

Tower Semiconductor Acquisition: Advancing Intel's Presence in the Global Market

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This paper delves into the economic event surrounding Intel Corporation's high-profile acquisition of Tower Corporation. It aims to investigate the reasons behind Intel's decision to acquire Tower, employ the SWOT analysis method to evaluate the event, and examine its impact on relevant stakeholders. The findings indicate that Intel's acquisition of Tower was driven by objectives such as strengthening business areas, expanding market share, technological innovation and development, and future development strategy. Through the application of SWOT analysis, it becomes evident that the advantages of the acquisition lie in strengthening technical capabilities and expanding business segments, while simultaneously facing challenges such as integration complexities and pressure. The significance of this paper lies in gaining a comprehensive understanding of the strategic motivations and potential impacts associated with corporate acquisitions, thereby providing valuable insights for decision-making processes. The innovation lies in the comprehensive utilization of SWOT analysis to holistically evaluate the acquisition event, enabling a thorough assessment of its various aspects. For government and policymakers, they should strengthen regulation of corporate takeovers to ensure fair and transparent market competition, provide support and incentives, and strengthen cooperation to develop common policies and norms. As for enterprises, it is advised that strategic planning and comprehensive consideration should be formulated and carried out when making acquisitions. Also, stakeholders should actively participate in and monitor the process of corporate acquisition discussion and decision-making, and strengthen cooperation to ensure fair competition, maximizing the interests of all parties.

Keywords: intel corporation, tower corporation, acquisition, strategic motivation, potential impacts, SWOT analysis, cooperation

Introduction

Tower Semiconductor (TowerJazz) is an Israel-based semiconductor enterprise that was established in 1993. TowerJazz distinguishes itself in the realm of analog and mixed-signal integrated circuit (IC) design, fabrication, and distribution. The global reach of this company is evident through its numerous fabrication plants situated strategically across Israel, the United States, and Japan. On a parallel note, Intel Corporation, an American multinational technology corporation instituted in 1968, specializes predominantly in computer hardware, software, and allied technical services. With exceptional acumen in chip manufacturing and design, Intel holds a preeminent position as one of the foremost chip fabricators worldwide. In a noteworthy turn of events, Intel

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revealed its intent to procure three of TowerJazz's manufacturing facilities, such as the prestigious Mibelam manufacturing facility in Israel and the esteemed Nasdaq manufacturing facility in the United States, for a substantial sum of \$85 million. Subsequently, this transaction culminated in December 2019. In a nutshell, this acquisition propels Intel's trajectory towards becoming a prominent global provider of foundry services and manufacturing capacity, bolstering its position as one of the industry's most diverse technology portfolios. This mutually advantageous transaction unites Intel's cutting-edge nodes and extensive manufacturing scale with Tower Semiconductor's specialized technologies and customer-centric approach. By combining forces, the collaboration aims to offer customers worldwide an unparalleled combination of leading technology, robust manufacturing capabilities, and elevated value (Mena Report, 2022).

The aforementioned agreement presents Intel with a prime opportunity to augment its prowess in the fabrication and design of analog and mixed-signal chips. These domains are of utmost significance for the advancement of cutting-edge computer and communication devices, thereby undergoing a rapid expansion. Through the acquisition of TowerJazz's business, Intel effectively broadens its horizons and fortifies its market presence within these niches. Simultaneously, this deal bolsters the standing of Israel's semiconductor industry. Israel, revered as a global hub for semiconductor innovation and manufacturing, boasts substantial technological expertise and profound manufacturing prowess in this sphere. By extension, this transaction furnishes crucial financial and technical backing to the Israeli semiconductor industry, thus catalyzing its innovation and growth trajectory. In view of these deliberations, it becomes evident that Intel's procurement of TowerJazz underpins Intel's unwavering commitment to fortifying its competitive edge within the realm of analog and mixed-signal chips, while exuding unwavering confidence in the trajectory of Israel's semiconductor industry.

Consequently, this paper aims to explore three key aspects of this momentous economic event, namely the rationale behind the acquisition, an analysis of the acquisition's characteristics through a SWOT analysis, and the far-reaching implications engendered by this significant acquisition. This discourse ultimately serves to shed light on the paramount role played by the semiconductor market in today's global landscape.

The structural framework of this paper encompasses distinct sections, each serving a specific analytical purpose. The initial section delves into a comprehensive examination of the underlying rationales precipitating the acquisition in question. Building upon this foundation, the subsequent section systematically dissects the intricate characteristics and attributes associated with said acquisition, employing a discerning lens to conduct a SWOT analysis. Finally, the third section entails a cogent exploration of the discernible impact derived from this acquisition, gauging its significance in shaping the prevailing landscape of the industry at large. By virtue of this meticulously organized structure, this paper endeavors to provide a holistic and in-depth understanding of the multifaceted dimensions of the discussed acquisition, offering invaluable insights from both a macro and micro perspective.

Reasons for Acquisition (Motivation)

Strengthen Business Areas

The distinction between Intel Corporation and Tower Corporation lies in their respective areas of focus within the semiconductor industry. Intel primarily specializes in the manufacturing and design of digital chips, whereas Tower is dedicated to analog and mixed signal chips. "Tower's specialty technology portfolio, geographic reach, deep customer relationships and services-first operations will help scale Intel's foundry services and advance our goal of becoming a major provider of foundry capacity globally," said Pat Gelsinger, Intel CEO (Electronics Bazaar, 2022). Tower products can stand out among similar competitors due to several key factors:

Technological advantage. Tower may possess unique and advanced technologies, endowing its products with notable advantages in terms of performance, functionality, or efficiency. Specifically, in terms of performance, Tower's chips exhibit superior capabilities with higher processing speeds and enhanced computing power, resulting in improved performance across various application domains. From a functional perspective, Tower's chips offer an array of advanced features, including faster data transfer speed, increased storage capacity, and expanded interface options. These features provide users with a broader range of choices and enhanced convenience. Furthermore, Tower's chips excel in efficiency, particularly in energy management and power control. Through optimized design and energy-saving technology, their products deliver lower energy consumption while maintaining the same level of performance, translating to extended battery life for users. These technological advancements can stem from innovative patented technologies, distinctive design concepts, or advanced manufacturing processes.

Quality and reliability. Tower products are known for their high quality and reliability, meeting the exacting standards of customers and operating effectively in demanding application environments. Tower's reputation for delivering reliable products builds trust among customers and enables its products to excel in a competitive market.

Customization capability. Tower excels in catering to customer customization requirements. The company possesses a strong ability to tailor designs and developments to meet specific customer needs. For example, it deserves to be mentioned that a specific interconnect model for transmission lines was developed specifically for the SBC18 Tower Jazz process, aiming to be utilized at Maxim Integrated Products. This model possesses the capability to forecast the series inductance and resistance of the line, as well as the shunt capacitance and conductance resulting from the substrate. It incorporates simulations for both single-ended and coupled lines. The model accounts for the skin effect to enhance reliability at higher frequencies (Harker, 2014). By fulfilling personalized customer demands, Tower's products can acquire distinct characteristics, allowing them to outperform competitors in the market.

Supply chain and production capacity. Tower boasts a well-established supply chain and efficient production capacity. This enables them to deliver products promptly, meeting customer demands and maintaining a competitive edge. Tower's strength in the supply chain and production capacity grants them advantages in terms of customer delivery times, flexibility, and cost-effectiveness compared to their competitors. According to the data from FangZheng Securities Research Institute (please see Figure 1), Tower is ahead of the industry in terms of production, and has made breakthroughs in technology in many aspects.

By integrating these factors into its overall strategy, Tower Corporation positions itself as a robust player in the semiconductor market, differentiating itself from Intel and other rivals in the industry.

Expand Market Share

Tower, a globally renowned manufacturer of analog chips and a dominant player in discrete analog components, holds a prominent position in the industry. While Intel, a company headquartered in California, announced the agreement with the aim of enlarging its worldwide presence, manufacturing capacity and technology portfolio in order to effectively address the exceptional industry demand (UPI Top US News, 2022). If Intel were to acquire Tower, it would fuel the expansion of Intel's market share and bolster its competitiveness in the semiconductor market and restore Intel's effective competitiveness in the chip industry market share. This acquisition would enable Intel to offer a wider array of products and services, enriching the semiconductor market with greater diversity and abundant technological solutions.

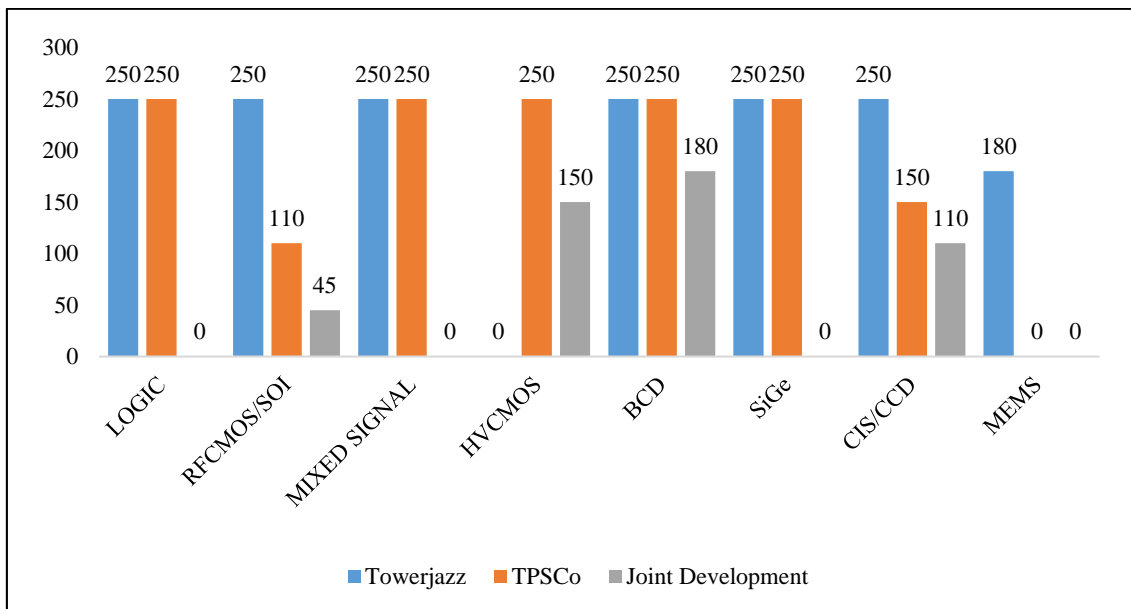


Figure 1. Some aspects of Tower technology progress ahead of the same industry manufacturers. Unit: nm; Data Sources: FangZheng Securities Research Institute; Photo credit: Original.

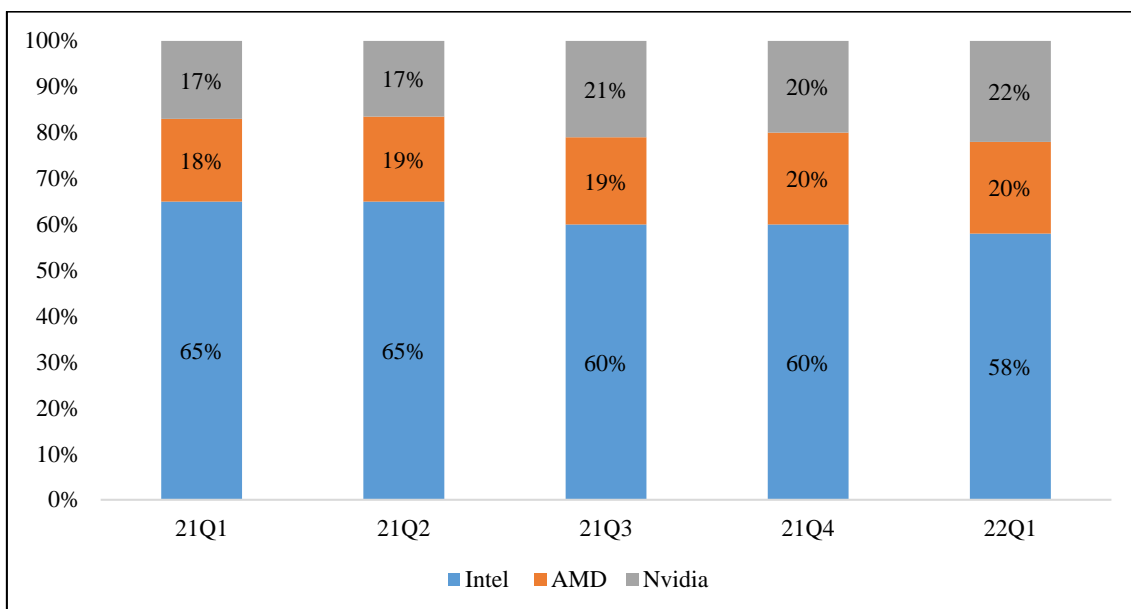


Figure 2. From 2019 to 2022, changes in the shipment market share of major enterprises in the global GPU chip industry. Data Sources: Jon Peddie Research Foresight Industry Institute; Photo credit: Original.

According to the data from Jon Peddie Research Foresight Industry Institute (please see Figure 2), from 2021 to 2022, Intel experienced a gradual decline in its global shipment market share within the GPU chip industry. The decline can be ascribed to two principal factors. Firstly, Intel finds itself immersed in a formidable battleground of competition against well-established contenders like NVIDIA and AMD. These competitors possess industry-leading technology and comprehensive product portfolios specifically tailored to the GPU field, thereby capturing a significant portion of the market share. Secondly, Intel’s GPU technology may lag behind its competitors in certain aspects. These competing companies may offer superior performance, lower power

consumption, and more innovative products, thereby attracting a segment of users. As a result of this ongoing trend, Intel should proactively explore novel avenues for collaboration or acquisitions. By acquiring relevant entities, Intel can leverage complementary capabilities and rejuvenate its competitive edge, enhance its GPU technology, and better cater to the evolving needs of its user base.

Technological Innovation and Development

By acquiring Tower Corporation, Intel Corporation has gained access to Tower's patents and technologies, providing Intel with a significant edge in technological innovation and advancement. This acquisition empowers Intel to leverage Tower's expertise and cutting-edge technologies to develop novel semiconductor chips that cater to the evolving demands of the consumer market. By 2026, it is estimated that the worldwide semiconductor market will attain a value of USD 730.29 billion, showcasing a commendable compound annual growth rate (CAGR) of 5.2% throughout the projected duration. The escalating adoption and usage of consumer electronic devices are anticipated to stimulate the demand for semiconductors within this projected period. Additionally, the escalating demand for sophisticated semiconductor chips across diverse industrial domains is poised to greatly enhance the proliferation of the semiconductor market in the forthcoming years. Moreover, the pervasive integration of smartphones is predicted to fuel the requisition for semiconductors, resulting in a substantial surge in revenue within the semiconductor market (Financial Services Monitor Worldwide, 2020). Additionally, it enhances Intel's potential to explore uncharted market territories, expanding their reach and impact in the semiconductor industry.

Future Development Strategy

According to Dr. Randhir Thakur, the President of Intel Foundry Services, the invaluable decades of foundry expertise possessed by Power, along with their extensive customer relationships and technological offerings, will expedite the growth of Intel Foundry Services. The objective of Intel Foundry Services is to establish itself as a customer-centric technology innovator, equipped with an expansive assortment of intellectual property (IP), services, and manufacturing capacity. Through the collaboration between Tower and IFS, an extensive range of foundry solutions will be made available on a global scale, facilitating the realization of our customers' ambitions (Plus Company Updates, 2022). The acquisition aligns perfectly with Intel's ambitious strategy for future growth. As Intel Corporation ventures into novel technology domains, including cloud computing, artificial intelligence, and the Internet of things, the addition of Tower Company to its portfolio enables a heightened emphasis on advancing and investing in these areas. This strategic move not only strengthens Intel's position within emerging technologies but also fosters focused development in key sectors, propelling their presence and influence to new heights.

SWOT Analysis

Strengths and Weaknesses

Intel Corporation boasts formidable technology and expertise in chip manufacturing and design, solidifying its position as one of the world's foremost semiconductor manufacturers. The acquisition of Tower presents Intel with an opportunity to extend its reach into new business segments, augment its market share, and leverage Tower's technological advancements and industry experience to propel the development of innovative products and technologies. Tower's technical prowess encompasses various aspects, including pioneering product design

characterized by unique chip architectures, patents for pivotal technologies, and enhanced functionalities. Such disruptive designs confer Intel's products with competitive advantages in performance, power consumption, integration, and other crucial areas. Moreover, Tower's utilization of advanced process technologies, exemplified by cutting-edge semiconductor nodes like 7 nm and 5 nm, grants their products higher levels of integration, lower power consumption, and superior performance. These advanced technological benefits position Tower favorably in the market.

While Intel excels in digital chip technology, its comparative advantage in analog and mixed signal chips is not as pronounced. Consequently, the acquisition of Tower addresses this particular shortfall, although it necessitates a dedicated investment of time and resources to facilitate adjustment and development in this domain. For instance, TI, a prominent semiconductor company, has established itself as a leader in analog and mixed-signal chips. Their product portfolio includes a diverse selection of analog and mixed-signal chips known for their dependable performance and exemplary design solutions. ADI specializes in the design and manufacturing of analog and mixed-signal chips. With a rich history and extensive experience in this domain, they are dedicated to fostering innovation and propelling technological advancements. Maxim Integrated, a leading global company in analog IC design, prioritizes delivering high-performance, energy-efficient, and reliable analog and mixed-signal solutions across a wide range of applications.

Opportunities and Threats

The semiconductor market is undergoing significant transformations, with notable advancements witnessed in sectors like electric vehicles, artificial intelligence, and the Internet of things. As per the publication titled "Semiconductor Market Size, Share & Industry Analysis" by Fortune Business Insights, the comprehensive report outlines that the semiconductor market, encompassing various components such as memory devices, logic devices, analog ICs, MPU, discrete power devices, MCUs, sensors, and others, achieved a valuation of USD 488.07 billion in the year 2018. Moreover, the report delves into the segmentation of the market based on applications, including networking & communications, data processing, industrial, consumer electronics, automotive, government, and others. The forecast period of the report spans from 2019 to 2026, shedding light on the size and growth prospects of the semiconductor industry (Plus Company Updates, 2020). Tower caters to rapidly expanding markets such as mobile, automotive, and power. The company possesses a strategically positioned foundry footprint with facilities in the United States and Asia, effectively serving fabless companies and integrated device manufacturers (IDMs). Additionally, Tower adopts a customer-centric approach, prioritizing the needs of its foundry clients through an industry-leading customer support portal and IP storefront. The company also offers comprehensive design services and capabilities (ENP Newswire, 2022). The acquisition of Tower positions Intel favorably to expand its presence in these areas, effectively catering to future market demands and exploring novel business opportunities.

Nevertheless, the acquisition of Tower does entail certain potential risks and threats. One such concern pertains to the long-term integration costs and challenges that may arise from merging the two entities. It remains crucial to assess whether the merger can successfully accomplish its intended objectives and deliver the desired outcomes, particularly in terms of seamlessly integrating technological innovations and harmonizing marketing activities. Furthermore, the acquisition process may encounter obstacles in terms of stress detection and regulatory approval, subsequently impacting the timeline and progress of the merger. These hurdles necessitate careful navigation and management to ensure a successful and smooth consolidation.

Acquisition Impact

Business Strategy Perspective

Looking at the business strategy perspective, the acquisition of Tower presents several advantages for Intel. Firstly, this deal enhances Intel's manufacturing and design capabilities specifically in analog and mixed-signal chips. By expanding into this field, Intel reduces its reliance on digital chemistry, thereby ensuring a diversified business portfolio.

Secondly, the acquisition enables Intel to advance its chip manufacturing technology, strengthening its position in the market and enhancing competitiveness. This move empowers Intel to stay at the forefront of technological advancements and meet evolving customer demands effectively. By satisfying the escalating worldwide requirement for semiconductor manufacturing capacity, this acquisition positions the company as a significant provider of foundry capacity based in the United States and Europe, supplying customers on a global scale. The acquired entity, IFS, boasts cutting-edge process and packaging technology, a steadfast commitment to capacity in the US and Europe (with potential expansions into other regions), and an extensive portfolio of valuable intellectual property (IP) (Internet Business News, 2022).

Furthermore, Intel's acquisition of Tower brings valuable financial and technical support to the company. This infusion of resources allows Intel to continue driving innovation and propelling the development of future technologies and processes, cementing its position as a leader in the industry.

Perspective of Technological Innovation

When considering technology innovation, this acquisition presents Intel with a multitude of opportunities to foster innovation and drive technological advancements. In addition, the acquisition represents a notable stride in Intel's IDM 2.0 strategy, manifesting as an expansion of the company's manufacturing capabilities, global presence, and technological repertoire in response to unparalleled demand within the industry (Smart Photography, 2022). Intel can leverage this acquisition to enhance and advance its analog and mixed-signal chip technology, while capitalizing on Tower's expertise and capabilities to create new and innovative products.

Through this transaction, Intel stands to gain substantial benefits from Tower's existing business. This encompasses the opportunity to leverage proprietary technology, cutting-edge research laboratories, and invaluable expertise in driving advancements across key domains. Such synergistic advantages will empower Intel to strengthen its technological capabilities and maintain a leadership position in driving innovation within the industry.

Geopolitical Perspective

From a geopolitical perspective, the acquisition holds significant importance for Israel and the United States alike. Tower Semiconductor operates strategically located foundries in the United States and Asia, effectively catering to fabless companies and integrated device manufacturers (IDMs). With a capacity of over 2 million wafer starts per year, Tower provides ample manufacturing capabilities, including growth potential in Texas, Israel, Italy, and Japan (Dataquest, 2022). Therefore, that makes huge geopolitical sense. On the other hand, in the realm of Israel's semiconductor industry, Tower stands as a preeminent entity, boasting cutting-edge technologies and extensive proficiency that have the potential to fortify Israel's standing within the global semiconductor market. Correspondingly, Intel, a prominent American corporation deeply entrenched in chip design and manufacturing, assumes a pivotal role in bolstering the United States' economy and technology sector. Consequently, this acquisition possesses the capability to cultivate heightened economic and technological

cooperation between Israel and the United States, yielding novel prospects and expanded markets for the semiconductor industry in both nations.

Summary

Overall, the acquisition of Tower Company by Intel exerts a profound influence on Intel's strategic framework, technical prowess, market competitiveness, and geopolitical dynamics. Simultaneously, this event generates a positive ripple effect, elevating the overall standard of the regional industry. Consequently, the acquisition is widely perceived as a mutually beneficial collaboration between the two entities, fostering positive cooperation and synergy.

Conclusion

In a nutshell, this paper revolves around the significant economic event of Intel Corporation's acquisition of Tower, a corporate transaction that has garnered significant attention. The motivation behind Intel's acquisition of Tower, as well as the intricacies of the acquisition process, holds substantial merit for discussion.

The primary research objective of this paper is to perform a comprehensive SWOT analysis based on the rationales driving Intel's decision to acquire Tower. Additionally, the paper aims to evaluate the multifaceted impact of this acquisition on various pertinent aspects. Such research carries immense significance as it enables us to comprehend the strategic motivations underlying corporate acquisitions and assess the potential repercussions they may yield. The findings will offer valuable insights and assist relevant stakeholders in making informed decisions and adjustments, rendering the study an instrumental point of reference.

Based on an in-depth examination of Intel's acquisition of Tower, the analysis reveals that the primary drivers behind this strategic move include expanding market share, acquiring crucial technologies and intellectual property rights, and enhancing overall competitiveness. These factors offer strategic advantages and prospects for long-term gains. An extensive SWOT analysis further uncovers that the acquisition bolsters Intel's technical prowess, market channels, and brand influence, contributing to overall advantages. However, challenges such as integration complexities and competitive pressures also exist. Furthermore, there are opportunities stemming from market demand growth and potential partnerships, while threats may arise from competitors and shifts in market trends.

The research unequivocally demonstrates that Intel's acquisition of Tower will significantly impact the market competition landscape, technological innovation, and employment opportunities in the industry. This acquisition has the potential to stimulate industry consolidation and innovation, driving progress and growth. Nevertheless, it is important to consider potential concerns regarding increased competition and employment dynamics. The findings underline the transformative potential of acquisitions while emphasizing the need for careful analysis and consideration of the associated consequences.

It is crucial to offer recommendations to policymakers, businesses, and other stakeholders involved. Government regulators should enhance their oversight of corporate acquisitions to ensure a fair and transparent market competition. The regulators should conduct thorough reviews and assessments of the impact of acquisitions on the competitive landscape, particularly in cases where there is a risk of monopoly or monopolistic tendencies in the relevant sector. To promote technological innovation and industrial development during the acquisition process, policymakers should offer support and incentives. These measures could encompass funding for research and development (R&D), preferential tax policies, or technical collaboration aimed at driving

innovation and enhancing competitiveness in the relevant industries. To ensure transparency and compliance in corporate acquisitions, government agencies should strengthen their collaboration and establish shared policies and norms. Different sectors should collaborate to evaluate the impact of acquisitions on the national economy, industrial chains, and technological ecosystems. Based on this evaluation, appropriate policies and measures should be formulated to safeguard the public interest. Enterprises engaging in acquisitions should prioritize strategic planning and consider various factors comprehensively. Sufficient due diligence should be performed prior to the acquisition to gain a deep understanding of the target company. Clear integration plans should be developed to maximize the synergies derived from the acquisition. Concurrently, internal controls and communication should be strengthened to ensure the successful execution and implementation of the acquisition. All relevant stakeholders should actively participate in and closely monitor the discussions and decision-making processes related to corporate acquisitions. Stakeholders should strengthen their cooperation to ensure equitable competition and maximize the benefits for all parties involved. This can be achieved through information sharing, cooperative exchanges, and regular communication channels.

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