

# **International Investment and Market Trends, 2017 (August – September)**

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## **I. Investment Trends Worldwide and in Taiwan**

### **Abstract**

- According to UNCTAD (United Nations Conference on Trade and Development), the global economy will grow 2.6% in 2017, slightly higher than the 2.2% registered in 2016. Recovery of developed economies is mainly hindered by fiscal austerity. Weak global demand also affects international trade.
- Taiwan's fixed investment as a percentage of GDP has fallen in recent years. While growing, Taiwan's fixed investment only rose 2.0% in the first half of 2017. The private sector still accounted for the largest share which has continued to rise every year.
- From January to August, investment by overseas Chinese and foreign nationals, investment from Chinese companies, outward investment, and investment in China all declined. Investment by overseas Chinese and foreign nationals saw the largest year-on-year decline at 26.6%.

### **1. Global trade and development**

According to the Trade and Development Report 2017 published by UNCTAD (United Nations Conference on Trade and Development) in September 2017, global economy has continued a slow recovery in 2017. UNCTAD forecasts that global economy will grow 2.6% this year, slightly higher than the 2.2% registered in 2016, but below the 3.2% average before the financial crisis.

UNCTAD indicates fiscal austerity as the main obstacle to a robust recovery in advanced economies. From 2011 to 2015, 13 out of 14 developed countries employed austerity. That said, the Eurozone is expected to see its fastest growth since 2010 (1.8%); the US and Japan will also exhibit better performance than last year at 2.1% and 1.2% respectively.

The report also points out sluggish trade caused by insufficient global demand. While a minor improvement is expected this year due to a recovery in South-South trade led by China, there is still much uncertainty, especially when the brief recovery in

commodity prices failed to sustain.

**World Output Growth (%)**

Country or Area	2001-2008	2015	2016	2017 <sup>a</sup>
<b>World</b>	<b>3.2</b>	<b>2.6</b>	<b>2.2</b>	<b>2.6</b>
<b>Developed countries</b>	2.2	2.2	1.7	1.9
Japan	1.2	1.2	1.0	1.2
The US	2.5	2.6	1.6	2.1
The UK	2.5	2.2	1.8	1.5
Eurozone	1.9	2.1	1.7	1.8
Germany	1.3	1.7	1.9	1.9
<b>Developing countries</b>	6.2	3.8	3.6	4.2
Africa	5.7	3.0	1.5	2.7
South Africa	4.4	1.3	0.3	0.5
Latin America and Caribbean	3.9	-0.3	-0.8	1.2
Brazil	3.7	-3.8	-3.6	0.1
Asia	7.3	5.2	5.1	5.2
China	10.9	6.9	6.7	6.7
India	7.6	7.2	7.0	6.7
<b>Transition economies</b>	7.1	-2.2	0.4	1.8
Russian Federation	6.8	-2.8	-0.2	1.5

Source: UNCTAD

Note: The country aggregates are calculated based on gross domestic product at constant US dollars in 2005.

a: forecasts

## 2. Domestic fixed investment

In September, DGBAS (Directorate General of Budget, Accounting and Statistics) released information on Taiwan's domestic fixed investment in the first half of 2017. Domestic fixed investment as a percentage of GDP declined to 20.5%, 2.9% lower than 2011. While growing, the fixed investment only rose 2.0% during this period.

The private sector still holds the largest share of domestic fixed investment and the share has continued to rise. The share taken by the private sector was 84.2% in the first half of 2017, 7.8% higher than 2011. The share held by the government and

public sectors both declined. The government sector made up 11.5% of the domestic fixed investment, down by 5.5% than 2011.

The construction industry remained the most important investment with a share of 37.4%, followed by the machinery equipment business at 31.4%. It is worth-mentioning that the share of intellectual property business has continued to rise in recent years, accounting for nearly one-fourth (24.7%) in the first six months of the year, the highest over the past five years.

Taiwan's Capital Formation

	2011	2012	2013	2014	2015	2016	2017
<b>As a percentage of GDP</b>	23.4	22.3	22.2	21.7	20.8	20.9	20.5
<b>Growth rate</b>	-1.2	-2.6	5.3	2.1	1.6	2.5	2.0

Source: DGBAS

### 3. Investment by overseas Chinese and foreign nationals

Investment Commission of MOEA revealed statistics of investment by overseas Chinese and foreign nationals, investment from China, outward investment, and investment in China from January to August of 2017. All of them registered declines.

Compared to the same period last year, investment by overseas Chinese and foreign nationals posted the biggest fall at 26.6%, followed by outward investment at 14.3%, investment in China at 5.0%, and investment from China at 1.5%.

The total amount of investment by overseas Chinese and foreign nationals was NT\$4.866247 billion. Electronic part and components manufacturing accounted for the largest share with NT\$2.014746 billion (41.4%), followed by real estate with NT\$625.829 million (12.9%) and financial and insurance with 521.737 million (10.7%). These three sectors took 65.0% of the investment by overseas Chinese and foreign nationals.

## International Investment and Market Trends 2017

### Top Five Industries Invested by Oversea Chinese and Foreign Nationals, January – August, 2017

(Unit: US\$1000; %)

Industry	Number of cases	Amount (Share)	YoY Amount	YoY Comparison	
				Amount	Growth rate
Electronic parts and component manufacturing	55	2,014,746 (41.40)	3,557,173	-1,542,426	-43.36
Real estate	104	625,829 (12.86)	230,831	394,998	171.12
Financial and insurance	166	521,737 (10.72)	785,168	-263,432	-33.55
Wholesale and retail trade	724	505,015 (10.38)	882,211	-377,196	-42.76
Specialist, science, and technical services	352	336,624 (6.92)	278,082	58,542	21.05

Source: Investment Commission, MOEA

## **II. Key Industrial Information**

### **1. Information and communications industry**

- **5G to drive demand for RF demand**

With the maturity of 5G technology, RF front-end chips will bring new market opportunities. Demand for RF PAs is expected to grow further. The traditional metal oxide semiconductor process will be replaced by GaN (Gallium Nitride) process. As 5G technology requires support for more components and higher frequency, GaAs manufacturing process will see steady growth.

The introduction of new RF technology will lead to RF PAs based on new manufacturing processes. GaN processes will become the mainstream manufacturing technology for RF PAs with an output power above 3W.

- **Development of mobile VR devices**

Since 2015, a large number of vendors have been engaged in developing mobile VR devices. Although these vendors capitalized on consumer curiosity about VR and employed a low-cost strategy, the industry has failed to thrive. Google launched Daydream in 2016 to create a VR ecosystem and expand product offerings and applications by working with mobile device partners. However, these efforts failed to deliver the expected outcomes. As a result, the mobile VR market has faced extremely challenging times.

The main reasons for the failure include scarce resources invested in hardware and software by vendors, high product similarity, and poor consumer experience. Therefore, vendors must enhance the casings of the products and ergonomic design instead of focusing on cost reduction. However, new design will boost product prices. The estimated product price is US\$100. In addition, Google must lower Daydream's requirements to speed up the development of devices support this platform.

## 2. Pharma & biotech industry

- **The latest development of cancer drugs**

At the 2017 ASCO (American Society of Clinical Oncology), drugs that received the most attention included nivolumab, pembrolizumab, bevacizumab, ipilimumab, trastuzumab, durvalumab, paclitaxel, cisplatin, gemcitabine, and carboplatin. These drugs are used to treat breast cancer, lung cancer, colorectal cancer, gastrointestinal stromal tumor, leukemia, melanoma, prostate cancer, myeloma, and ovarian cancer.

There are four other important developments. 1. A variety of IO (Immuno-Oncology) combinations are expected to deliver long-term outcomes. 2. With new drugs costing more than US\$100,000 for a single course of treatment, cancer treatment will become more and more expensive. Hence, observational cancer research will become increasingly important in clinical decision-making in order to reduce the financial burden on cancer treatment. 3. CAR T-cell therapy continues to expand. Novartis and Kite have filed for approval of their new CAR-T cell therapy in the US. 4. Genomic sequencing approach will play an important role in the development of cancer drugs. Applying genomic sequencing in patient selection will become the norm.

## 3. Fintech industry

- **Taiwanese third-party payment service providers consider adopting fingerprint recognition technology**

Regulations for e-payment (third-party payment) security in Taiwan are divided into four types, depending on the amount of the transaction. For transactions under Type C, biometric authentication is allowed. However, the government currently forbids vendors to authenticate identity using the fingerprint recognition function on a mobile phone. Instead, they have to collect fingerprint data by themselves and use specific apps for authentication.

The Bankers Association is planning to ask the Financial Supervisory Commission to amend the regulations. To facilitate transactions, the Bankers Association hopes the biometric authentication methods stipulated in

Regulations Governing the Standards for Information System and Security Management of Electronic Payment Institutions will allow the use of the fingerprint recognition function on a smartphone.

For consumers, providing their fingerprint data for e-payment service providers poses a high risk for data leakage. Most e-payment transactions in Taiwan fall under Type A and B, so users tend to use a fixed set of password and a one-time passcode sent via text message for authentication. According to TRI, about 50% of smartphones have provided fingerprint recognition function. As international mobile payment brands (Apple Pay and Samsung Pay) have supported authentication via Smartphones' fingerprint recognition function, the amendment to the regulations will enhance the convenience of e-payment and benefit the development of Taiwanese third-party payment service providers.

Europe and the US place a high focus on regulating the security of authentication. In emerging countries where traditional financial services have not prevailed, Internet financing and financial inclusion has seen rapid progress. In addition, privacy protection regulations in emerging countries are less strict. As a result, emerging countries have led Europe and the US in the development of biometric recognition.

- **China to regulate P2P lending**

P2P (Peer to Peer) lending is booming in China. In August 2017, CBRC (China Banking Regulatory Commission) released the Guide to the Disclosure of Information on Business Activities of Peer-to-peer Lending Information Intermediaries to standardize the disclosure of information by P2P lending companies. The Guide requires P2P lending companies to disclose their backup plans as well as how they manage and approve loans. During the first five days of every month, they must reveal information on their balance, the number of loans granted, and overdue loans on their websites, Weibo accounts, and mobile apps. They also need to provide lenders with information regarding their borrower's overdue loans and loans on other platforms to prevent them from borrowing across multiple platforms.



As of July 2017, there were 2090 P2P lending companies in China and 700 of which have signed custody agreements with banks. However, only 450 companies' custody systems have come online. Less than 10% of the total platforms have met the custody regulations. Although this Guide will significantly increase P2P lending companies' compliance costs, it will also improve the transparency of P2P lending.

The Internet Finance Information Disclosure Standards for P2P Lending created by NIFA (The National Internet Finance Association of China) in October 2016 established 96 information disclosure indexes. As these are self-regulatory standards without legal effect, the outcomes are poor. In addition, it is hard for P2P lending companies to prevent a borrower from borrowing across multiple platforms if he/she intends to conceal it.

#### 4. E-commerce industry

- **Warehouse and logistics robots become a trend**

Amazon has introduced Kiva robots that help with picking tasks at its US logistics warehouses to improve logistics efficiency. The company is also devoted to developing logistics automation technology. Chinese company JD.com has developed its own picking robots which it started testing in a Shanghai distribution center. JD.com is likely to open a fully automated warehouse in 2018. Alibaba's affiliate Cainiao Network Technology established an automated warehouse which started operation in August 2017. Hundreds of AGV (Automated Guided Vehicle) robots have been used inside the warehouse to move goods together or independently. Alibaba has also collaborated with Chinese car vendors SAIC Motor, Dongfeng Motor, and Weifang Rainchst Automobile on developing new energy vehicles and smart logistics.

A robot picker currently works at only half the speed of a human. Using robots to tackle all picking tasks can cut down 20% of labor cost for e-commerce vendors. However, Kiva robots can move goods to the pickers, but cannot sort, pack, and ship the goods. Therefore, advanced robot technology will remain the focus of future development.

## 5. Startups industry

### ● **Taiwanese vendors chase after the UAV market aggressively**

With enormous business opportunities, the UAV (Unmanned Aerial Vehicle) market has continued to grow. The market is expected to reach US\$6 billion in late 2017 and exceed US\$11.2 billion in 2020. Taiwanese vendors capable of providing customized models as well as system integration services and components have geared up to capture the huge potential of the commercial UAV market. For example, industry giants GEOSAT Aerospace & Technology, Thunder Tiger, and AVIX Technology have unveiled their new technology.

GEOSAT uses NEC's facial recognition technology to expand the use of its drones to public safety and anti-terrorism operations. With the ability to provide customized products rapidly, AVIX Technology has developed variable-pitch multi-rotor drones with a GPS autopilot flight system to provide automatic flight guidance. Thunder Tiger has developed coaxial dual-rotor drones and high-precision RTK (Real Time Kinematic) positioning technology.

In terms of applications and market segments, most Taiwanese vendors have aimed at mapping and agricultural spraying. There are significant business opportunities for traditional drone helicopters in the agricultural spraying market. Among the 12000 pesticide companies in Taiwan, almost every company needs agricultural spraying services. Crop-spraying helicopters not only increase operation efficiency but also reduce the risk of exposure to pesticides.

### ● **Opportunities for the Taiwanese AI industry**

Taiwan has been criticized for lacking the capacity to develop AI as Taiwan has missed the revolutions of software, Internet, search engine, and social media. In fact, the development of a valuable and predictive AI system relies on the quality and quantity of data. What kinds of data are needed? How much data is needed? There are no answers to these questions until the purpose of the AI system is determined. Without vision and planning, the data collected will not meet the requirements of an AI system due to absence of key data or low quality.

Most Taiwanese vendors trying to exploit big data have difficulty using or

extracting value from the data after deploying sensors in large scale to collect big data. Without systematic collection of data and deployment of sensors in line with their goals, these vendors have wasted their money.

AI is a means to enhance services and products. Therefore, TRI believes creating a quality business model before making inroads into the AI market is the right way to do. Vendors must integrate different industries' domain knowledge before introducing the technology. After evaluating the competitive advantages of their business models, they can collect data and choose the algorithm and hardware to use based on their purposes. This is the only way to successfully expand into the market or achieve economic benefits.

### III. Investment case study

Major investments during this period of time include the bombshell announcement of Google's acquisition of HTC's Pixel team and TSMC's investment in the advanced 3nm process. Below is an analysis of the impact and future development of these two landmark investments that will significantly influence Taiwan's industries.

Major investments

Investment	Companies involved	Case study and future development
<p><b>Google announced signing a cooperation agreement with HTC in September 2017</b></p> <p>Google will acquire HTC's mobile phone contract manufacturing business, its "Powered by HTC" R&amp;D division that has worked with Google on Pixel smartphones, and a non-exclusive license for HTC's intellectual property. In this \$1.1 billion-worth deal (NT\$33 billion), Google will not take a stake in HTC. The agreement is expected to complete in 2018. HTC will keep its brand and mobile phone business.</p>	HTC	<ul style="list-style-type: none"> <li>● HTC's revenue in August hit a record low at NT\$3 billion with market share falling below 1%. Selling the "Powered by HTC" R&amp;D division will slightly ease HTC's hardships as HTC can reduce its operating expenses by 30% to 40%.</li> <li>● While HTC still owns its mobile phone brand, it will focus on VR in the future. As HTC desperately needs resources to develop its software platform, the deal will contribute to its emerging VR business.</li> <li>● HTC is expected to work with more VR startups on applications and services to jointly expand its Viveport platform in order to attract more users.</li> </ul>
	Google	<ul style="list-style-type: none"> <li>● Software needs hardware to function. Compared to Apple, Google's hardware business is still at the initial stage. Through this deal, Google can acquire HTC's ODM assets and IP license rights while enhancing control over the Pixel phone supply chain. Google can also improve the connection between its hardware and software, thereby</li> </ul>

Investment	Companies involved	Case study and future development
		<p>effectively integrating its hardware and software for its deployment in the promising AI market.</p> <ul style="list-style-type: none"> <li>● The “Powered by HTC” team has worked with Google for years on its Pixel phone. Therefore, Google can reduce training costs and cultural conflicts. However, the retention of the core talent remains to be seen.</li> <li>● Google currently has an office in Taipei. After this deal, Google is likely to increase its investment in Taiwan.</li> </ul>
<p><b>TSMC announced to build a 3nm foundry in Tainan Science Park in September 2017.</b></p> <p>This will be the world’s first advanced 3nm fab. The investment is worth about NT\$500 billion.</p>	TSMC	<ul style="list-style-type: none"> <li>● As a major driving force for Taiwan’s exports, TSMC posted NT\$947.9 billion in revenue in 2016. The company expects to launch 7nm process in 2018 and 5nm process in 2020 and is currently developing 3nm process. This announcement has sustained TSMC’s technology leadership in the global semiconductor industry.</li> <li>● TSMC’s Fab 6 and 14 are located in the Tainan Science Park. The new 3nm fab will not only benefit from industrial clustering and the supply chain in this area but also encourage investment in Taiwan’s packaging, material, and equipment industries. The total investment in the upstream and downstream is expected to hit NT\$750 billion.</li> <li>● TSMC’s 5nm process scheduled for mass production in 2020 will increase electricity demand in the park by 46%, requiring 720 megawatts of electricity. The amount of</li> </ul>

Investment	Companies involved	Case study and future development
		<p>electricity needed is higher than the park's planned capacity and nearly equal to the increase in power the park applied for.</p> <p>Furthermore, TSMC's 7nm process needs to use EUV (Extreme ultraviolet) which requires more electricity. Its 3nm fab will adopt more advanced EUV process which consumes even more water and electricity. Hence, TSMC will need to maximize its production capacity to amortize costs.</p> <ul style="list-style-type: none"> <li>Besides wafer fabrication, other hi-tech industries such as photonics, memory, and packaging also need steady electricity supply. Even if TSMC has sufficient supply of power for its current needs, Taiwan still cannot meet high electricity demand in the long term if electricity supply problems remain unsolved. This will force wafer foundries to move their production overseas or seek cooperation with foreign companies.</li> </ul>
<p><b>Tesla set up Taiwan headquarters in Neihu, Taipei, in August 2017</b></p> <p>Combining office, technical service, exhibition, and customer experience functions, the headquarters will act as a demonstration zone for new energy innovations.</p>	Tesla	<ul style="list-style-type: none"> <li>The Taipei city government's Neihu Technology Park 2.0 program provides state-owned land to encourage investment. Tesla has set up several public facilities including an experience center, energy lecture room, and innovation center. Aligned with the government's policy, these facilities will increase Tesla's brand visibility.</li> <li>Many components used in Tesla's products are provided by Taiwanese suppliers such as Hota Industrial, BizLink, K.S. Terminals, Delta,</li> </ul>

Investment	Companies involved	Case study and future development
		and First Hi-tec. Therefore, the relationships between Tesla and Taiwanese vendors will become stronger. The technical service and maintenance facilities also enable Tesla to provide maintenance services close to drivers and fully support customers' needs.

Source: compiled by TRI, October 2017