

INDUSTRY OVERVIEW

Certain information and statistics, including estimates, set forth in this section and elsewhere in this prospectus have been extracted from a report commissioned by us and prepared by International Business Strategies, Inc. (the "IBS Report") in relation to the camera module and optical components industries. We have taken reasonable care in extracting and reproducing such information, and we have no reason to believe that such information is false or misleading or that any fact has been omitted that would render such information false or misleading in any material respect. However, the information has not been independently verified by us or any other party involved in the prospectus, and no representation is given as to its accuracy or completeness. As such, investors are cautioned not to place any undue reliance on the information and statistics set forth in this section or similar information included elsewhere in this prospectus.

INDUSTRY CONSULTANTS AND INFORMATION SOURCES

International Business Strategies

We commissioned International Business Strategies Inc. ("IBS"), an independent market research consulting firm that is principally engaged in the provision of market research consultancy services, to conduct a detailed analysis of the global and Chinese camera module industry. IBS has been in business for over 25 years and is actively involved in top-level strategic consulting for global leaders in the electronics industry. IBS's independent market research was undertaken through both primary and secondary research based on various sources. Primary research involved in-depth interviews with key stakeholders and industry experts including camera module suppliers, foundry service providers, design houses, module assembly houses, industry associations and experts, among others. Secondary research involved research regarding information and statistics published by government departments, trade and business media, company annual reports and publicity materials, IBS research reports, analyst reports, industry associations, industry journals, online sources and data from the research database of IBS. Such methodology utilizes a multilevel information sourcing process, in which information gathered is cross-referenced to ensure accuracy.

IBS considered the following parameters in preparing its market sizing and forecast model for the IBS Report:

- the market demand by geographic region for smartphones, feature phones, multimedia tablets, digital still cameras, automotive, security, and other platforms that consume high volumes of camera modules;
- the longer-term demand profiles for smartphones and multimedia tablets, as well as the strengthening of PRC vendors;
- the increased adoption of imaging as a key part of social networking on a global basis within the smartphone and multimedia tablet ecosystem;
- enhancements in technologies that can offer higher resolution and lower cost imaging capabilities, including the impact of enhancements in image sensors, image stabilization, autofocus, chip scale packaging and other areas;
- the competitive pressures in the camera modules market and the impact of the price of image sensors, as well as the effectiveness of the low-cost camera module vendors; and
- the supply chain for image sensors, lenses, and other key components for camera modules.

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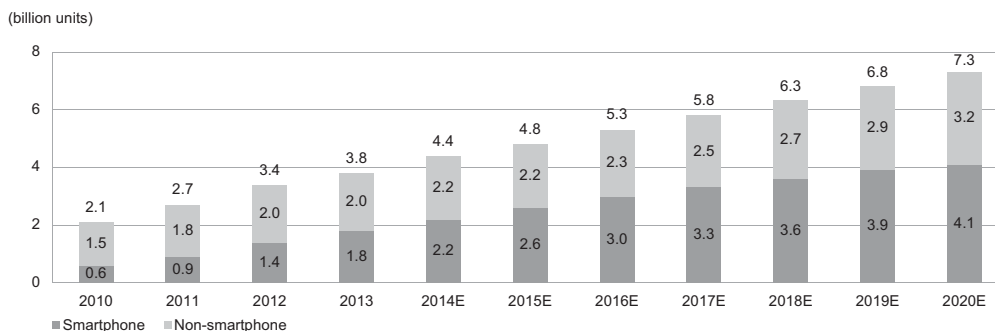
IBS further assumed that no natural disasters will adversely affect the demand and supply of camera modules.

We have extracted certain information from the IBS Report in this section as well as in the sections headed “Risk Factors,” “Business,” “Financial Information” and elsewhere in this prospectus to provide investors with a more comprehensive overview of the industry in which we operate. We paid IBS a fee of US\$75,000 for the IBS Report.

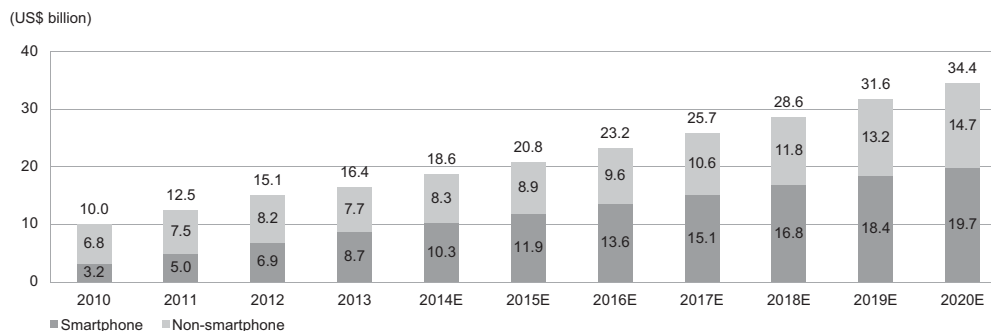
GLOBAL CAMERA MODULES MARKET

A camera module is a device that converts an optical image into electronic video signals. These electronic signals are then converted into digital data on the display of a digital imaging device for users to store as a digital image. The booming demand for mobile phones, smartphones, multimedia tablets and other mobile devices has driven the demand for camera modules, which are the core components for built-in digital cameras and have become one of the key differentiating factors for such devices. According to the IBS Report, the global camera modules market grew from 2.1 billion units in 2010 to 3.8 billion units in 2013, representing a CAGR of 22.8%, and is expected to grow further to 7.3 billion units in 2020, representing a CAGR of 9.5% over 2013 to 2020. In terms of revenue, according to the IBS Report, the global camera modules market grew from US\$10.0 billion in 2010 to US\$16.4 billion in 2013, representing a CAGR of 17.8%, and is expected to further grow to US\$34.4 billion in 2020, representing a CAGR of 11.2% over 2013 to 2020.

Global Camera Modules Market by Volume



Global Camera Modules Market by Revenue



Source: International Business Strategies, Inc.

The two major segments in the global camera modules market are flip-chip and COB (chip-on-board). Flip-chip camera modules are generally smaller than COB camera modules but require higher precision packaging technologies. According to the IBS Report, flip-chip camera modules are expected to represent 76.3% of total camera module sales in 2020.

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Market Applications of Camera Modules

Camera module applications have expanded beyond their use traditionally as a component of digital still cameras to a wide range of markets in automotive devices, security, medical and other areas, due to the cost and performance advantages of camera modules.

Camera features are becoming key differentiating factors for mobile multimedia platforms such as smart phones and tablet computers and there is also growth in camera module demand in automotive, surveillance, medical and other areas.

Global camera module shipments are expected to increase in the coming years with the increase in the number of smartphone shipments, further enhanced by the rising demand for mobile phones with a camera at both ends (front and rear). Rear-end cameras are driving enhancements in camera modules for higher pixel count while front-end camera modules are at a lower pixel count and based on fixed focus technology. According to the IBS Report, the sales volume of rear-end camera modules grew from 1,315 million units in 2010 to 2,065 million units in 2013 and is expected to increase further to 3,040 million units in 2020, representing a CAGR of 5.7%. Front-end camera module sales grew faster from 405 million units in 2010 to 1,317 million units in 2013, representing a CAGR of 48.2%, and are expected to grow further to 2,778 million units in 2020, representing a CAGR of 11.3%. Rear-end and front-end camera modules represented 61.1% and 38.9% of total camera module sales volume in 2013, respectively. By 2020, rear-end and front-end camera modules are expected to represent 52.3% and 47.7% of total camera module sales volume, respectively. Rear-end camera modules have reached pixel counts of over 16 megapixels, but there still is a large market for 5 megapixels and 8 megapixels. Front-end camera modules are typically two megapixels in pixel count. Overall, camera module technology will be driven by the need to support a wide range of image resolution levels.

Global Camera Modules Market Volume⁽¹⁾

	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
	(in millions of units)										
Rear-end	1,315	1,592	1,918	2,065	2,273	2,374	2,501	2,622	2,762	2,912	3,040
Front-end	405	716	1,033	1,317	1,565	1,705	2,002	2,204	2,414	2,616	2,778

(1) Includes camera modules for mobile devices with defined rear-end and front-end camera modules (including mobile phones and tablets)

Source: *International Business Strategies, Inc.*

Smartphones

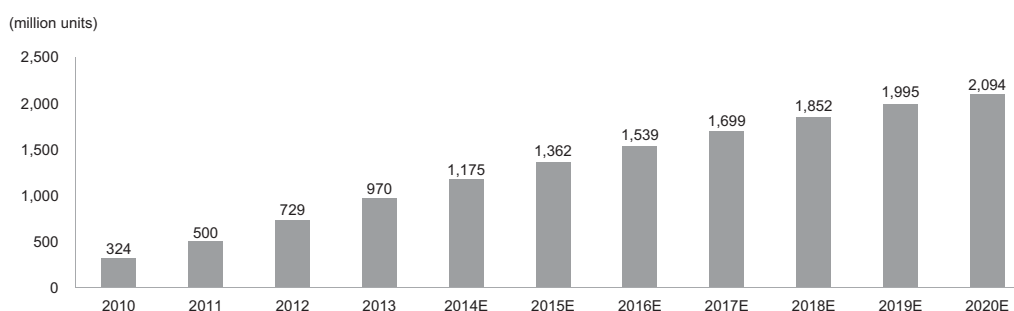
The camera modules market is primarily driven by increasing application of camera modules in smartphones.

According to the IBS Report, the volume of the global smartphones market is expected to increase from 970 million units in 2013 to 2.1 billion units in 2020, representing a CAGR of 11.6%, and will be a key driver for the camera modules market through 2020.

While the growth from non-China smartphone vendors is lower than that of Chinese smartphone vendors, the technology requirements of camera modules in the non-China market are typically higher, which leads to higher selling prices for camera modules. The volume of smartphones sold in the non-China region is expected to increase from 624 million units in 2013 to 895 million units in 2020, representing a CAGR of 5.3%.

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Global Smartphone Market Volume



Source: International Business Strategies, Inc.

According to the IBS Report, Samsung Electronics was the largest smartphone vendor in terms of sales volume with a 33.1% global market share in 2013. Apple and Huawei were the second and third largest smartphone vendors with market shares of 15.8% and 5.4% respectively in 2013. Other leading smartphone vendors during 2013 included Microsoft/Nokia, LG Electronics, Lenovo, ZTE, Sony, Coolpad, Xiaomi and Blackberry.

Market Shares of Smartphone Vendors

Company	2013	
	Sales (in millions of units)	Market Share (%)
Samsung Electronics	321.2	33.1%
Apple	153.4	15.8%
Huawei	52.0	5.4%
Microsoft/Nokia	51.8	5.3%
LG Electronics	47.6	4.9%
Lenovo	42.9	4.4%
ZTE	40.0	4.1%
Sony	38.4	4.0%
Coolpad	36.7	3.8%
Xiaomi	18.7	1.9%
BlackBerry	18.4	1.9%
TCL	17.6	1.8%
HTC	16.1	1.7%
Google/Motorola	12.5	1.3%
Other	102.6	10.6%
Total	969.9	100.0%

Tablets

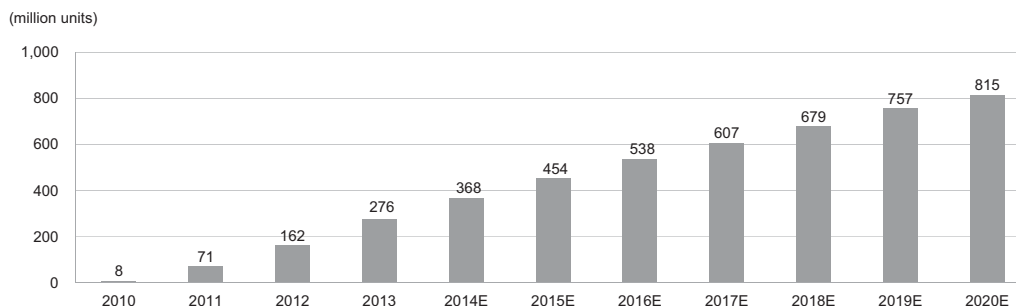
Camera modules are also gaining popularity and seeing increased demand in as components for multimedia tablets. As is the case for smartphones, front and rear cameras have become one of the key specifications for tablets.

According to the IBS Report, the volume of the global tablet market is expected to increase from 276 million units in 2013 to 815 million units in 2020, representing a CAGR of 16.7%. The growth of mobile Internet usage serves as one of the main drivers for increasing sales of tablets on a global basis. The tablet market is expected to continue to experience strong growth despite increasing overlap with

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large-area display smartphones and the low-end notebook computer market. The volume of tablets sold in the non-China region is expected to increase from 112 million units in 2013 to 267 million units in 2020, representing a CAGR of 13.2%.

Global Tablet Market Volume



Source: International Business Strategies, Inc.

According to the IBS Report, Apple was the largest vendor of tablets in terms of sales volume in 2013 with a market share of 26.9%. Samsung Electronics and Asus were the second and third largest vendors of tablets with market share of 14.6% and 4.4% respectively in 2013.

Market Shares of Tablet Vendors

<u>Company</u>	<u>2013</u>	
	<u>Sales</u> (in millions of units)	<u>Market Share</u> (%)
Apple	74.2	26.9%
Samsung Electronics	40.4	14.6%
Asus	12.1	4.4%
Amazon	10.2	3.7%
Lenovo	7.9	2.9%
Other	131.2	47.5%
Total	276.0	100.0%

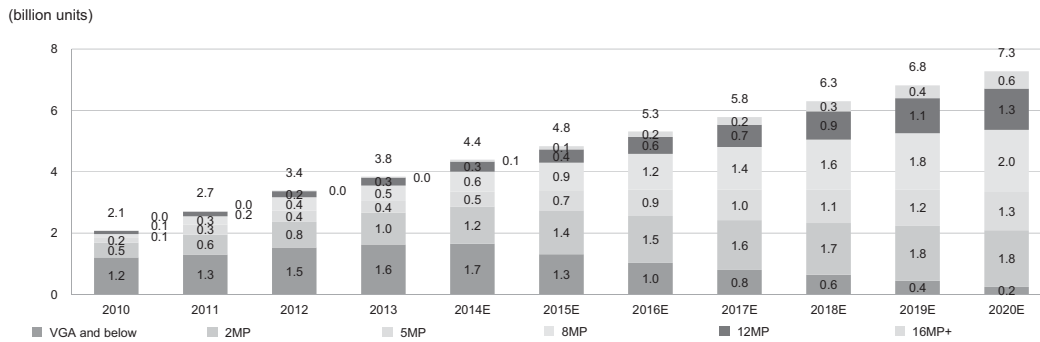
Camera Module Resolutions

Image resolution for camera modules is measured by the pixel count and is one of the key metrics of camera module performance. Demand for higher pixel count camera modules continues to grow, driven by large end user demand for high quality pictures.

According to the IBS Report, global shipments of mid to high resolution camera modules, characterized by a pixel count of 5 megapixels and above, amounted to 725 million units in 2013 and are projected to jump to 5,182 million units in 2020, representing a CAGR of 32.4%. Camera modules with high resolution, characterized by a pixel count of 8 megapixels, 12 megapixels, 16 megapixels and above, had unit volumes of 342 million in 2013 which are expected to increase to 3,931 million units in 2020, representing a CAGR of 41.7%, reflecting increasing demand for high resolution cameras in smartphones, multimedia tablets and other applications, including in the automotive sector.

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Global Camera Modules Market Volume by Pixel Count



Source: International Business Strategies, Inc.

Growth Drivers and Technology Innovations

While Japanese camera module manufacturers have been the technology leaders within digital still camera applications, their high cost structure has not allowed them to be competitive in the high volume market for smartphone camera modules. From 2014 onwards, cameras capable of generating content with a horizontal resolution on the order of 4,000 pixels (“4K”) are expected to become a key market segment, as demonstrated by the introduction of Panasonic’s 4K wearable camera.

The ability to manufacture high volumes of high-quality lens systems is another key element to becoming a market leader in camera modules. Lens systems require skills in a wide range of capabilities and having the ability to customize lens system features functions as an important competitive advantage.

Key trends in technology are increased pixel count to 20+ megapixels for rear-facing cameras that require powerful signal processing technology and reduced pixel size to 0.90µm. The inclusion of image signal processors (“ISPs”) within camera modules is another increasing trend.

Camera Module Components and Materials

Major components for camera modules include CMOS image sensors, lens modules, substrates and filters. According to the IBS Report, the price of major components and materials for camera modules is expected to be flat or lower through 2020, as shortages of such components and materials are not expected due to the strengthening of production capabilities for CMOS image sensors, lens modules, substrates, filters and other components by PRC suppliers through 2020, and such increasing capabilities are likely to result in significant downward price pressure as PRC suppliers seek to gain market share.

For CMOS image sensors specifically, prices for certain specific pixel sensors, such as 8 megapixels and 22 megapixels, have historically declined over time, which is the normal pattern within the semiconductor industry. However, the migration to higher pixel count for front-facing cameras, due to the increasing demand for better image quality resulting from the increasing importance of self-taken images, had a counter-vailing impact of generally increasing the average prices of image sensors used in front-facing cameras, which is expected to continue.

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The following table sets forth the historical and estimated average prices for image sensors for the periods indicated, as well as the growth rate of such prices between the periods, according to the IBS Report:

	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014e</u>	<u>2015e</u>	<u>2016e</u>	<u>2017e</u>	<u>2018e</u>	<u>2019e</u>	<u>2020e</u>
Wireless handset											
Smartphones											
Front-facing cameras											
(US\$)	0.809	0.838	0.863	0.875	1.018	1.198	1.448	1.676	1.937	2.104	2.234
Growth rate (%)	N/A	3.640	2.950	1.380	16.360	17.700	20.870	15.750	15.590	8.600	6.170
Back-facing cameras											
(US\$)	4.766	4.588	4.412	3.620	3.194	3.250	3.320	3.462	3.585	3.730	3.882
Growth rate (%)	N.A*	(3.740)	(3.820)	(17.950)	(11.790)	1.770	2.160	4.270	3.530	4.050	4.090
Non-Smartphones											
Front-facing cameras											
(US\$)	0.292	0.275	0.252	0.241	0.241	0.242	0.244	0.245	0.249	0.259	0.308
Growth rate (%)	N.A*	(5.720)	(8.450)	(4.360)	0.080	0.550	0.770	0.230	1.680	4.190	18.780
Back-facing cameras											
(US\$)	0.671	0.796	0.918	0.953	1.096	1.124	1.173	1.283	1.408	1.608	2.002
Growth rate (%)	N.A*	18.500	15.440	3.760	15.070	2.480	4.390	9.350	9.760	14.220	24.480
Tablet computer											
Front-facing cameras											
(US\$)	—	0.855	0.886	0.904	1.048	1.166	1.262	1.336	1.443	1.575	1.760
Growth rate (%)	N.A*	N.A*	3.680	1.990	15.900	11.340	8.190	5.880	7.960	9.200	11.710
Back-facing cameras											
(US\$)	—	3.627	3.460	2.875	2.982	3.028	3.086	3.180	3.269	3.330	3.363
Growth rate (%)	N.A*	N.A*	(4.590)	(16.910)	3.740	1.540	1.900	3.040	2.800	1.860	1.000

Source: International Business Strategies, Inc.

* N.A. means not applicable

For lenses, adequate manufacturing capacity and heavy competition in the industry are expected to result in relative stability in supply through 2020. The following table sets forth the historical and estimated low and high price range for lens modules for smartphones and tablet computers for the periods indicated, according to the IBS report:

	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014e</u>	<u>2015e</u>	<u>2016e</u>	<u>2017e</u>	<u>2018e</u>	<u>2019e</u>	<u>2020e</u>
Low (US\$)	0.35	0.34	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.25
High (US\$)	1.50	1.60	1.70	1.75	1.80	1.90	1.95	2.00	2.05	2.10	2.15

Source: International Business Strategies, Inc.

PCB consumption in camera modules has historically accounted for less than 0.1% of total global PCB consumption. PCBs used for COB camera modules are very small in size. Depending on tolerances and number of layers, the price of PCBs currently ranges from US\$0.15 to US\$0.45. It is not expected that there will be any shortages in the supply of PCBs or any limitations in technology for use in camera modules through 2020.

HTCC is a better substrate for flip-chip camera modules than PCB substrates. HTCC prices for smartphone camera modules currently range from US\$0.25 to US\$0.60, and prices are expected to be relatively flat through 2020.

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Competitive Landscape of Camera Modules Market

The global camera modules market is large and fragmented with many competitors. According to the IBS Report, our share of the global camera modules market was 5.0% in 2013, ranking us as the sixth largest supplier of camera modules in the world. Larger competitors such as LG Innotek and Samsung Electro-Mechanics (“SEMCO”) were ranked first and second, due to large demand for mobile devices produced by their affiliated companies, LG Electronics and Samsung Electronics. Similarly, Partron gained market share as a key camera module vendor to Samsung Electronics. Lite-On Technology gained market share with strong demand from China.

According to the IBS Report, we, along with LG Innotek, are one of the three largest suppliers of flip-chip camera modules in terms of production capacity. Our competitive advantages in the flip-chip camera modules market are our excellent services to our customers, high quality of our products and our manufacturing efficiency.

Also according to the IBS Report, smaller companies will be challenged to compete in the camera modules market in the long-term due to limitations on their ability to keep pace with the technological and manufacturing capabilities of market share leaders.

Global Camera Module Market Share by Revenue

Company	2010		2011		2012		2013		2010– 2013 CAGR
	US\$MM	Market Share (%)	US\$MM	Market Share (%)	US\$MM	Market Share (%)	US\$MM	Market Share (%)	
LG Innotek	573	5.7%	1,049	8.4%	1,561	10.4%	2,389	14.6%	60.9%
SEMCO	592	5.9%	619	5.0%	1,458	9.7%	1,982	12.1%	49.6%
Sharp	653	6.5%	774	6.2%	795	5.3%	1,037	6.3%	16.7%
Lite-On Technology	291	2.9%	426	3.4%	781	5.2%	850	5.2%	42.9%
Partron	95	0.9%	191	1.5%	557	3.7%	825	5.0%	105.5%
Cowell	159	1.6%	323	2.6%	528	3.5%	814	5.0%	72.3%
Sunny Optical Technology	109	1.1%	190	1.5%	400	2.7%	742	4.5%	89.5%
Foxconn Technology	902	9.0%	1,011	8.1%	857	5.7%	703	4.3%	(8.0)%
Chicony Electronics	357	3.6%	418	3.4%	456	3.0%	463	2.8%	9.1%
Toshiba	527	5.3%	486	3.9%	445	3.0%	371	2.3%	(11.0)%
Other ⁽¹⁾	5,752	57.5%	6,969	55.9%	7,223	48.0%	6,208	37.9%	2.6%
Total	10,010	100.0%	12,456	100.0%	15,061	100.0%	16,384	100.0%	

Source: International Business Strategies, Inc.

(1) Other competitors include Primax Electronics, CammSys, STMicroelectronics, Truly Opto-electronics, PowerLogics, MCNEX, BYD and Tessera DOC.

Barriers to Entry

To compete in the camera modules market, a camera module company not only needs to have strong and established relationships with leading mobile device manufacturers, but also needs an advanced and flexible manufacturing platform with large manufacturing capability and a competitive cost structure. It is critical to have high volume manufacturing capability and efficient logistics for packaging and to have a large manufacturing capacity for packaging technologies.

Strong engineering capability is also required for long-term success in the camera modules market. The ability to support and manufacture camera modules utilizing both flip-chip and COB technology represents a key competitive advantage for camera module manufacturers to cover the full low-, mid- and high-end camera modules market across different pixel counts.