THAILAND INVESTMENT REVIEW

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CIRCUITOF INNOVATION: Powering Thailand as a Smart Electronics Powerhouse



BOI NET APPLICATION

January-March 2024



Total Foreign Investment 460 Projects USD 4.66 Billion

17 Section	FOREIGN INVESTMENT BY TARGET SECTORS			
	First S-Curve		New S-Curve	
	Electronics 91 Projects I USD 2,0	999.39 M	Digital 23 Projects I USD 382.75 M	
	Automotive 66 Projects I USD 55	0.93 м	Medical 7 Project I USD 29.29 M	
	Petrochemical & Chemicals 46 Projects USD 41	s 2.29 м	Automation & Robotics 4 Projects USD 17.81 M	
	Tourism6 Projects I USD 168	.50 M	Biotechnology 1 Projects I USD 15.69 M	
	Agriculture & Food Process 22 Projects USD 10	ing 8.31 M	Aerospace 1 Projects I USD 5.50 M	

FOREIGN INVESTMENT BY MAJOR ECONOMIES



Unit: USD (1 USD = 36.3315 THB as of 26 July 2024)

Note: Investment projects with foreign equity participation from more than one economy are reported in the figures for both economies. Statistics on net applications are adjusted whenever applications are returned to applicants due to insufficient information. For more details, please visit **www.boi.go.th**

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Thai Economy at A Glance



The Power of Emerging Technologies in Thailand's Electronics Transformation

As the world progresses into an era characterized by rapid technological advancements, traditional industries are undergoing significant transformations. A prime example of this evolution is the electronics industry, where a variety of cutting-edge technologies are at the forefront of relentless change

Recently, the electronics industry has witnessed a significant shift due to breathtaking technologies such as the Internet of Things (IoT) and Artificial Intelligence (AI). The IoT enhances the connectivity of devices via Bluetooth and the internet, enabling faster data transfer, while AI processes vast amounts of data, making it possible to undertake a broader scope of tasks. These two technologies drive the electronics industry into exciting new territory, revolutionizing how electronics are designed, manufactured, and utilized, making them more efficient, intelligent, and integrated. While technologies like IoT and

Al are crucial in making modern electronics smarter and more connected, these devices still require robust components to achieve maximum performance. This is where semiconductors play a vital role. These tiny yet powerful components serve as the 'nervous system' of many devices, such as computing systems, communication devices, renewable energy systems, and smart appliances. The advancement and integration of semiconductor technology are not just supporting but propelling the evolution of electronics, ensuring that devices are increasingly capable of meeting the demands of a digital world.

More Dynamic and Interconnected Electronics Sector

Thailand has long been a hub for the electronics industry, consistently ranking as a top producer and exporter of HDDs over the years. Despite the advent of new breakthrough technologies, Thailand's robust foundation as an electronics manufacturer remains superior to other countries in the region. This solid base positions Thailand as a prime destination for new investments in the electronics industry, especially as the ongoing conflict between the US and China is predicted to continue and intensify in the future.

The opportunities for Thailand are not just limited to the supply side; demand also accelerates this momentum. In a world where connectivity is becoming increasingly vital, electronic products such as smartphones and other smart devices have become necessities in daily life and are projected to expand even further in the future. As more people gain access to these modern electronics, semiconductorswhich help connect and control various components in electronic devices-become key to strengthening the overall industry. This ensures a more dynamic and interconnected future for the electronics sector in Thailand.

Industry Developments Boost Semiconductor Demand

The development of key industries such as EVs, renewable energy, and data centers has significantly accelerated the demand for semiconductors, as these sectors require advanced electronic parts and smart components to function effectively.

Thailand's EV industry is rapidly expanding due to ambitious policies such as the 30@30 policy. which aims to produce 725,000 ZEVs by 2030. As Thailand strives to become a hub for EVs, the industry requires a comprehensive supply chain from upstream to downstream, including electronic parts and components. EVs rely on sophisticated electronic components like semiconductors, which are integral to battery management systems, power electronics, and advanced sensors to ensure optimal performance and safety. This presents a significant opportunity for semiconductor investors to meet this growing demand.

Thailand is committed to achieving 30% renewable energy in its total energy consumption by 2037, carbon neutrality by 2050, and net zero emissions by 2065. Meeting these ambitious targets necessitates substantial contributions from the energy sector. Transforming traditional energy sources to renewable energy requires the development of smart systems that depend heavily on advanced electronics for efficient energy conversion, storage, and distribution. Semiconductors and other smart electronic components are essential for maximizing energy output and ensuring the stability of the power grid.

Thailand is also home to more than 30 data centers, ranking 6th in Asia and 3rd in ASEAN. With plans from major firms like Microsoft and Amazon to build data centers in Thailand, there will be a proliferation of cloud services, IoT, and digital businesses, all of which demand robust infrastructure. Consequently, the growth of data centers significantly boosts the demand for semiconductors and other relevant electronic parts, contributing to the overall expansion of the industry.

R&D and Innovation to Facilitate Transformation

Beyond external factors such as the evolving technological landscape and the impact of EVs, renewable energy, and data centers development, the government has implemented several strategic initiatives to support the industry's transition toward more advanced electronics. One key initiative is the establishment of the Eastern Economic Corridor of Innovation (EECi). Within this zone of technological development, the ARIPOLIS has been established as one of the EECi's four centers of innovation, serving as a translational research hub that connects laboratory researchers with end users. The ARIPOLIS focuses on the localization of technology for automation, robotics, and smart systems, driving the advancement and application of innovative technologies.

The Sustainable Manufacturing Center (SMC) is a pilot project within the EECi that operates with a focus on five key areas to support the competitiveness of Thailand's smart electronics ecosystem. These areas include human resource development,

The Sustainable Manufacturing Center (SMC)



business and technology matching,test beds, research and development, and standards and testing. The center aims to address shortages in the local manufacturing sector caused by a lack of skilled workforce and outdated machinery. By improving competitiveness and enhancing energy efficiency in the manufacturing process, the SMC targets improvements in industrial manufacturing, as well as the agricultural and wellness industries.

Apart from these services, the EECi ARIPOLIS also offers support for smart electronic devices through various initiatives, such as IoT system design and development, the Network Platform for Internet of Everything (NETPIE) IoT cloud platform, Industrial IoT and Data Analytics (IDA) aimed at manufacturing supply chain management, and the UNAI location tracking system. Investors operating in the EECi **ARIPOLIS** benefit from numerous privileges, such as long-term lease rights for building research centers and indoor space for R&D, access to common areas and R&D infrastructure, a sandbox environment, a pool of research experts, and more.

To further enhance competitiveness in the electronics industry, the National Electronics and Computer Technology Center (NECTEC) plays a pivotal role in supporting and promoting research and development in electronics and computer technologies. This support is helping Thailand establish itself as a thriving investment hub. For example, NECTEC has contributed to the success of various R&D projects that have increased the private sector's demand for smart devices. Additionally, NECTEC consistently works on creating and developing the infrastructure to support smart electronics.

NECTEC has also implemented specific measures to promote the growth of the smart electronics industry. These measures include enhancing the competitiveness of the traditional electronics industry, stimulating local demand for smart electronics, and developing an ecosystem to support the industry's growth, particularly in terms of systems and infrastructure. Through these efforts, NECTEC has been instrumental in driving innovation and competitiveness in Thailand's electronics sector.

All of these initiatives and ecosystem developments are equipping Thailand with new competitive advantages that support the country's ongoing journey from traditional to smart electronics. However, Thailand

is not only aiming to enhance products in the downstream industry. The country is also focusing on the upstream industry, especially in the production of semiconductors and PCBs, which are key components of nextgeneration electronic devices. With well-strategized plans and concerted efforts from both the government and private sector, opportunities in this sector are being unveiled and welcoming all investors to explore. In the Industry Focus article, you will see numerous factors shaping the ecosystem along the supply chain into a smart and innovative industry.

As Thailand continues to innovate and adapt, it is well-positioned to lead the way in the electronics industry, fostering growth and competitiveness in an increasingly technology-driven world and becoming a leader in the global electronics landscape.



Building Blocks of Success: Streamlining Thailand's End-to-End Supply Chain

Boasting a strong supply chain foundation, Thailand has long been a significant production base for the electronics and electrical (E&E) industry. Rapid technological advancements, however, mean the existing infrastructure needs to evolve if the country is to remain competitive. In response to this changing environment, Thailand is proactively enhancing both its upstream and downstream production capabilities to align with the demands of the smart electronics era.

Building the Next Level on a Solid Foundation

Traditionally, Thailand has served as a critical hub for multinational companies in the E&E sector, particularly in the electrical appliances industry. The country's extensive domestic supply chain and high utilization of locally sourced components have underpinned its manufacturing success for over 50 years. Various products manufactured in Thailand can seamlessly integrate into smart electronic systems, showcasing the country's robust industrial capabilities.

Recognizing the need to stay competitive in a rapidly changing technological landscape, Thailand is elevating its development efforts. By focusing on both upstream and other production segments, the country aims to enhance its supply chain to better support smart electronics. This strategic upgrade is essential for maintaining Thailand's position as a leader in the global E&E market.

Current Status of E&E in Thailand

Looking at the current state of Thailand's E&E industry, the country hosts 2,920 enterprises in the sector. The majority of these business ventures focus on electrical parts (27.23%), electronics (25.1%), and electrical products (18.56%), with the remainder involved in supporting and trading services. Notably, half of the 2.45 million workers in the industry are engaged in electrical businesses (55.13%), according to data from the E&E Intelligent Unit as of May 2024

In terms of market value in 2023, the total production value accounted for 97.94 billion USD while exports were valued at 74.36 billion USD. This indicates strong external demand coupled with

robust production capabilities. The top destinations for Thailand's E&E products are the USA, Japan, Hong Kong, and China, reflecting the country's extensive reach in global markets.

Although the Thai electronics industry faced slight challenges in 2023, signs of recovery are expected to emerge in the third quarter of 2024, driven by rising global demand for computers and integrated circuits in IT infrastructure and innovative new devices. This increase in demand has led to higher domestic sales and exports in the second half of the year. The value of production



is expected to rise by 6.89% in the second quarter and 4.96% in the third quarter.

Breaking down the situation by product, growth is significantly influenced by market expansion in the USA and Europe for HDDs. This expansion is fueled by the establishment of new data centers in the AI and information sectors, which require HDDs to store vast amounts of data. Additionally, integrated circuits have seen increased domestic demand, further fueling the growth of the Thai electronics industry.

Taking all of this into consideration, Thailand is looking at a positive future for E&E. The electronics industry in 2024 is expected to see a production and export increase of approximately 1.0% to 5.0% compared to the previous year. The focus on IT infrastructure and innovative new devices ensures a robust demand for electronic components. While global geopolitical risks may persist, the overall outlook for Thailand's E&E sector remains positive, with continuous monitoring and strategic responses enhancing resilience and growth.

Policy Initiatives and Strategic Goals

On the policy side, the Office of Industrial Economics (OIE) has revealed its Smart Electronics Industry Development Action Plan, aligned with the government's policy to make the electronics industry one of the country's key target industries. For the medium term (2023-2027), Thailand aims to attract no less than 50 billion baht (approximately 1.4 billion USD) in investments in the E&E sectors, up from 38.27 billion baht (approximately 1.1 billion USD) in 2017. This plan is crucial for strengthening Thailand's supply chain and enhancing its role as a key player in the global E&E market.

Thailand's success as a manufacturing hub for multinational companies, particularly in the electrical appliances industry, is built on the country's extensive domestic supply chain together with the high proportion of locally sourced components. This wellestablished supply chain supports the integration of various products manufactured in Thailand into smart electronic systems. Additionally, local electronics manufacturers have a strong technological foundation, enabling them to advance in design and value creation. As such, they are well-positioned to integrate within the industry or across industries to develop efficient smart electronic systems.

The Smart Electronics Industry Development Action Plan focuses on leveraging these strengths to further develop and modernize the supply chain. By attracting significant investments, the plan aims to enhance infrastructure, foster innovation, and nurture technological capabilities. This strategic approach will ensure that Thailand's supply chain will remain robust and adaptable, meeting the evolving demands of the smart electronics industry and underscoring the country's commitment to becoming a leader in the sector.

Additionally, to further enhance the capabilities of the E&E sector, especially in the upstream industry, the government plans to establish the National Semiconductor Policy Committee (Semiconductor Board). This initiative aims to ensure that Thailand's E&E industry develops in the right direction and maintains strong momentum, keeping a competitive edge at the global level.

Building a Workforce to Innovate E&E Industry

Thailand has been proactive in transforming its economy, moving from reliance on traditional industries to creating new, hightech, and high-value industries. This is an exciting phase for the Thai economy, especially in developing foundational industries like upstream semiconductors and advanced batteries, which are essential for a wide range of





electronics, including automobiles, machinery, automation, medical devices, and data centers.

To achieve this ambitious target, the industry needs to prioritize human resource development and the creation of a highly skilled workforce. The government's "Ignite Thailand" initiative focuses not only on establishing industry hubs but also on building a future-ready workforce for emerging industries. In this regard, the Ministry of Higher Education, Science, Research, and Innovation (MHESI) will spearhead policy design and measures to upskill and reskill the workforce, ensuring adaptability and competitiveness in the evolving global arena, particularly in high-tech sectors such as semiconductors. advanced electronics, EVs, and Al.

In the semiconductor and advanced electronics sector, MHESI aims to train 80,000 skilled workers within the next five years. Several quick-win policies are in the pipeline, including the STEM Plus program for upskilling and reskilling, the Coop+ program that matches students in semiconductor-related fields with private companies, and initiatives to send students for internships in universities or private sector companies in targeted areas.

Additionally, MHESI is planning mid-term and long-term strategies such as developing a higher education sandbox, designing international curricula in collaboration with renowned global universities, and supporting scholarships for doctoral degrees in semiconductor fields. These initiatives will ensure a steady supply of highly skilled professionals, driving Thailand's E&E industry forward and securing its position in the global market.

In alignment with these actions, the BOI collaborated with MHESI to conduct an Online Job Matching event in June 2024. This event brought together seven global firms, including Zhen Ding Tech and Unimicron, the top two advanced PCB manufacturers. with workers and graduates from Thai universities, aiming to fill up to 300 positions in engineering, production, design, software development, logistics, and more. All these initiatives and events underscore Thailand's strategic efforts to foster a dynamic and innovative E&E industry, solidifying its position as a compelling destination for investors.



The Policy Accelerator: Electrifying Industry Transformation

Since the electronics industry was designated as one of the 10 target industries to drive the future economy—referred to as the "New Engine of Growth"—the government has been committed not only to upgrading the capabilities of the traditional electronics industry but also to promoting the development of the smart electronics industry in parallel. The importance of these development goals has been brought into even sharper focus by the changing global dynamics that are being driven by technological advancements, the transformation of modern industries, and the changing lifestyles of consumers. This rapidly changing global market has resulted in a decline in the role of Thailand's former major export products, such as hard disk drives (HDDs). Recognizing the significance of restructuring industrial production, strengthening the supply chain, developing cuttingedge technologies, and enhancing product value, the government aims to promote the manufacture of products that are even more aligned with future demands.

The Action Plan for the Development of the Smart Electronics Industry Phase 1 (2023-2027), jointly developed by the Office of Industrial Economics and the Electrical and Electronics Institute, aims to establish Thailand as a hub in ASEAN for the production of smart electronic devices and systems with the goal of developing its own technology by 2027. The approach under this action plan encompasses enhancing the industry by attracting investments and developing personnel, stimulating demand for the use of smart electronic devices in both the public and private sectors, as well as promoting and developing the industrial ecosystem. This includes developing the infrastructure, advancing the technology, setting the standards, and managing the entire product life cycle.

In pursuit of its goal of establishing Thailand as a hub for smart electronics in ASEAN, the government is dedicated to enhancing the comprehensiveness of the supply chain. This involves elevating the industry to a higher value proposition by attracting key players in high-tech semiconductor manufacturing, including upstream chip production, electronic design, and highend chip contract manufacturing and testing. As the lead agency for investment promotion in Thailand, the Thailand Board of Investment (BOI) has implemented various measures aligned with this objective. Under the 5-year investment promotion strategy (2023-2027), the BOI has expanded the number of promoted industries from 7 to 10 to reflect the agency's focus on promoting new industries, particularly those that utilize advanced technologies. Additionally, the BOI has introduced Group A1+ incentives for upstream industries that employ cutting-edge technologies and innovations. The key incentives provided for upstream electronics industries include: 1) electronic design, such as microelectronics, optoelectronics, or embedded systems, which are granted an 8-year corporate income tax exemption with no cap, and 2) manufacturers of wafers, which are granted a 13-year corporate income tax exemption with no limit on the income tax exempted.

With the increasing demand for semiconductors and electronic components for new technologies such as 5G, cloud computing, and AI, the BOI recognizes the growth potential of the industry. In March 2024, it therefore decided to expand the types of businesses eligible for incentives in the electronics industry. The focus is on enhancing coverage for both manufacturers and service providers in the printed circuit board (PCB) sector, which is crucial for electronic devices used across various industries, including electronics, electric vehicles, medical devices, automated machinery, and digital





technology, especially in high-tech industries such as smart electronics. The BOI has expanded the list of eligible business activities to include critical operations. These include support activities for PCB production, such as lamination, drilling, plating, and routing; the manufacture of essential materials for PCB production, such as copper clad laminate (CCL), flexible CCL (FCCL), and prepreg; and the production of other necessary materials and components for PCB manufacturing, such as dry film, transfer film, and backup board. These activities will be granted benefits such as import duty exemptions on machinery, import duty exemptions on raw materials used for export production, and corporate income tax exemptions for up to 8 years, classified according to the importance of the materials, technology, and investment scale.

In addition to promoting upstream electronics industries and research and development, the BOI also comprehensively supports various businesses throughout the electronic supply chain. This includes the manufacture of electronic parts, electronic products, circuit boards, data storage, energy storage, smart electrical appliances, smart electronics, products using microtechnology, and other related products and components. Manufacturers in these categories will receive corporate income tax exemptions for up to 8 years, depending on the type of business.

The BOI has also recognized the trend of relocating semiconductor and PCB production bases due to ongoing geopolitical conflicts. As a result, the BOI is encouraging the comprehensive relocation of businesses to Thailand by providing incentives for both new investment projects and existing operations.



Manufacturing businesses that apply for investment promotions together with an International Business Center (IBC) will receive an additional corporate income tax exemption for 3 years, on top of the basic benefits according to their business category, but not exceeding a total of 8 years. Additionally, if investment promotion is applied for in conjunction with an IBC and the establishment of an R&D center, an additional 5-year corporate income tax exemption will be granted, but not exceeding a total of 8 years. This measure will be applicable to projects applying for investment promotions by the last working day of 2024.

However, the BOI's promotion efforts are not limited to tax incentives alone. As an agency that connects entrepreneurs throughout the supply chain, the BOI also links industries through the BOI Unit for Industrial Linkage Development (BUILD). It provides investors with various services, such as local and international sourcing, joint venture services, customized business matching, an online database, and local and international exhibitions. A key activity that has been continuously carried out is the organization of Subcon Thailand, the largest industrial subcontracting and business matching event in ASEAN. The event attracts up to 40,000 participants and generated over 20 billion baht in economic value at its most recent occurrence in 2024. It serves as a crucial platform for comprehensively connecting entrepreneurs in the automotive, electronics, and electrical appliance industries.

Under both the proactive investment attraction efforts of the BOI and support from related agencies, Thailand has progressed to become the leading PCB manufacturing base in the ASEAN region. This achievement has been bolstered by attracting key global entrepreneurs, thereby strengthening the supply chain. New policies and measures have also fostered an ecosystem conducive to transitioning into high-tech industries, adding significant value to the country. It is thus believed that Thailand will soon elevate itself to become a leading manufacturing base for the electronics and smart electronics industries not only within ASEAN but also in the global market.

The EEI and the Innovation Blueprint Driving E&E Advancement

The transition of Thailand's electronics industry into a smart electronics industry is now inevitable. However, the sheer pace of technological advancements, particularly with the emergence of high-tech manufacturing products such as semiconductors, SSDs, and smartphones, is posing significant challenges to the traditional electronics industry as it seeks to evolve. Merely attracting investments, as was done in the past, is no longer sufficient to fuel exponential growth. Instead, financial investments must be accompanied by technological upgrades and workforce skill development if the industry is to keep pace with these changes. Today, we are honored to have Mr. Narat Rujirat, Executive Director of the Electrical and Electronics Institute, share his perspectives on the current state of the industry and the strategic direction of its advancement.

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Smart electronics encompasses not only devices connected to the Internet of Things (IoT) but also electronic products that are inherently high-tech or those utilized in industries with promising future growth ⁷⁷

Mr. Narat Rujirat Executive Director of the Electrical and Electronics Institute

The Role of the Electrical and Electronics Institute in Advancing Thailand's Electronics Industry

The Electrical and Electronics Institute (EEI), an affiliated agency of the Ministry of Industry, plays a pivotal role in fostering the growth of Thailand's electronics industry by conducting research, providing policy recommendations, developing human resources, and offering various industry support services. Currently, the Institute operates through three main sub-centers: the E&E Intelligence Unit, the Industry Development and Promotion Unit, and the Industry and Entrepreneur Service Unit.

First of all, the E&E Intelligence Unit processes and analyzes data from diverse sources to

produce state-of-the-industry reports, industry warning alerts, and analyses of new technologies.

Secondly, the Industry Development and Promotion Unit operates under a three-part framework known as the 3P approach. The first "P" stands for "People," as it provides training services to an annual average of 10,000 entrepreneurs and workers through various courses in management and technology. The second "P" stands for "Process," as it offers technical consultancy on issues such as productivity enhancement, environmental management, and green manufacturing. The final "P" stands for "Product," as it provides services in product design and development. Currently, it operates an electronics laboratory at the KX Building, King Mongkut's University of Technology Thonburi, registered as FabLab Bangkok. It plays a supportive role in startups focusing on smart electronics, smart appliances, and various types of PCB designs and prototype development.

Lastly, the Industry and Entrepreneur Service Unit assists entrepreneurs with product testing and certification, for both Thai and international standards, prior to market entry. This covers issues related to safety and efficiency, as well as sound, light, and environmental impacts.

Overall, the Institute serves as a comprehensive service provider from upstream to downstream. Simultaneously, it also undertakes agenda-based projects to lay the groundwork for private sector continuation, with current focuses on green and net-zero emission initiatives.



Perspectives on Thailand's Industry in the Global Supply Chain

Thailand's electrical appliance industry is strong in terms of downstream production, particularly of household appliances. The country is the second-largest exporter of air conditioners in the world and ranks among the top five global exporters of refrigerators. However, most of the components used in assembling these electrical appliances are still predominantly imported.

In the electronics industry, Thailand excels in downstream sectors, particularly in HDD, PCB, and IC production. These products are subsequently used as components in other electronic products.

Currently, the government's goal is to propel the electronics industry to experience rapid growth once again, similar to the period when the Japanese relocated their home appliance manufacturing bases to Thailand and the time when HDDs were promoted as the country's Product Champion. Nevertheless, relying solely on downstream industries does not meet the government's goals for driving progress, and this has led to the establishment of the S-curve strategy, whereby the smart electronics industry is positioned as one of the engines of growth for the national economy.

From the industry's perspective, smart electronics encompasses not only devices connected to the Internet of Things (IoT) but also electronic products that are inherently high-tech or those utilized in industries with promising future growth, such as electric vehicles or renewable energy. Overall, the focus on driving the industry forward is directed toward advanced electronics and high-value electronics, primarily within upstream and midstream sectors.

Concomitantly, traditional products need to be adapted to create higher added value or to be integrated into value chains with greater demand. For example, in the past, power supplies were produced to power electrical appliances, but now they can be upgraded to serve as power supplies for EV chargers instead.

Current Policy Direction and Implementation Approach

Under Milestone 6 of the 13th National Economic and Social Development Plan and the Smart **Electronics Industry Development** Action Plan, Thailand aims to upgrade its products to be more high-tech and high-value. This specifically includes investing in new products in the upstream and midstream sectors, while also developing smart appliances and solutions that businesses can build upon in the downstream sector. For example, these technologies can be applied to smart farms and smart factories.

The aforementioned Action Plan outlines various measures designed to enhance the industry's competitiveness, stimulate domestic demand and markets, and foster an ecosystem conducive to industry growth. The implementation of each measure involves different projects and responsible agencies. While some measures have already commenced and their progress is being monitored, the future plan is



to establish a central committee to ensure that all implementation efforts are aligned and cohesive.

The EEI will be responsible for matters related to testing, which will require upgrading services to match new emerging products. This includes functions related to IoT, security, and other functional tests that are in increasing demand. In addition, the Institute is collaborating on projects with the Ministry of Higher Education, Science, Research and Innovation (MHESI) and the Ministry of Industry (MIND) to develop new products for further development in the private sector.

Recognizing the significance of the IC and semiconductor industry in Thailand, the Institute is also collaborating with the Federation of Thai Industries and the Thailand Science, Research and Innovation Agency (TSRI) to allocate funding for semiconductor development. A key objective is to establish a center of excellence named the "Advanced Electronics Design Center". With the specific aim of driving the upstream industry and design, the center is expected to be completed in 2025.

Factors Supporting Thailand's Attractiveness for Investment in the Electronics Industry

Thailand has long been a base for the electronics industry, resulting in a highly experienced and skilled workforce. In parallel with efforts to enhance capabilities in anticipation of the future smart electronics industry, government agencies such as the MHESI have developed various training programs to further strengthen human capital. Additionally, MHESI has introduced the "Higher Education Sandbox" initiative to develop innovative curricula in the fields of semiconductors and advanced electronics. This initiative aims to equip the workforce with the appropriate skills to meet the needs of target industries.

Furthermore, some electronics industries have already relocated their investment to Thailand, such as the upstream PCB industry. Approximately 10% of their production capacity has been shifted to Thailand, and each company involved is a global leader. It is anticipated that once production reaches full capacity, PCB could emerge as Thailand's new Product Champion, propelling the overall industry forward in leaps and bounds.

Points to Address for Investors Interested in Investing in the Country

The electronics industry is not a new industry for Thailand. With its longstanding experience, Thailand has gained a high level of expertise in this area. Thai personnel, therefore, are well positioned to adapt to the new skills that will emerge in the electronics industry the future. Additionally, Thailand has increasingly clear plans and development guidelines in terms of the necessary infrastructure, supply chain, and workforce, which ensure it is ready with an ecosystem that supports future changes. At the same time, the Board of Investment (BOI) is also making efforts to adjust the benefits for new businesses to better meet the needs of foreign investors. Hence, it is believed that the results of the current operations will achieve the desired goals and effectively attract foreign investors.

Productivity and People: Key Pillars of Success for Hana Microelectronics Groupe



Achieving higher productivity requires a strong management environment, good education, and robust infrastructure.⁷⁷

> Mr. Richard David Han President and Chief Executive Officer of the Hana Microelectronics Group

When looking at leading electronics companies in Thailand, the Hana Microelectronics Group is undoubtedly among one of the first names that come tomind. Since it was established in 1978, the company has grown steadily from its origins as a watch manufacturer to become a key player in the electronics industry. With its expertise now ranging from electronic manufacturing services to offshore assembly and testing, and high-tech investment, Hana Microelectronics has consistently stayed at the forefront of technological development and innovation despite numerous challenges over the years. In order to understand the key factors behind the company's success, we invited Mr. Richard David Han, President and Chief Executive Officer of the Hana Microelectronics Group, to shed light on how the company operates and thrives in such a highly competitive industry.

The Company's Perspective on the Development of the Electronics Industry in Thailand

The electronics industry in Thailand is currently facing a challenging period. As a relatively small country, Thailand competes with larger manufacturing hubs like China and India. Additionally, rising labor costs necessitate increased efforts to enhance productivity in order to keep Thailand competitive on the global stage. The implementation of the Global Minimum Tax in 2025 will also impact the country's ability to offer tax incentives, which has long been one of Thailand's key incentives for attracting investment. While these tax changes may not significantly affect companies with lower than the threshold revenues, they undoubtedly will impact Thailand's ability to attract large multinational firms to invest in the Kingdom.

On the other hand, geopolitical shifts, such as the decoupling of Western countries from China, present opportunities for Thailand. These changes have led to Thailand being chosen as a manufacturing base for the electronics industry in recent years. However, to leverage these opportunities effectively, Thailand must strategically position itself and enhance its presence to maintain its



competitive momentum. A clear example of this can be seen in the automotive industry, where Thailand has shifted its focus from the production of internal combustion engine (ICE) vehicles to electric vehicles (EV), thereby attracting more Chinese manufacturers to set up factories in the country.

The Unique Strength of Hana Microelectronics Group over Other Competitors

Whilst the electronics industry is generally cyclical in nature, the cycles are not the same for different industries. To mitigate such fluctuations in demand, Hana's core strategy encompasses a diverse range of disciplines and technologies, including EMS, OSAT, and RFID, to serve a broad range of industries such as automotive, mobile handsets/infrastructure, industrial, optoelectronics, medical, and consumers.

We believe that increasing our technical capabilities will enhance our value proposition and support the company's overall competitiveness. Therefore, in addition to enhancing our workforce productivity, we are investing in high-tech areas like our wafer fabrication plant in South Korea. We also send our employees to work in our facilities abroad, such as in South Korea and the United States, to learn advanced technologies and processes. This helps us build a more skilled and capable workforce and bring advanced technology back to Thailand, thereby maintaining a competitive edge over other Southeast Asian competitors. We believe that all these efforts come together to make our company an excellent choice for potential customers.

The Company's Efforts at Enhancing Productivity

Productivity is a broad term, but fundamentally, a person who is paid more must create more value to justify their higher wage. This isn't just about working harder but about working smarter with better tools and systems. Achieving higher productivity requires a strong management environment, good education, and robust infrastructure. Raising wages without corresponding increases in productivity will eventually price a country out of the market.

More importantly, management needs to play a critical role in enhancing productivity. The capacity of workers in different countries or regions may not vary significantly, but the ability of management to design effective systems and production lines differentiates worker productivity, which in turn impacts overall competitiveness. This involves investing in automation, providing comprehensive training, working closely with local technical universities, and creating an environment where productivity can thrive.

The Role of the Company in Driving the Thai Electronics Industry Ecosystem

The Hana Microelectronics Group has established strong relationships within the local supply chain, extending our reach beyond the electronics industry to serve many other sectors. We aim to act as a subcontractor for other companies. leveraging our infrastructure and capabilities to meet the specific requirements of our customers. This approach reduces the need for companies to set up their own facilities in Thailand by offering what we believe is a capital-light solution. Additionally, encouraging foreign manufacturers to utilize local suppliers adds value to the domestic industry, further enhancing the country's development and competitiveness.

Recommendations on the Future Direction of the Government's Policies and Measures

The government and Thailand's Board of Investment are very supportive and well aware of the issues that need to be addressed. However, we believe that the implementation of policies needs to be accelerated, especially as other countries are aggressively attracting foreign direct investment in specific electronic sectors. Education and skill development are also key to advancing industries, particularly in targeted areas like semiconductors. Grants and educational programs can help elevate the capabilities of our workforce and management. Additionally, creating an environment to retain talent is crucial, as many talented Thai engineers move



abroad for better opportunities. The industry needs policies and incentives to bring these talents back and keep them here where they can contribute to the local industry.

When attracting foreign investors, the government should also focus on promoting the domestic supply chain. For instance, large foreign investors often import most of their materials and parts, limiting local value addition. Therefore, Thailand needs policies that encourage foreign companies to use local suppliers. This will help strengthen and develop the entire supply chain in the country and improve the productivity of Thai labor.

Last Words to Investors or Manufacturers from the Electronics Industry

We advise potential investors to consider partnering with local companies. Many domestic manufacturers, including Hana Microelectronics, have the capability and expertise to handle various manufacturing needs, thereby reducing the risks and costs associated with establishing a manufacturing base. Investing in new infrastructure, technical personnel, and facilities can be burdensome for investors, especially in a foreign country where their local expertise and knowledge may be limited, and where competition is fierce. In many cases, we believe that this approach ensures a win-win situation that benefits both parties.

THAI ECONOMY AT A GLANCE

Key Economic Figures



GDP (2023) USD 513.5 Billion



GDP Growth



Source: NESDC (Data as of July 2024)



Export Figures

 Export value (USD million)

 Jan-Dec 2022:
 274,061.70

 Jan-Dec 2023:
 269,986.31

 Jan-Jun 2024:
 142,879.17



MDES



Market Profile (2023) Population 66.04 Million Minimum Wage THB 330-370 US\$ Approximate USD 9.17-10.29 Source: Ministry of Labour

Top 10 Export Markets (Jan-Jun 2024)

Rank	Value (USD Million)	Share
United States	25,344.81	17.74%
China	17,347.75	12.14%
Japan	11,372.64	7.96%
Australia	6,118.85	4.28%
Malaysia	5,941.00	4.16%
Hong Kong	5,809.26	4.07%
Vietnam	5,330.32	3.73%
India	5,310.59	3.72%
Singapore	4,923.45	3.45%
Indonesia	4,749.65	3.32%

Top 10 Exports (Jan-Jun 2024)

		Goods / Products	Value (US\$ million)	Share
		Vehicles and Parts	15,164.71	10.61%
	Ţ	Computers and Parts	10,848.49	7.59%
		Jewelry Products	7,442.69	5.21%
	Ø	Rubber Products	6,387.77	4.47%
	**	Machinery and Parts	4,685.09	3.28%
	0	Plastic Pellets	4,239.63	2.97%
	2	Refined Fuel	4,236.21	2.96%
	۲ ۱	Integrated Circuits	4,029.45	2.82%
	\$	Chilled, Frozen and Dried Fruits	3,922.56	2.75%
	四	Chemical Products	3.882.45	2.72%

Exchange Rates (As of 26 July 2024) THB 36.33 f THB 46.94 f THB 39.62 f THB 23.88 Source: Bank of Thailand

Tax Rate Corporate Income Tax: 0 - 20% Personal Income Tax: 5 - 35% VAT: 7% Witholding Tax: 1 - 15% Source: the Revenue Department (As of July 2024)

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ABOUT BOI

รั่างรับเขานั่นในอาจะสมมารถี่ยมสะมารถี่ยม CIFICE OF THE GOARD OF INVERTIGIA The Office of the Board of Investment (BOI) is the principle goverment agency that operates under the Prime Minister's Office for the purpose of encouraging investment in Thailand. We at the BOI serve as the professional contact points for investors, providing them with useful investment information and services. We offer business support and investment incentive to foreign investors in Thailand, including tax and non-tax incentives. A few non-tax incentives include granting land ownership to foreigners and facilitating visas and work permits. Besides serving the needs of overseas investors, we also offer consultation services to Thai investors who are interested in investment opportunities abroad.

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