



#2017  
**INFOCUS:**

FORECAST  
**2020**  
SIZE OF PCB  
PRODUCTION



# The PCB Industry in Asia

## – what does the future look like?

In this issue, we look more closely at the PCB manufacturing industry and its development in different countries and regions in Asia. Historically, China has been dominant and is still so now, but the industry is also seeing growth elsewhere. We reflect on the way it is developing and present NCAB Group's view of where things are going.

East Asia almost totally dominates the global PCB industry today. According to figures from Prismark, Europe and the United States together accounted for only 8.5 per cent of world production in 2016. The world's four largest manufacturing countries, China (including Hong Kong), Taiwan, South Korea and Japan, together accounted for 84 per cent. Among them, China is the largest, accounting as it does for about 50 per cent of the world's production of PCBs.

At the same time, we also see the continuation of the PCB industry in Southeast Asia. This is being driven mainly by foreign investments, for example setting up operations in Thailand and Malaysia. Together, the countries in Southeast Asia account for 6 per cent of world production. We are also seeing an increase in the production of printed circuit boards in India.



We are seeing an increase in the production of printed circuit boards in India. But for them to become an important player in the world market, will require the right kind of investments in materials, equipment and technology, as well as improved electricity and water supplies.

In what ways do the PCB industries in the different Asian countries and regions differ? Where are the different types of boards manufactured and for what types of end products? What are the strengths and the challenges in each geographic area? And what are the prospects for the future like? We discussed these issues with Jack Kei, Managing Director of NCAB Group China, and Chris Nuttall, NCAB Group's Chief Operations Officer.

### ADVANCED CIRCUIT BOARDS IN THE FAR EAST

If we start by looking at the way the regions differ in terms of the technology or the kinds of boards that they manufacture, we find the more advanced PCBs in Japan, Taiwan and, to a certain extent, South Korea. It is within this category that the printed circuit board industry in these countries has a future.

"For the past 20 years, China has been very successful in building an industry that meets the expectations of Western customers. At the same time, they still lack some knowledge and experience of the more



**"Investments in China are also moving in a similar direction, and fast approaching the point where they will have caught up with the high-end producers."**

**CHRIS NUTTALL, CHIEF OPERATIONS OFFICER, NCAB GROUP**

complex products. When it comes to the really high-end product categories, then I think we will see Taiwan, South Korea and Japan continuing to compete, through investing in research and development," says Chris Nuttall.

Jack Kei points out that in China, manufacturers are producing printed circuit boards for all kinds of products, and he continues: "That is where we find the widest range of PCBs, from low-end to high-end. The PCB Industry in China is still undergoing strong growth, both in terms of manufacturing capacity and quality. There is a strong belief in the future," he says.

At the same time, the industry is far from dead in the other East Asian countries. A growth forecast for Taiwan in 2017 shows that production there is projected to grow by 2.7 per cent and another for South Korea forecasts 2.8 per cent growth rate. That is under 1 per cent lower than the forecast for China, which is 3.6 per cent. This trend is also expected to continue in the coming years.

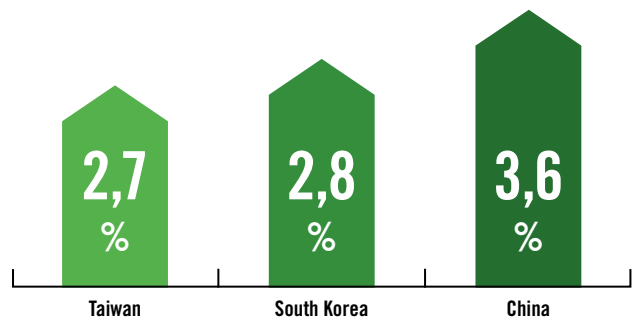
"China is where you can truly benefit from economies of scale and the country will definitely remain the [PCB] industry's powerhouse for many years to come. But at the same time, there is also room for growth in Taiwan, Japan and South Korea. Although that applies to a narrower segment of the industry, involving highly complex products and products where short lead times are critical," says Chris Nuttall.

### CHINA IS NOT UNIFORM

Obviously, the Chinese PCB industry is also focusing on developing more advanced technology. Ten years ago, China was the low-cost and low-tech alternative. Nowadays, they also produce more advanced boards there.

Chris Nuttall points out that investments in China are also moving in a similar direction, and fast approaching the point where they will have caught up with the technology.

Moreover, China is far from uniform. About 60 percent of the PCB



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About 60 percent of the PCB production in China is located in southern China, centered in Shenzhen. This is also where NCAB Group China has its head office (to the right in the picture).

production in the country is located in Southern China, centered in Shenzhen, 30 percent in East China, near Shanghai and 10 percent inland, in provinces such as Jiangxi, Sichuan, Hunan and Hubei.

"It is first and foremost in Southern and Eastern China that we see Investments being made in more advanced technology. Inland, the focus is on expanding production capacity. This area offers cost advantages, with lower labour, electricity, water and tax costs. The total cost is about 20 percent lower than in Shenzhen. On the other hand, skilled labour there is in short supply, so manufacturers inland produce mainly low-end PCBs," says Jack Kei.



Jack Kei, Managing Director, NCAB China

## INLAND COMPETING WITH "NEW" COUNTRIES

The industry in China's coastal provinces is looking to develop its capability to produce increasingly advanced products, whilst at the same time retaining its unique manufacturing breadth. Inland provinces are, in contrast, competing on the same platform as the emerging industries in Southeast Asia and India. In Southeast Asia, there are currently about 50 factories producing PCBs, mainly lower end, low-cost boards. At the same time, it takes time to build an entire industry from scratch. Personnel with the necessary skills are hard to come by. The supply chains don't work as well as they do in China, local facilities for servicing equipment are often lacking, and so on and so forth.

"In China, it has taken 15-20 years for the industry to develop into what it is today. So although the Southeast Asian countries and India can compete with, for example, lower costs and less stringent environmental rules, it will take time before they can seriously compete with China," says Jack Kei.

For India to become an important player in the world market they will require the right kind of investments in materials, equipment and technology, as well as improved electricity and water supplies.

"My guess is that within a 5 - 10 year perspective, inland China will be attracting more investments than South East Asia and other new places when it comes to low-end PCBs. China's inland offers considerable potential, while support from the public sector is extensive. Investors from Southern China, Taiwan and Japan are already investing heavily here. I think Southeast Asia will eventually develop into a real hotspot in a coming years, but that won't happen until the next phase, when China will have reached perhaps 60 per cent of world output and it will be hard to grow the industry further here," predicts Jack Kei.

**"I think that Asia will eventually develop into a real hotspot, but that won't happen until the next phase."**

JACK KEI, MANAGING DIRECTOR, NCAB CHINA

## NCAB SETS HIGH STANDARDS

For a player like NCAB Group to consider investing in manufacturing in Southeast Asia or India, we would first need to be sure that a number of requirements could be met.

"Our mission has been and remains: Zero defects on time for demanding customers. Consequently this calls for a high level of experience and credibility at our factories. For a factory in Southeast Asia or India to be attractive for us, it would have to be stable and able to show long-term growth," says Chris Nuttall.

He believes that factories in these countries would need to develop their operations right across the board in order to be able to live up to NCAB's values in terms of quality first and high levels of delivery reliability. In its sourcing process, NCAB looks at the whole picture. For example, the type and standard of equipment and materials used, what certifications the factory has and what category of customers they enter into business with.

"One thing you can be sure of, we will not be doing anything just for the sake of it, that would enable us to say that we are present in multiple places. A factory must be able to deliver something beyond what we already have. It should allow us to offer added value to our custom-

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ers. This applies both to low-cost manufacturing in new countries, and inland China, or for that matter to the manufacture of high-end PCBs, or to production with short lead times in countries such as Taiwan and South Korea. Having said that, we should never allow ourselves to become complacent or self-satisfied. We need to always keep our eyes open, look at the available options and challenge ourselves,” says Chris Nuttall emphatically.

**WELL ESTABLISHED INDUSTRY IN CHINA**

Looking at the foreseeable future, China will most likely manage to maintain its competitiveness, particularly within medium and low-end technology.

“Looking at the total cost, China benefits from a mature supply chain, which includes industrial equipment and all kinds of materials for PCB production. The skilled manpower is there, both when it comes to management and factory personnel. Productivity has increased, quality has improved and they are using increasingly advanced technology. Furthermore, we are seeing both domestic and foreign entrepreneurs investing for the future,” says Jack Kei.

In the case of high-tech boards and boards with short lead times, NCAB is already evaluating the options available in countries such as Taiwan and South Korea. If it turns out that their factories can deliver value to NCAB customers that is over and above what the factories in China are doing, we may well see NCAB extending its



China will most likely manage to maintain its competitiveness. The skilled manpower is there, both when it comes to management and factory personnel. In the picture Ellefen Jiang, PCB Design Manager NCAB Group China, is inspecting materials in a factory together with her colleagues.

factory management work to these markets also.

“However, in the HMLV (High Mix, Low Volume) segment, where we are a particularly important player, experience has shown that making a switch to factories in South Korea and Japan is no easy task. The factories there are traditionally very focused on servicing their domestic markets and find it hard to adapt to a more international supply chain in terms of materials selection, equipment and so on. This may well change in the future,” says Jack Kei.

“The overall conclusion is that China will, for the foreseeable future remain the most important player within PCB manufacturing. This does not preclude other regions also developing positively within their respective niches. For our part at NCAB, we are keeping an open mind. What matters to us is that we can deliver in accordance with our values. The bottom line as things stand now, is that we are meeting that objective by keeping the lion’s share of our production in China. Yet, this is not an end in itself. As and when factories in other countries show that they can provide customers with new added value, we will be there,” concludes Chris Nuttall.

**PCB PRODUCTION IN DIFFERENT COUNTRIES**

	JAPAN	SOUTH KOREA	TAIWAN	SOUTHERN CHINA	INLAND CHINA	SOUTHEAST ASIA	INDIA
<b>Product type</b>	IC Substrate, HDI, flex, high layer count, ceramic and metal core	HDI, IC, flex, rigid-flex, normal rigid	HDI, IC substrate, flex, standard multilayer, rigid-flex	1L,2L,Standard multilayer, HDI, flex, Flex-rigid, IC substrate, IMS	1L,2L,Standard multilayer, flex, flex-rigid, HDI	1L, 2L, Standard multilayer, flex, IC substrate, IMS	1L, 2L, multi-layer, flex
<b>End products</b>	Communication, Automotive; smart phone, high reliability	Communications, Consumer, Automotive	Communications, Consumer, computer, semiconductor, Automotive; smart phone	Communications, Consumer, Automotive industry, health, military and aerospace	Communications, Consumer, Automotive, smart phone.	Consumer, automotive	Consumer
<b>Volume</b>	QTA, Prototype, Small, middle and mass	High	High and middle	QTA, Prototype, Small, middle and mass	High	High	High
<b>Technology</b>	High	Middle	Middle and high	Middle	Middle	Low	Low
<b>Quality</b>	High	Middle	Middle and high	Middle, high and low	Middle and low	Low	Low

# Formidable development

HANS STÄHL  
CEO NCAB GROUP



During my 30 years in the PCB industry, I have seen it undergo major changes. Of course, the boards have become more sophisticated, driven by miniaturization, but the major changes are where they are manufactured. In Sweden, there were 30 PCB manufacturers 30 years ago and boards from China were essentially non-existent.

Some 20 years ago boards from China started to make their appearance in the West, and their quality was, to put it mildly, low! Then something happened. China pumped massive resources into building PCB factories and major investments were made by the Chinese state. That, together with a work force that was - and is - incredibly dedicated and hardworking, coupled with lower wage levels

than in the West, all adds up to the success stories we see today.

China truly stands out and I would go so far as to say that it is also a leader on the quality front. When it comes to high-end boards, Japan is the leader. All the major electronics manufacturers have their own factories [in Japan] that no one else has access to. Interestingly, China has so much more to offer regarding development of the PCB industry in the different regions within that vast country.

Nevertheless, as far as NCAB is concerned, it remains important to keep an eye on what's happening in other parts of the world. Whatever country or countries we may choose to buy from in the future, we will never compromise on quality!



## NCAB Group in Social Media

For a few months now, customers and other interested parties have been able to follow us on Twitter and

LinkedIn. We have also started a blog where we immerse ourselves in the versatile world of circuit boards! Follow us on:

» [Twitter](#) » [LinkedIn](#) » [Blog](#) » [YouTube](#)

## Join us!

We are always on the lookout for full time competent employees. If you are a first-class Technician,

Customer Support or Key Account Manager, do not hesitate to contact us or send your CV to: [recruitment@ncabgroup.com](mailto:recruitment@ncabgroup.com)

## Subjects we have covered earlier

Do read our earlier newsletters. You will find them all on our website, [www.ncabgroup.com/newsroom/](http://www.ncabgroup.com/newsroom/)

### » Engagement and competence development in focus

2017 04 06 | NEWSLETTER 1 2017

### » Future strategy

2016 12 14 | NEWSLETTER 4 2016

### » Working closely with the factory

2016 10 12 | NEWSLETTER 3 2016

### » Responsibility as a business concept

2016 06 22 | NEWSLETTER 2 2016

### » China's economy

2016 04 08 | NEWSLETTER 1 2016

### » UL Approval

2015 12 09 | NEWSLETTER 4 2015

## Are we taking up the wrong subjects?

We are always looking for interesting subjects that we could take a more in depth look at. If there is something you would like to learn more about, or perhaps you would like to comment on anything we have written, do get in touch with us and tell us more.

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