



Taiwan's Transformation: Eight Countries Investing in Taiwan's New "Divine Defense" Foreign Companies Become Taiwan's Silicon Shield

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In an ASML clean room in Taiwan, young engineers work on transport grippers that will be included in ASML machines shipped to foundries around the world. This site in Taiwan is becoming ASML's major manufacturing hub outside of the Netherlands.

Taiwan is facing a crucial moment of transformation. Here are some of the top foreign companies that are leading transformative upgrades in Taiwan's workforce, salaries, and industries.



(Photo Credit: Cheng Sih-ti)

Are two entirely different worlds emerging in Hsinchu? In an office in downtown Hsinchu, Huang Wei-ting, a former R&D engineer at the age of 28, is stepping into a new role as sales.

During his four years at Entegris, a US semiconductor materials company, Huang has gotten off work at 6 p.m. almost every day. The company's "make-up days" are extra holidays, not extra working days. After he joined the company for six months, he was assigned to Japan for a training course. Moreover, he will relocate to one of the company's US sites in Arizona in the end of this year.

A short ten-minute drive away at Taiwan Semiconductor Manufacturing Company's (TSMC) headquarters, new MA hires enjoy competitive package but need to endure a grueling three-shift schedule where 12-hour workdays and weekend shifts are the norm for engineers. Many TSMC veterans say that they barely have time to eat during office hour, and no personal life at all.

As more and more foreign companies invest in Taiwan, is it finally becoming possible to earn a high salary without unhealthy amounts of overwork?

The answer is yes, and the transformation is already under way.

According to the Ministry of Economic Affairs (MOEA), the figures show that foreign companies invested an average of US\$9.814 billion (approximately NT\$274.8 billion) every year in Taiwan over the past four years, an increase of nearly 50% over the annual average of US\$6.611 billion (approximately NT\$185.1 billion) in the 2002-2017 period.

Foreign companies are setting up all over Taiwan, even in places that struggled to attract investment in the past: the coastal areas of Changhua; Dongshan township in Yilan, where known for its annual Children's Folklore and Folkgame Festival; and the indigenous village of Hongye in Hualien, near the famous Ruisui hot springs— the foreign investment in Taiwan is accelerating.

The Economist recently described Taiwan as the most dangerous place on Earth. Taiwan's air defense identification zone saw nearly 1,000 incursions from Chinese warplanes last year. So why are these companies still coming? Why are they making this small island a lynchpin of their global strategy—and, in their own way, providing a measure of security for Taiwan?

Germany: A 354-year-old chemical manufacturer "Atomic-scale" semiconductor materials developed and manufactured in Kaohsiung

"This is the best chance to invest in Taiwan in three decades," says Chairman John Lee of Merck Taiwan. The Merck Group is one of the world's oldest manufacturers of pharmaceuticals and chemical materials; since its founding in Germany 354 years ago, it has grown into a global presence spanning 66 countries. Now Taiwan will be the site of an unprecedented manufacturing breakthrough for Merck.

At the end of last year, Merck announced a plan to invest NT\$17 billion (around US\$599 million) in Taiwan over the next five to

seven years. The new investment will give Taiwan an integrated semiconductor material production site with a comprehensive product portfolio.

Merck's manufacturing in Kaohsiung has been focused on producing deposition materials for semiconductor fabrication. But with its new investments, Merck's manufacturing in Taiwan will include materials across all four major parts of the semiconductor fabrication process. This will turn Taiwan into Merck's first semiconductor materials manufacturing and R&D hub. In the future, this hub will manufacture "atomic-scale" materials and supply systems—even smaller and more precise than current nanometer-scale materials.

"Merck does not have a single plant anywhere in the world that produces materials covering the comprehensive process. This is very significant for Taiwan," says Lee.

Merck is not alone. Entegris—whose market cap is the equivalent of approximately NT\$480 billion, higher than Taiwan's ASE Technology Holding, the world's biggest provider of chip packaging and testing services, —has also located its global R&D and manufacturing hub in Taiwan. "We'll have the newest equipment, the most machines, the widest range," says Alvin Hsieh, Entegris's Taiwan Country Manager.

These companies are not just investing in Taiwan because of the recent global environment; they are also attracted by the accomplishments of Taiwan's industry, which has created the world's most comprehensive semiconductor supply chain.

Why continue to invest in Taiwan? "Our most advanced client is based in Taiwan. TSMC is the fastest mover, and we need to grow along with it." Said Tony Chao, Senior Managing Director at ASML's Center of Excellence.

Taiwan's Minister of Economic Affairs Wang Mei-hua echoed the sentiment in an interview with Business Weekly, saying that many foreign semiconductor companies are accelerating their investment in Taiwan. "They have to be here. They might be performing at 80% technically, but they could improve to 90% just by working with TSMC. If they didn't land in here, their competitors will do."

It is interesting to note that Taiwan's top-tier technological prowess is attracting not only semiconductor companies, but also downstream hardware companies and even consumer-focused retail and service companies. These players are chasing the increase in consumer spending that comes with an improved economy and higher salaries.

The International Monetary Fund and think tanks like the Taiwan Institute of Economic Research project that Taiwan's GDP per capita will exceed South Korea's sometime between this year and three years from now, reaching US\$42,800. This will be the first time in 18 years that Taiwan has surpassed South Korea in this measure.

This growth can be seen in Tainan, where the city's police department is planning traffic and crowd control measures on its first day back from the Lunar New Year holiday. These measures are not for the upcoming Lantern Festival, but for the impending opening of the Mitsui Outlet Park at the end of the month. This new outlet mall directly next to Tainan's high speed rail station represents an investment of NT\$3 billion, targeting the spectacular rise in consumer spending in southern Taiwan fueled by Tainan's science and technology park.



(Photo Credit: Courtesy Sing Da Marine Structure) | Expand Photo

Improving Basic Technical Competence



SDMS was invested and founded by China Steel Corporation. It has successfully begun manufacturing of underwater foundations for wind turbines, allowing China Steel to improve its value added by expanding from steelmaking to steel product manufacturing. (Photo Credit: Cheng Szu-Ti) | Expand Photo

The Netherlands: The world's most advanced semiconductor equipment maker. Average cost for each single new hire in the first 18 months is around NT\$6 million (around US\$210 thousands)

Can the influx of foreign investment transform the overwork culture in Taiwan?

Our reporting for this story took us to ASML's plant in Linkou. ASML is the only company in the world that manufactures the extreme ultraviolet (EUV) lithography machines used in the 7nm and under advanced semiconductor fabrication modes. ASML's spending in Taiwan has doubled over the past five years, and it is planning a further expansion of its site in Linkou.

Employees of ASML Taiwan can expect to get the annual salary package with 20 months, and the grand total is around NT\$1 million (around US\$35K) for entry-level. The company spends over NT\$6 million (around US\$211 thousands) on training each new hire in their first 18 months.

Facing fierce competition for talent from their foreign counterparts, Taiwanese companies have been forced to improve employee compensation.

"Foreign companies have changed the overall wage structure since they offered really competitive package. said Professor Tsai Ming-fang of Tamkang University's Department of Economics. Tsai said that foreign companies are raising the upper bound of salary expectations and providing more competition. As offers from technology companies grow higher and higher, traditional and service industries must also improve their offers to retain employees.

"A raise of one or two thousand NT dollars per month might not be enough. They might need to offer five thousand NT dollars or more to retain the employees. This will cause a positive effect on the salaries for youth group."

Data from the Directorate General of Budget, Accounting and Statistics shows that the average monthly salary in Taiwan in 2020 hit NT\$54,300 (around US\$2K), an increasing of 3.7% over 2018. OECD statistics show that the average annual salary in South Korea grew by only 0.8% in the same period.

The impacts that the foreign companies brought to us not only the high pay but also the technology transfer.

Improving the workforce



ASML spends over NT\$6 million on training a new hire in their first 18 months at the company. Employees are often seconded to the company's headquarters in the Netherlands for training and communication courses. All employees are accustomed to a highly diverse working environment. (Photo Credit: Cheng Szu-Ti | Expand Photo

Denmark: The world's biggest energy infrastructure fund Hands-on assistance turning a Taiwanese steelmaker from manufacturer to consultant

Pan Chang-ting is a deputy fabrication manager at the Chang-fang and Xidao offshore wind farms, both developed by Copenhagen Infrastructure Partners (CIP), the world's biggest energy infrastructure investment fund. He never expected that he would spend two years working not in CIP's offices, but in a manufacturing plant in the Port of Taipei operated by their partner, Century Steel.

Century Steel was selected by CIP to supply wind turbine foundations for their wind farms. CIP's order specifications called for a steel cone with a diameter of 284 centimeters at the widest, equal the height of a one-story building, but only 140 centimeters at the narrowest.

This is an immense engineering challenge, even for a company like Century Steel that has been in business for 35 years. Their initial attempts saw several steel plates valued at NT\$1.5 million turned into scrap metal after the welding work failed to meet standards.

To help Century Steel meet its quality targets, CIP not only sent Pan to work with them, but also brought their QA manager from Europe to Taiwan for hands-on assistance to build their first foundation that met standards. Century Steel chairman Lai Wen-hsiang did not know much English, and it became a joke in CIP that the first four words he learned were “thank you,” “yes,” “no,” and “Mark”—the name of the CIP QA manager.

This intensive build-up in expertise led to explosive growth for Century Steel. Before its entrance into the offshore wind sector in 2019, the company’s annual revenue was only about NT\$2.4 billion. Last year its revenue broke NT\$10 billion, and its gross margin increased from 15% to over 25%.

In the future, Century Steel could even follow CIP into other Asian markets such as Japan, making money not just as a manufacturer, but also providing consulting services to other manufacturers.

Across companies big and small in every sector of the economy, this wave of foreign investment is bringing better technology, broader horizons, and more open mindsets. Even for individuals, these investments are leading to better skills and higher salaries.

A company working in offshore wind construction revealed that, while an average welder in Taiwan makes about NT\$3,500 for a day’s work, a highly skilled welder licensed to work on offshore wind components could make double that amount.

“For Taiwan, this is the time to develop high-end manufacturing,” says Minister Wang.

France: The world’s biggest industrial gas company. Bringing green hydrogen cars to Taiwan

Professor Chiou Jiunn-rong of National Central University’s Department of Economics explains: “Many Taiwanese companies are used to minimizing costs, producing in bulk, and competing based on low prices.” An ecosystem that is so set in its ways could only be disrupted by a metaphorical invasive species—and foreign companies that can bring capital and technology are the perfect candidate to break the cycle. “We’ve talked so much about transforming and upgrading Taiwan’s industry, but it was all empty talk. Now it’s truly put into effect.”

As Taiwan’s connections with foreign companies grow stronger, more and more futuristic developments could happen right here.

In Paris, a fleet of blue taxis vie for business. But these are no ordinary taxis: They form the first hydrogen taxi fleet in the world. There are currently over 600 of these zero-emission taxis on the streets of Paris, and all rely on hydrogen stations built by Air Liquide, France’s largest supplier of industrial gas, for refueling.

All of this could become part of Taiwan’s green transportation landscape, now that Air Liquide has established a presence here.

Air Liquide Far Eastern (ALFE), a joint venture between Air Liquide and Taiwan’s Far Eastern New Century group, has invested over NT\$7 billion in Hsinchu, Tainan, and Kaohsiung. Although the joint venture primarily serves customers in the semiconductor and panel industries, it is also looking for new business opportunities. Sources say that ALFE is now in discussions with local governments around Taiwan to establish hydrogen bus pilot programs, which may serve as shuttle services in northern Taiwan or between high-speed rail stations and science parks.

An advanced green energy pilot like this in Taiwan would foster the development of a supply chain. As the US, Germany, and Japan are investing hundreds of billions of dollars in hydrogen projects, Taiwan also has the resources to seize the opportunity. While Taiwan needs to learn from other countries about offshore wind now, perhaps it could teach them about hydrogen in the future.

If Taiwan could start making money on expertise and new technologies instead of sheer physical labor, then it could escape its current economy of overwork.

Professor Chiou of National Central University explains that economy growth and per-capita GDP are ultimately measures of a country’s development and the quality of life in its populace. “Why do we want to reach US\$40,000 or US\$50,000 GDP per capita? It’s not about the number, it’s the way of life that this level of development could bring.”

Even as cross-Strait relations remain tense, foreign companies in the technology, manufacturing, and even service sectors are expanding their presence in Taiwan. Not only do these

companies bring higher salaries and more employment, they are also contributing to an enhanced “silicon shield.”

The concept of the “silicon shield” was first described by Australian journalist Craig Addison in 2000. He wrote that Taiwan’s semiconductor industry was its best guarantee of security in the face of military threats.

Now TSMC is not the only part of this important defense. Foreign companies from the US, Germany, the Netherlands, and France are all forming part of Taiwan’s “divine defense.”

Su Tzu-Yun, an associate research fellow at the Institute for National Defense and Security Research, believes that companies around the world setting up important manufacturing and R&D hubs in Taiwan could help bolster Taiwan’s national security. “We can see this all through history. Kuwait is a small country, but the US and the UN were willing to help it because it had oil.”

“Over the past two years, people have begun to say that semiconductors are even more important than oil. If anything happens to Taiwan, the entire world will feel the effects. This will absolutely help Taiwan’s security,” says Minister Wang.

However, there is also a darker side to foreign investment. As more and more companies come to Taiwan, the challenge of resources—including shortages of water, electricity, land, and talent—will only grow more severe.

An executive at a top foreign company states bluntly that current trends could easily reverse if Taiwan’s shortage problems are not resolved and South Korea or the US catches up with its semiconductor capabilities. “The race between countries never stops. Sometimes you’re in front, and sometimes you’re behind. If you don’t anticipate the future clearly, you could fall behind for a long time.”

Even individuals who miss the boat in this transformation could find themselves permanently behind the curve.

A manager at a foreign semiconductor company in Taiwan said that, although Taiwan produced about 90,000 STEM graduates every year, only about 20,000 or so are capable with the English and professional skills that can be considered as the potential talents..

Over the next decade, individuals and companies who are capable of riding this wave of transformation will see spectacular income growth. But for those who are not, the sense of discontent at rising costs of living and housing prices will only become stronger.

An age of transformation that Taiwan has not seen in decades lies ahead. The wind is blowing, and the test for every one of us will be if it could take us where we want to be.