

Photonics Market Forecast for Engineers

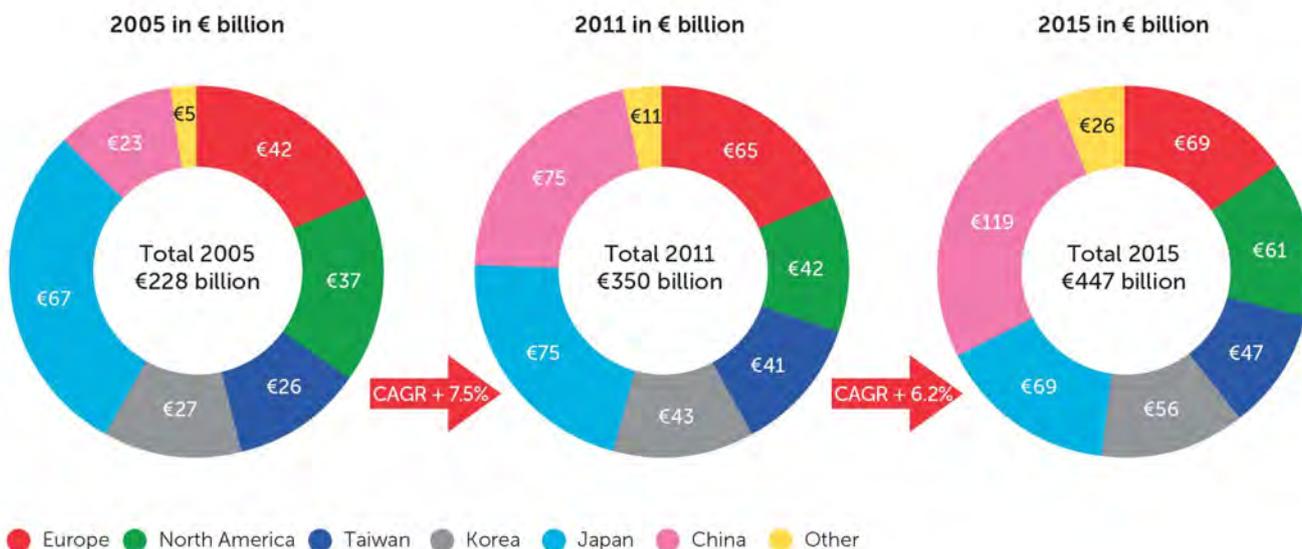
By Ali Afshari

According to final Photonics 2017 figures, there were 1,293 exhibitors from 42 countries, drawing 32,000 visitors, 90 percent of which traveled from outside of Germany to attend the Munich show. The top visitor countries were mostly from France, then UK, Japan, Switzerland, and USA. 60 percent of exhibitors were from outside of Germany.

According to Optec Market Research Study published by Photonics 21, Japan has experienced a significant share erosion in past 12 years, while China has gained Japan's share of the market. So far, China has the 22% share of the 500 billion Euros market while Europe has 18%, and Japan has 12% of world market share (see also page 16). As one could easily notice out of these total figures, display technology has 27% of the market, information technology has 15%, while optical components have only 5% of the market share.



Optics students at OMiD booth, Laser 2017 Munich show

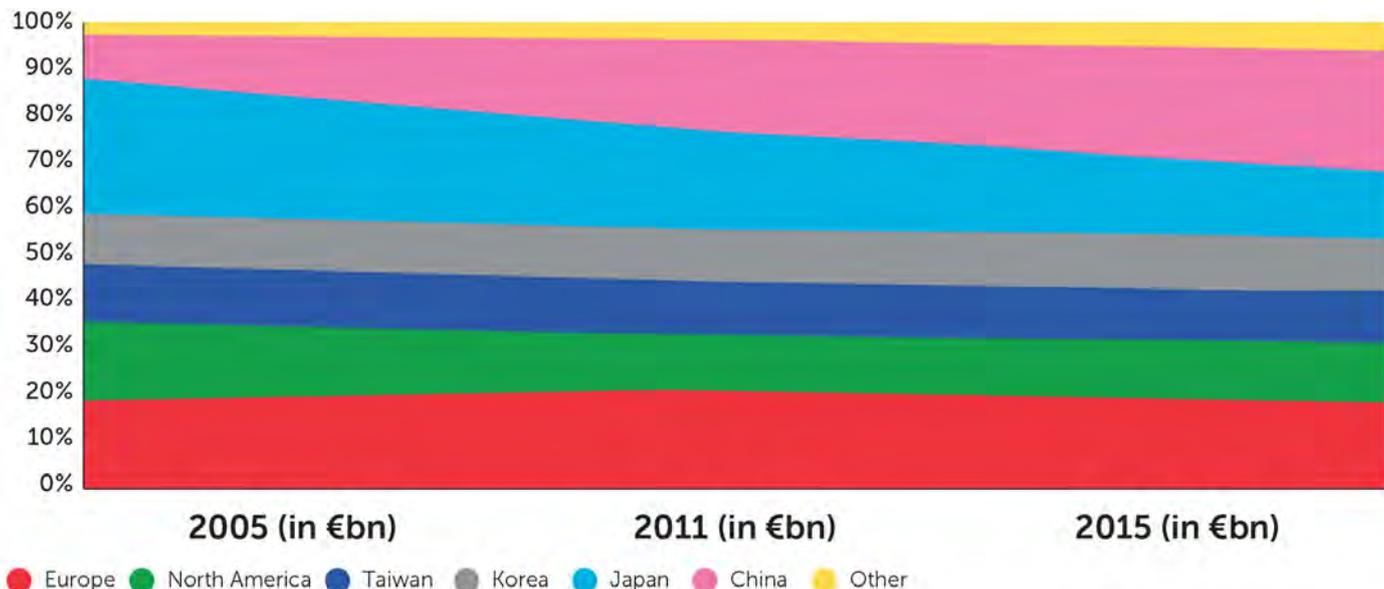


Production Volume on Ero Basis (including photovoltaics which is not subject of PPP) shows solid growth above global GDP: Photonics grew from a 228 Billion Euros industry to a 447 Billion Euros industry in 2015. Source: Photonics 21 market study research 2017. I love their colorful representation of economic charts, that are user friendly to engineers.



Impressive booths (left), dominated the World of Photonics show in 2017. Japan's pavilion (right), many Japanese companies like Toshiba were slow in their R&D, and lost the laser diode market share to much less quality "made in China".

Photonics industry grew from 228 Billion Euros in 2005 to 447 Billion Euros in 2015 (an annual growth of 6.2%). Displays, and information technology have had the largest increase during these 10 years while components has stayed in low bottom without much change. So to all optomechanics lovers, our market share is the lowest (only 5%) of the world market. So many companies I have visited, who sell optomechanics, have a department for information technology to grab a part of its high market share. I visited Laser 2000 this year in Munich, and as expected, they also had a good portion of their building allocated to supporting this market.



Market share comparison between 2005 to 2015 revealing China's growth vs Japan's decline. Source: Photonics 21



Laser 2000 booth offered free snacks to all attendees entering the exhibition every morning.



Optic booth displayed the Microbench system, still being published as the Linos Catalog.

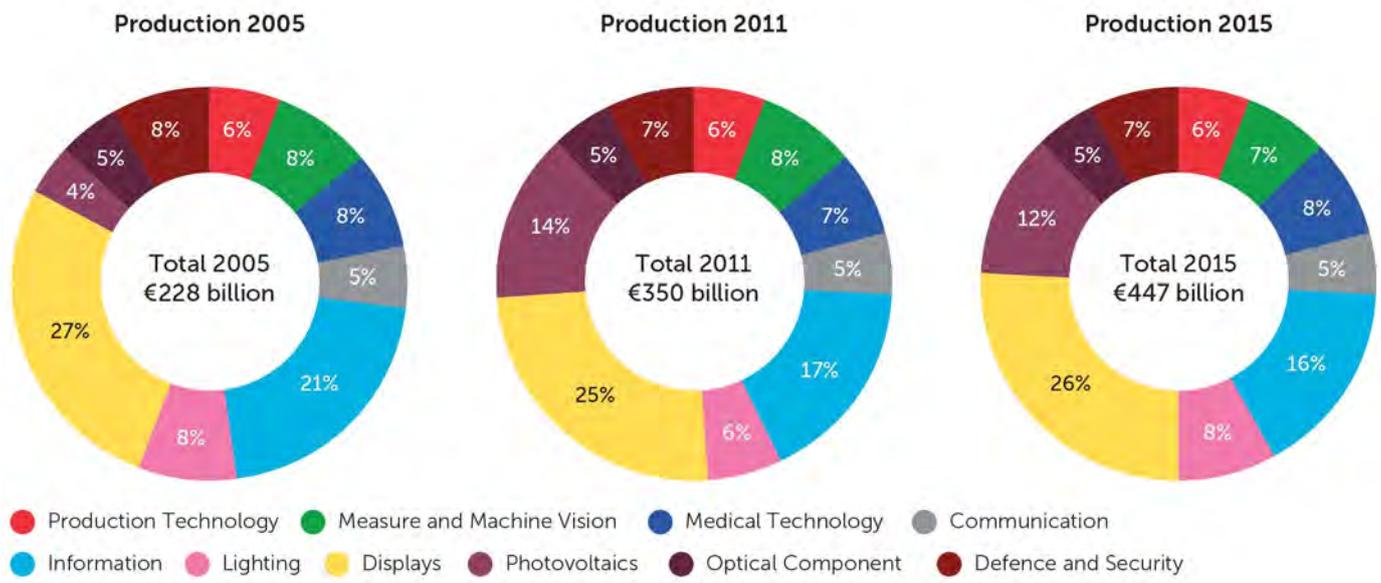


Thorlabs MacDonal Concept, displayed along their products. Many students order from Thorlabs just to get snacks!



Thorlabs Booth at hall B1 with the over head statement: "You speak - we listen".

Display technology has been one of the three major technologies for Japan's economy (other two being automotive, and digital cameras). This year, China had a big stand to sell their displays to European market.



Development of various segments over time. Most fluctuation came from photovoltaics by information technology. Source: Photonics 21. Note the optical components market only occupies 5% of total market.



US pavilion costs extra, so many companies were scattered around the show. China, on the other hand, gives so many incentives to Chinese companies to be part of China pavilion. China occupied the back portion of halls B1, B2, and B3.

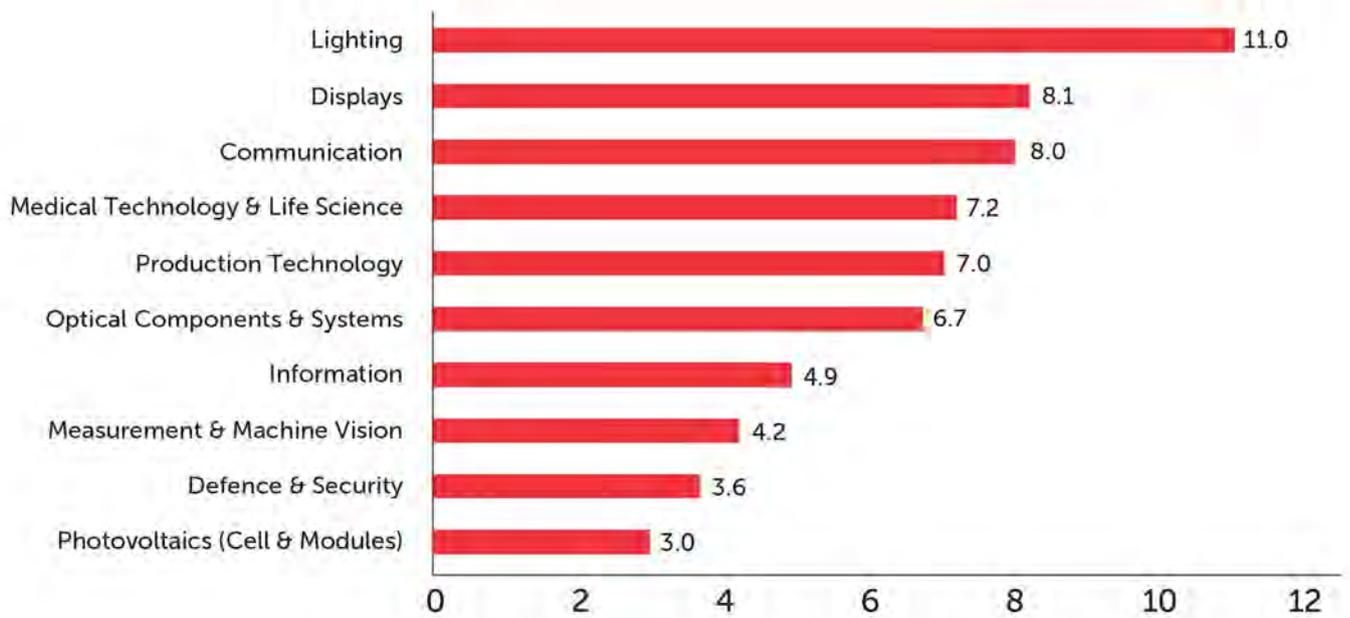


At OSA booth at the entrance hall way of the show. A Renticular 3-D logo of OSA was given away to visitors.



At PI booth with Lucius Amelung of Micos, maker of precision motorized stages.

Growth rate on Euro Basis – CAGR 2011–2015 in %



Market growth rate of various photonics segments. Source: Photonics 21. Note the optical components market with 6.7% in market growth, and lighting is by far, the most growing filed in photonics. This is useful in estimating sales forecast in the few upcoming years.

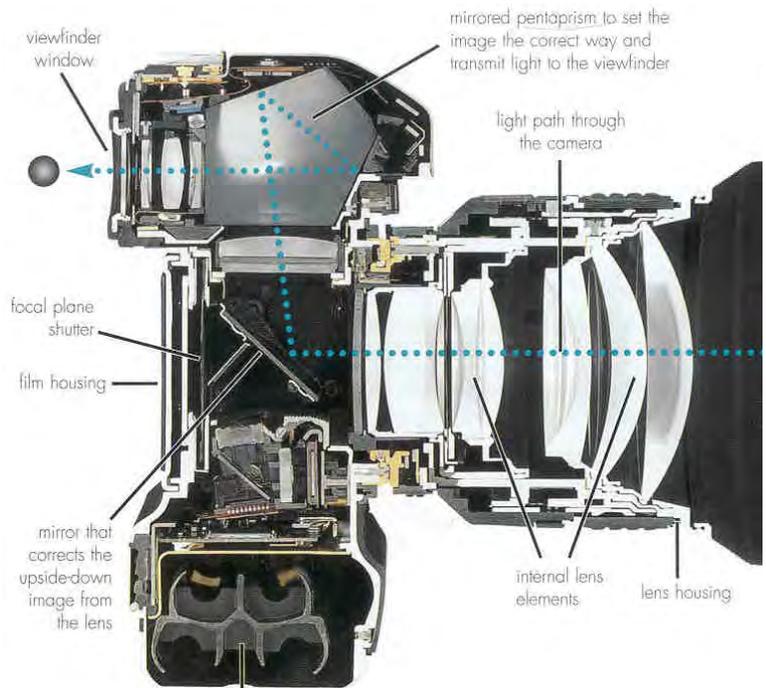
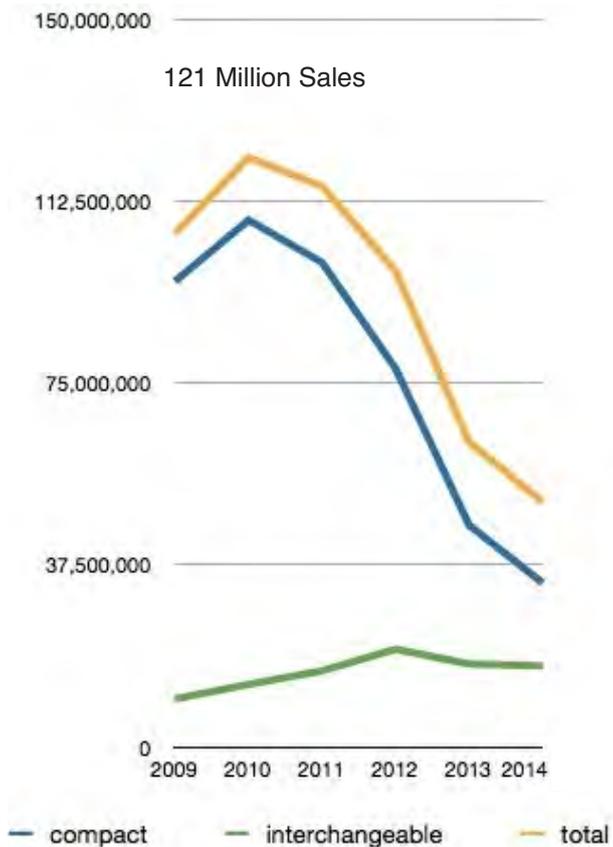
Production Volume in Euro*



Long term photonics growth forecast until the year 2020. Source: Photonics 21. While the photonics market has a positive growth forecast, see the downfall of digital camera market since 2010, next.

Digital Cameras Sales Forecast, What happened to Konica, and Minolta?

Japan's Camera Sales drop in 5 years (opposite page) shows the real challenge in the industry. Historically, the German camera Leica, Swedish made Hasselblad, Japanese made Mamyia, Nikon-F3, and Canon F-1 dominated the pro-photo industry, and just as the film camera industry had reached its highest point in 1996, Casio introduced its first commercially available digital camera. The digital revolution started with Sony Mavica in 1981 but with a 0.3 MP image quality, and began what is known as one of Japan's three sacred treasures (other two are LCD Technology, and DVD recorder). At least the display technology is being challenged today by China. Chinese made LED display panels by CEDAR Electronics were showcased at Laser Munich 2017 at low prices with impressive dot size, and picture quality.



Canon's optomechanical design backed by Japan's micro-electronics success for over 70 years, broke record sales with their AE-1 in 1976. Their new domination in digital camera market is the culmination of Japan's leading edge manufacturing.

As for digital cameras, Japan had 90% of the world market, but in 2000, digital camera sales dropped drastically, and many Japanese manufacturers could not make a profit. In 2005, companies like Olympus showed a loss of 23.9 Billion Jpy. The same year, Kyocera, who made point and shoot cameras that were rebranded by companies like Vivitar, discontinued their camera division. Konica, and Minolta who had joined earlier, had to shut down with a loss of Jpy 8.7 billion, and all their digital camera division was sold, and transferred to Sony. Sony bought their camera division for Jpy 20 billion to become a top digital SLR camera maker. Canon had made a similar strategic move in 1999 to acquire NKK Semiconductor in 1999 to fabricate their own sensors. For the surviving companies, 2010 was a top year for camera industry with over 121 million cameras sold world wide (above). In 2013 it was reduced to half, and in 2015 was cut in half



Mirrorless Cameras

Market Share of cameras in 2016:

DSLR Cameras	13%
Mirrorless Cameras	34%
Compact Cameras	52%

Worldwide Camera Sales in 2012:

Japan	20%
Asia	11%
Americas	32%
Europe	33%
Other	4%

Source: Cameras Sales Data by Alan Griffith

again to only 31 million cameras, and in 2016 was dropped again to 23 million sales. This was mostly due to the decline in sales of compact cameras with non-interchangeable lenses. in 2012, the lens production was at its highest (31 million), and in 2016 it dropped to 19 million.

Smart phones killed the compact camera market with its global sales in 2016, reaching 1.4 billion units. Cameras have become a nostalgic passion of older people! The younger generation are far less interested in photography as a professional hobby, so smart phones are getting better, and replacing even DSLRs. According to Reuters, Nikon announced \$222 million loss in sales as high-end camera market stalls, and is laying off 1000 workers.

The forecast for 2017 for digital cameras is around 20 million total sales. Cinema cameras such as RED, and Alexa will experience a great challenge in the coming years. The 4K revolution started with RED-One in 2007, and RED became

a Leica or Hasselblad for cinematographers. In 2009, Red introduced their iconic camera design, the Epic, and played hard ball to challenge the giant Sony. With introduction of Blackmagic in 2012, and Sony's F55 in 2013, RED dropped its price from \$40K to nearly half to stay in business.

In a second marketing move that displeased many of its devoted users, RED discontinued their upgrade for the 5K Epic line, to promote their new 6K Dragon cameras. Both RED, and Arri are being challenged today because so many film makers think the name brand is really for big budget Hollywood studios, and they could do the same job with Canon 5D Mark III, and C300, or Panasonic HC-X1000.



Digital Camera sales figures in \$M shows the decline of the pro-camera sales while the mirrorless is unchanged. Source: CIPA (Camera & Imaging Products Association).



Canon acquired NKK Semiconductor in 1999 to fabricate their own sensors. 14 years later, Canon's C300, and C500 cameras were a big hit at the NAB show with ISO 25,000 sensor for their ability to shoot at low light.



5K RED Epic (right, introduced in 2009), and Sony PMW F55 camera (left, introduced in 2013) went head to head in pro-cinema market. In just four years after it's introduction, RED Epic price was dropped in half to compete with Sony. Many believe RED made its money in those few years.