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FIVE TRENDS SHAPING THE FUTURE OF THE AUTOMOTIVE CAMERA MARKET

The automotive camera market employs the most significant cutting-edge technological developments, such as cameras with AI technology, 360-degree surround-view camera systems, and wide-angle camera technology, creating huge potential for driving enhancement, from park assistance to blind spot detection. Some of the key trends in the automotive camera market are the increasing penetration of

cameras per vehicle, a shift from monocular cameras to stereo camera systems in ADAS, increasing application of CMOS image sensors, new technology developments, and strict government regulations regarding safety and driver assistance. The major drivers of this market are the growing demand for advanced driver assistance systems in cars, with an increasing focus on connected vehicle features and mandatory government regulations for installation of a rearview backup camera in every vehicle.



The automotive camera market is divided into several segments, such as digital cameras, thermal cameras, and infrared cameras. Key players in the automotive camera market include Bosch, Continental, Gentex, and Panasonic. These have been working on different strategies to drive sales using highly influential marketing approaches; however, as we examine the challenges and opportunities ahead in this market, companies can benefit from a strategy of pursuing technological advancements and product differentiation, to drive toward the key target market trends we have identified. Lucintel predicts that the global automotive camera market will be valued at \$7.9 billion by 2025, with an expected CAGR of approx.14.9% between 2020 and 2025.

Lucintel identifies five trends set to influence the global automotive camera market. Most of the industry players and experts agree that these five trends will accelerate developments in the automotive camera industry in the near future. In terms of the widespread knowledge about the automotive camera already on the horizon, there is still a lack of unified perspective on the direction the industry is moving to proactively address developments. To help bring more clarity to this gap, our study aims to provide insights concerning the direction that changes are taking and how these changes will impact the automotive camera market.

1. Increasing Penetration of Cameras per Vehicle

The number of cameras per car is increasing with the growing number of driving assistance features in each vehicle. The 2020 Hyundai Sonata has 5 cameras installed throughout the car to provide the driver with enhanced bird's eye views of the exterior of the vehicle. Tesla's autopilot makes use of 8 surround-cameras that provide 360 degrees of visibility around the car up to a range of 250 meters (820 ft).



The 2019 Kia K900 was built with 16 cameras and sensors to eliminate blind spots. Growth of the autonomous vehicle market will also drive the number of cameras per car. Level 4 and 5 autonomous vehicles will have 6 to 8 cameras per car.

2. Shift from Monocular Cameras to Stereo Camera Systems in ADAS

Vehicle systems transitioned in the past from radar based to camera based systems, and now there is an ongoing shift from monocular cameras to stereo cameras. The landscape of advanced driver assistance systems (ADAS) is ever-changing, with continuous advances in automotive electronics and a constant search for



near-human intelligence; this has led the shift from monocular camera systems to stereo camera systems. Lucintel predicts the ADAS market to grow at a CAGR of 21.1% over the next five years, and this will drive the demand for automotive cameras. With stereo cameras, the ability to measure distance is advancing and moving in a direction of wide-angle object detection. Lucintel also identifies increasing demand for low-cost, yet advanced, stereo cameras.

3. Increasing Application of CMOS Image Sensors

CMOS sensors have already found their way into cars equipped with ADAS capabilities, and the next big growth opportunity is likely to be in self-driving cars. Experts predict that a fully automated vehicle will require more than 25 CMOS sensors in order to



constantly monitor surrounding traffic and potential obstacles, demonstrating the huge developmental potential of the automotive camera market. There are challenges like degradation of images taken from a distance due to low resolution CMOS image sensors; however, this area also shows potential for further advancements thanks to the development of high-performance CMOS image sensors in the coming years.

4. New Technology Developments

As discussed earlier, the technologies in the automotive camera market have undergone significant changes in recent years. Traditional rearview camera (RVC) systems have been superseded by surround-view systems (SVS), thus featuring more than four cameras to allow a 360° perspective view of the vehicle. To ease the load on the driver, drive recorders, blind spot monitoring, night vision, road sign recognition, lane departure monitors, adaptive cruise control, emergency braking, and low-speed collision avoidance systems are already available. Constant developments in automotive cameras have pushed automotive manufacturers to reimagine the vehicle outline and replace traditional features like wing mirrors with better solutions. Some of the newly launched technologies having potential for future development in this market are listed below:

360-Degree Surround-View Camera Systems

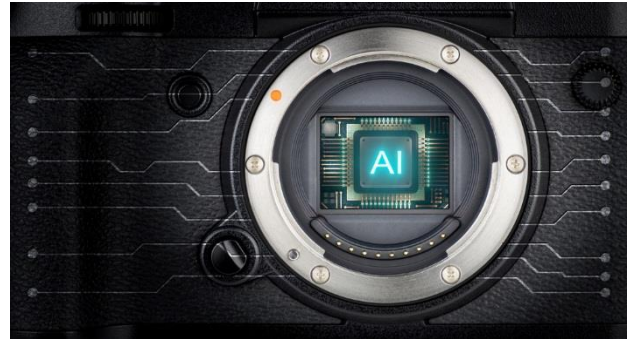
The 360° system, which allows the driver to monitor his situation in real time and in plain view without any blind spots, offers full control of the car and its surroundings, as well as obstacles in blind areas, thereby significantly increasing safety while reversing, parking in a confined space, turning, and in other maneuvers.

Infiniti and BMW have been leaders in surround-camera systems.



Cameras with AI Technology

When it comes to the future of automotive technology, autonomous driving has grabbed the spotlight, but behind it are artificial intelligence (AI) based innovations. Bosch recently developed an MPC3 camera with artificial intelligence for autonomous vehicles. The camera system uses a multi-path approach and AI for object recognition, thus making surround-sensing more reliable and roads much safer. Its application range can be extended, showing potential for further developments in this market.



3D and Multi-Functional Cameras with Lidar Technology

The integration of 3D and multi-functional cameras with Lidar technology provides a very high level of reliability in detection of an imminent collision. The multi-function camera with Lidar – MFL4x0 from Continental AG has the capability to completely avoid the crash if the speed of the detected object is less than 50 km/h (31.1 miles/hour), and if the speed differences are greater, emergency braking will significantly reduce the force of the impact and the crash severity.



Wide-Angle Camera Technology

Wider-angle lenses result in smaller blind spots, thus reducing the chance of road accidents. The enforcement of stringent regulations regarding



vehicle safety has compelled OEMs all over the world to provide advanced safety features for drivers, as well as pedestrians, with their vehicle offerings. As wide-angle lenses in automotive camera modules have a wide field coverage and enhanced picture quality, their usage is gaining in importance.

Object-Recognition Camera Technologies for Mirrorless Cars

Mitsubishi Electric Corporation has developed automotive camera technology that detects various object types at distances of up to about 100 meters (328.1 ft), and enables drivers to receive advanced warning, providing enhanced driving safety in mirrorless cars. Mirrorless cars that replace rearview and side mirrors with camera-monitoring systems stream high-resolution video to a display inside the vehicle.



Thermal, Infrared, and Digital Camera Technologies

Further development in capabilities is expected for all of these technologies already available in the automotive camera market.

5. Strict Government Regulations for Safety and Driver Assistance

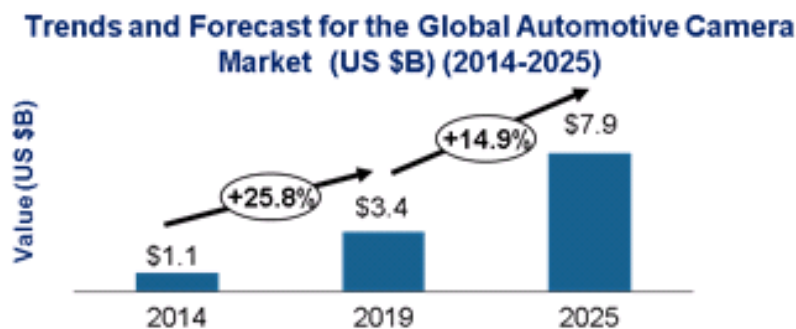
Increasing government mandates related to safety systems and driver assistance will drive penetration and developments in the automotive camera market. For instance, in May 2018, the government of Canada and the USA mandated that all vehicles under 10,000 pounds must be equipped with a backup camera. Also, the US government has a voluntary agreement with



many manufacturers to install autonomous emergency braking (AEB) by 2022. European governments are focusing on mandating ADAS, including emergency braking systems and lane departure warning systems.

Strategic Considerations for Key Players in the Automotive Camera Market

The automotive camera industry is dynamic and ever-changing. Successful industry players are masters of innovation, change, and adaptation. To retain this status, they need to be attentive to current trends. We believe there will be promising opportunities for automotive cameras in small cars, compact cars, large cars, SUVs and crossovers, and light commercial vehicles. As per Lucintel's latest market research report (Source: <https://www.lucintel.com/automotive-camera-market.aspx>), the [automotive camera market](#) is expected to grow with a CAGR of 14% to 16% between 2020 to 2025, and reach \$7.9 billion by 2025. This market is primarily driven by growing demand for advanced driver assistance systems in cars and mandatory government regulations requiring installation of a rearview backup camera in every vehicle in North America and Europe.



Source: Lucintel

Whether you are new to the automotive camera market or an experienced player, it is important to understand the trends that impact the development process, as these trends as listed above

will lead players to create long-term strategy formulation that will allow them to remain competitive in the long run. For example, to capture growth, some of the strategic considerations for players in the automotive camera market are as follows:

- Automotive camera market players can increase their capabilities to develop low-cost camera sensors and multi-functional camera systems which are compatible with the latest technologies, such as ADAS and Lidar.
- Players in the automotive camera market can focus on development of object recognition camera technology for mirrorless cars.
- Players should focus on the development of AI based camera systems, which are expected to lead future trends.
- Investment in increasing competencies to develop low-cost wide-angle camera technology for autonomous cars.
- Research and development activities in developing multi-camera technology to provide additional benefits to achieve higher autonomy levels.

Note: In order to gain better understanding, and learn more about the scope, benefits, and companies researched, as well as other details in the automotive camera market report from Lucintel, click on <https://www.lucintel.com/automotive-camera-market.aspx>. This comprehensive report provides you in-depth analysis on market trends and forecast, segment analysis, regional analysis, competitive benchmarking and company profiling of key players. In addition, we also offer **strategic growth consulting** to meet your customized needs. We have worked with many PE firms and corporate customers in the process of their market entry and M & A initiatives.



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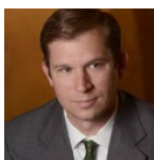


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