific countries, such as the United States and China, can significantly influence semiconductor trade and access to technology.

Major Parties Involved and Their Views

The United States of America

The United States of America has a significant stake in the stability of the semiconductor industry, not only for its domestic technological advancements but also for its global economic and strategic interests. The ongoing tension between China and Taiwan presents various challenges and concerns for the semiconductor industry, and the U.S. government has been closely monitoring and responding to these issues. The United States has maintained a consistent policy of supporting Taiwan, which includes diplomatic ties, arms sales, and other forms of assistance. This policy is referred to as "strategic ambiguity," intended to deter aggression and maintain peace in the region.

TSMC supports both American and Chinese firms such as Apple, Qualcomm, Broadcom, and Xilinx. Until recently, the firm also supplied Huawei but severed ties with

the Chinese giant in May 2020 because of U.S. Department of Commerce restrictions on Huawei suppliers over security concerns.

On October 7, 2022, the U.S. government enacted a series of new export control regulations targeting China's artificial intelligence (AI) and semiconductor industries. U.S. allies, particularly Japan and the Netherlands, are also key producers of the equipment used to fabricate advanced node semiconductors. Therefore, the long-term success of the policy depended on the United States securing Dutch and Japanese cooperation to control the types of semiconductor equipment that U.S. companies do not produce and to prevent Dutch and Japanese companies from backfilling the technologies that the United States is no longer willing to sell to China. In January 2023, the United States, the Netherlands, and Japan reportedly reached a deal establishing advanced semiconductor equipment export controls. Two months later, Dutch and Japanese governments announced their intention to proceed with new export controls on a diverse suite of semiconductor technology that will cover China. In a decision likely intended to reduce the likelihood of Chinese retaliation, neither country explicitly named China as the target of the export controls, nor did they indicate that their actions were related to an agreement with the United States.

People's Republic of China

The PRC has taken both diplomatic and military measures to assert its claims over Taiwan. It has engaged in diplomatic efforts to isolate Taiwan on the international stage and seeks to discourage other countries from recognizing Taiwan as a separate sovereign state. The "IC Promotion Guideline," outlines China's overarching strategy for the development of its semiconductor industry. It sets targets for self-sufficiency in semiconductors and provides guidelines for investment, research, and development. Furthermore, the government has poured billions of dollars into building new chip factories and developing domestic chip design capabilities. This includes the "Made in China 2025" initiative, which aims to achieve self-sufficiency in key technologies.

Taiwan

The semiconductor industry is a critical driver of Taiwan's economy, contributing significantly to its GDP and employment. Therefore, Taiwan has a substantial interest in safeguarding its semiconductor industry against potential disruptions. Taiwan also faces competition from other countries seeking to capture a larger share of the semiconductor market. In other words, Taiwan's future is closely intertwined with the global semiconductor industry. Navigating the current challenges and capitalizing on opportunities will be crucial for Taiwan's continued economic prosperity and technological advancement.

Japan

Japan, like many other countries, has been significantly affected by the global semiconductor shortage. Japan is home to major automobile manufacturers like Toyota, Honda, and Nissan. The semiconductor shortage has disrupted the production of vehicles, leading to delays and reductions in car manufacturing. This has had a significant economic impact on the automotive sector, which is a critical component of Japan's economy. Japanese semiconductor manufacturers, such as Toshiba, Renesas, and Kioxia (formerly Toshiba Memory Corporation), are significant players in the global semiconductor market. The shortage has affected their production capabilities and exports, potentially impacting Japan's trade balance and economic growth.

Japan has collaborated with Taiwanese semiconductor companies and invested in facilities in Taiwan. This collaboration deepens Japan's stake in the stability of the Taiwan Strait region and its connection to the semiconductor industry.

The China-Taiwan conflict creates geopolitical tensions in the region. Japan has strong strategic interests in the Asia-Pacific and has expressed concerns about regional stability. As a close U.S. ally, Japan shares interests with the United States in maintaining

peace and security in the region. Furthermore, Japan views the Taiwan Strait conflict as having significant national security implications. It could affect the security environment in the region, prompting Japan to reassess its strategic policies and investments related to national defense and technology security.

Germany

Despite being a major industrial power, Germany lacks significant domestic chip production capacity. The country relies heavily on imports, primarily from Asian suppliers like Taiwan and South Korea. This dependence has resulted in significant vulnerabilities exposed by the global chip shortage. The automotive industry, a critical sector for Germany's economy, has been particularly affected, experiencing production delays and job losses. Germany is investing heavily in building new chip factories and expanding existing facilities. This includes a €17 billion investment by Intel in a "mega-site" in Magdeburg and a €3 billion investment by Bosch in development centers. Germany recognizes the importance of a coordinated European approach to the crisis. It is actively collaborating with other EU member states to develop a unified strategy for strengthening the European semiconductor industry. Despite these efforts, Germany faces significant challenges such as time constraints whereby The chip shortage continues to impact industries, and overcoming this requires rapid and effective solutions.

Association of Southeast Asian Nations (ASEAN)

ASEAN members are infamous for avoiding open conflict. However, should the Chinese invasion of Taiwan spill over to the region, they will not be able to treat it as a distant problem; they will be forced to confront China openly, which they have avoided despite China's repeated incursions into disputed areas. China has been ASEAN's largest trading partner since 2009 and ASEAN, in turn, became China's largest trading partner in 2020, overtaking the EU. Chinese direct investment into ASEAN has also surged, but still trails behind inflows from the U.S. and EU for the Southeast Asian bloc as a whole.

Development of Issue/Timeline

Date	Event	Outcome
1874	Karl Braun discovered and documented the first semiconductor diode effect.	Braun observed that a current flows freely in only one direction.
1901	The first semiconductor device 'Cat Whiskers' was patented.	Jagadis Chandra Bose, a professor of physics at Presidency College in Calcutta, India, demonstrated the use of galena (lead sulfide) crystals contacted by a metal point to detect millimeter electromagnetic waves. In 1901 he filed a U.S patent for a point-contact semiconductor rectifier for detecting radio signals. This milestone thus paved the way for many other inventors to experiment with alternative materials, and these alternatives played a significant role in World War II.
August 1, 1949	Chinese Civil War	After World War II, China broke out into a civil war between the Chinese Nationalist Party (led by Chiang Kai-shek) and the Chinese Communist Party (led by Mao Zedong). CCP emerged victorious, causing Kai-shek to flee to Taiwan, establishing the Republic of China, while CCP established PRC on the mainland.

1971	UN passes Resolution 2758	The resolution recognizes PRC as “the only legitimate representative of China to the United Nations”. The ROC government in Taiwan had therefore lost its UN seat.
January 1, 1979	Taiwan Relations Act	After U.S.A formally recognized the PRC as the legitimate government of China, it severed diplomatic relations with Taiwan. However, the Taiwan Relations Act commits the U.S. to provide defense support to Taiwan.
February 21, 1987	TMSC founded	Taiwan emerges as a key player in the semiconductor industry.
January 18, 1991	Organic Law for the Mainland Affairs Council	The Mainland Affairs Council is formally established to function as the administrative agency under the Executive Yuan and is responsible for the overall planning of policies related to the mainland. More importantly, however, it regulates Taiwan’s relations with PRC.
March 14, 2005	China passes anti-secession law	The “Anti-secession Law”—a domestic law unilaterally enacted by China—claims that Taiwan is a part of China and suggests

		that non-peaceful means may be arbitrarily employed by China to achieve unification.
May 8, 2015	Made in China 2025 initiative	China launched the Made in China 2025 initiative which aims to boost domestic semiconductor production while reducing reliance on foreign technology, including from Taiwan.
2020-2021	Semiconductor Shortage	As a result of the COVID-19 pandemic, A global semiconductor shortage occurs due to increased demand for electronics during the COVID-19 pandemic.
October 7, 2022	USA imposes export controls	Export controls were imposed on certain semi-conductor equipment and technology to prevent them being used for military purposes by PRC. the U.S. government enacted a series of new export control regulations targeting China’s artificial intelligence (AI) and semiconductor industries. While most Americans are likely only faintly aware of the October 7 policy and its significance, the date marked the beginning of a new era in U.S.-China relations and, with it, international politics. These controls impact global semiconductor supply chains.

Previous Attempts to Solve the Issue

One-China Policy

The "One-China Policy" is a diplomatic stance that acknowledges the PRC as the sole legitimate government representing all of China, including Taiwan. As a result, most countries in the world, including the U.S., do not maintain official diplomatic relations with Taiwan. Still, this policy provides a framework for maintaining peace in the Taiwan Strait. By acknowledging the PRC's sovereignty over Taiwan, it discourages countries from supporting Taiwan's independence, which could lead to conflict.

The world's dependence on Taiwan for semiconductor manufacturing has grown significantly over the years. Many leading technology companies rely on TSMC for advanced chip production. Regarding its role in addressing the semiconductor shortage, political or military conflict in the Taiwan Strait could disrupt semiconductor production, leading to global shortages and economic impacts. Furthermore, the "One-China Policy" may indirectly contribute to stability in the global semiconductor supply chain by encouraging countries to engage in economic relations with the PRC, including semiconductor trade.

Despite broadly consistent statements, the policy concerning Taiwan remains somewhat ambiguous and subject to different interpretations. Apart from questions about what the policy entails, issues have arisen about whether U.S. Presidents have stated clear positions and have changed or should change policy, affecting U.S. interests in security and democracy. Policy makers have continued to face unresolved issues, while the political and strategic context of the policy has changed dramatically since the 1970s. Since the early 1990s, U.S. interests in the military balance as well as Taiwan's security and democracy have been challenged by the PRC's military buildup (particularly in missiles) and potential coercion, moves perceived by Beijing for Taiwan's de jure independence under the Democratic Progressive Party's (DPP's) president (2000-2008), and resistance in Taiwan by the Kuomintang (KMT) party to investing in self-defense.

However, disagreements remain about the PRC's goal of political talks for unification, Taiwan's status, Taiwan's self-defense, and U.S. arms sales and other cooperation with Taiwan. On September 23, 2014, 29 Members of the House sent a letter to Secretary of State John Kerry, calling for a new Taiwan Policy Review (after 20 years) to examine expanded engagement with Taiwan.

Diversification of the supply chain

The U.S. government has been exploring measures to boost domestic semiconductor manufacturing and reduce reliance on foreign sources, including Taiwan and China. Legislative proposals and investments have been made to enhance semiconductor research, development, and manufacturing capabilities. On the other hand, Taiwan has also been investing in the expansion of its semiconductor industry. Efforts include attracting talent, improving infrastructure, and collaborating with international partners to strengthen the supply chain.

Many companies are actively seeking to diversify their semiconductor supply chain by engaging with multiple foundries and suppliers. This strategy helps reduce dependence on a single source and mitigates risks associated with geopolitical tensions. To strengthen this, governments are implementing stricter export controls and regulations on semiconductor-related technologies. This is aimed at preventing the transfer of sensitive technologies to regions of concern, thereby reducing security risks. Simultaneously, countries are investing in domestic semiconductor production to reduce their reliance on overseas manufacturers. This includes government incentives and subsidies to encourage the establishment of semiconductor manufacturing facilities.

While these steps have increased public awareness of the risks of the shortage, resulting in increased risk-mitigation strategies and transparency, companies and governments continue to face certain issues. These include balancing cost-effectiveness with redundancy in the supply chain, Unforeseen challenges in securing suitable locations

with necessary infrastructure, and Ongoing geopolitical tensions impacting the speed of diversification efforts.

Multilateral organizations

As geopolitical tensions between China and Taiwan heightened, and concerns over potential disruptions to the semiconductor supply chain increased, some industry leaders and policymakers began advocating for multilateral efforts to mitigate risks and ensure the stability of the semiconductor industry. As a result, discussions and proposals emerged at international forums, emphasizing the need for collaboration to secure the semiconductor supply chain.

International organizations, such as the World Trade Organization (WTO) and the World Semiconductor Council (WSC), are working to address trade and technology issues in the semiconductor industry. The aforementioned entities explored the creation of task forces or working groups to address semiconductor supply chain risks; these organizations facilitate dialogue and cooperation among nations. Furthermore, countries with a significant stake in semiconductor production engaged in talks to establish cooperative frameworks.

While collaborative efforts led to increased awareness and coordination on semiconductor supply chain risks, challenges included achieving widespread participation, overcoming political barriers, uneven implementation, and varying levels of commitment from different nations.

The World Semiconductor Council (WSC)

WSC is an international forum that brings together industry leaders to address issues of global concern to the semiconductor industry. The World Semiconductor Council (WSC) meets annually at a CEO level in May and issues a Joint Statement that includes a set of recommendations to the governments and authorities of the six

participating regions. Following each meeting of the WSC, government/authority officials from each of the six participating regions hold a meeting. Known as the “Government/Authorities Meeting on Semiconductors (GAMS),” this meeting is a forum for government/authorities to discuss, reach agreement, and take action on the WSC’s recommendations. WSC industry representatives also hold a joint meeting with the GAMS at this time to introduce the WSC recommendations and better understand the conclusions of the GAMS meeting. Furthermore, its Market Committee prepares the joint report with associations using various statistics on semiconductor trends, such as market size, applications, CAPEX, R&D and trends.

The WSC has provided a platform for industry leaders and government officials to discuss the crisis and develop joint solutions, published reports and data on the chip shortage, providing valuable insights to stakeholders, urged governments to avoid protectionist policies that could further restrict the global supply chain, and has encouraged governments and businesses to invest in new chip factories and research and development to increase production capacity. However, it continues to face challenges due to the lack of authority to enforce its recommendations, relying on voluntary cooperation from governments and industry; the WSC primarily interacts with large corporations and governments, potentially overlooking smaller players and specific regional challenges. While the WSC addresses long-term challenges, it hasn’t offered immediate solutions to address the current shortage.

Possible Solutions

Public-Private Partnerships

The semiconductor crisis requires urgent attention. Immediate action is needed to boost semiconductor production and address supply chain vulnerabilities. Public-private partnerships can be established swiftly to expedite the development and implementation of solutions and can be established at both national and international levels, involving governments, industry players, and research institutions from various countries.

Fostering public-private partnerships to jointly invest in semiconductor manufacturing, research, and development, will reduce the risks associated with overreliance on private-sector actors. Such partnerships become more appealing when risks and rewards are shared, making it more attractive for private firms to invest in the semiconductor industry, which often involves high upfront costs and long development cycles. Furthermore, companies can adopt blockchain technology to enhance transparency and traceability within the semiconductor supply chain, reducing risks associated with counterfeit components and data breaches.

Enhanced Export Monitoring

Enhanced export monitoring involves collaboration between government agencies responsible for trade and commerce, as well as relevant industry stakeholders. This includes customs and border protection authorities, trade ministries, semiconductor manufacturers, and other entities involved in the semiconductor supply chain. It requires cooperation between exporting and importing countries to create a standardized and effective system for monitoring semiconductor exports across borders; this is vital as monitoring exports can help identify and prevent the unauthorized export of sensitive technologies that could pose security risks.

Strengthen export monitoring mechanisms to ensure that sensitive semiconductor equipment and materials are not diverted to entities of concern. Use trade safeguards, such as safeguards and anti-dumping measures, judiciously to prevent market distortions while avoiding escalations in trade disputes that could impact the semiconductor industry. Additionally, enhanced export monitoring can help prevent the hoarding and stockpiling of semiconductors by certain entities. By monitoring exports, governments can identify and address practices that contribute to the shortage.

Enhanced export monitoring contributes to market stability by preventing speculative actions that can lead to fluctuations in semiconductor prices. This benefits both producers and consumers in the long run.

Diversify Supply Chains

Diversifying supply chains in the semiconductor industry means reducing dependence on a single source or region for the production of semiconductors. This can be achieved by encouraging the establishment of semiconductor manufacturing facilities in multiple countries and fostering collaboration among international partners. Establishing diversified supply chains requires strategic planning, investments, and policy changes that should be implemented as soon as possible to address the current shortage and prevent future vulnerabilities.

A diversified supply chain is more resilient to unexpected shocks, such as natural disasters, geopolitical tensions, or other disruptions. If one region faces challenges, other manufacturing facilities can compensate, ensuring a continuous and stable semiconductor supply.

To address the most important issue of all, diversifying supply chains is crucial to meeting the growing demand for semiconductors. As technology advances and more industries rely on semiconductor components, a diversified supply chain can accommodate increased production requirements.

Improve Domestic Production

Improved domestic production refers to increasing the capacity and capabilities of semiconductor manufacturing within a country. This can involve investments in research and development, incentives for semiconductor companies, and the creation of a

conducive regulatory environment to encourage domestic production. Establishing a robust domestic production infrastructure should be a priority to ensure long-term resilience.

Improved domestic production should take place in countries that are major consumers of semiconductors. This can be applicable globally, depending on the economic and technological capabilities of each nation. The strategy involves establishing or enhancing semiconductor manufacturing facilities within a country's borders. A strong domestic semiconductor industry is essential for national security. It ensures a secure and reliable supply of critical components for various sectors, including defense, telecommunications, and infrastructure. By reducing dependence on Taiwan, which is a major hub for semiconductor manufacturing, improved domestic production can help mitigate the risks associated with geopolitical tensions in the Taiwan Strait. This reduces the potential impact of conflict-related disruptions.

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