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Next Level Market Insights

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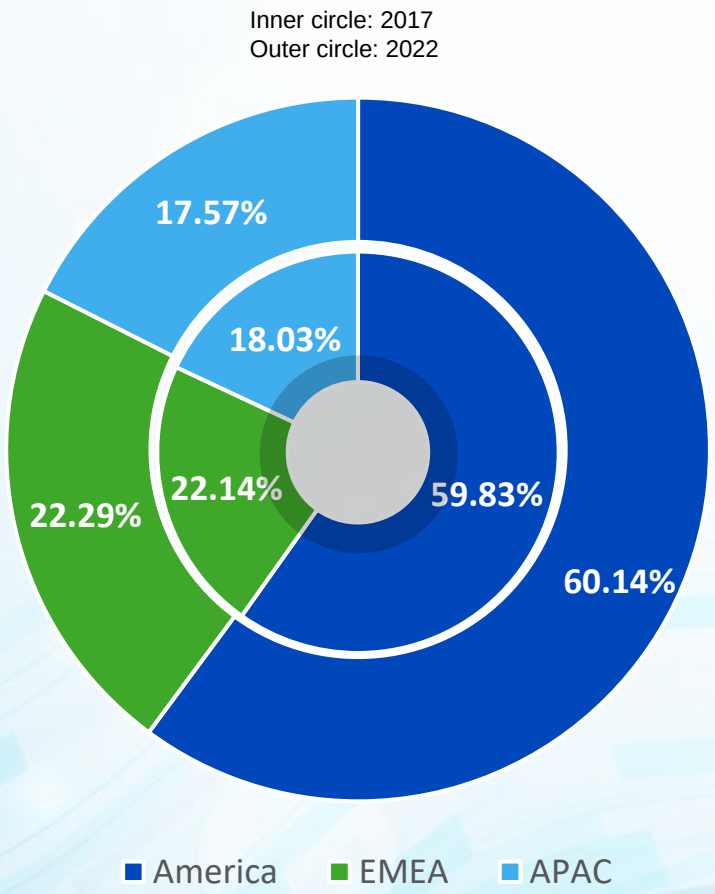
Investment in the Global Nanosensors Market: Geographic Landscape



2017: US$110 million

2022: US$3,319 million

- **The Americas** will continue to dominate the market during the forecast period in the adoption of nanosensors, growing at a CAGR of 97.78% over the period 2017–2022
- The region is driven by the increased automation in the industrial, automotive, and healthcare sectors
- The federal budget allocated around US$1.4 billion for the National Nanotechnology Initiative (NNI) to promote R&D in nanotechnology in 2017

2017: US$66 million

2022: US$1,996 million

- **EMEA** is expected to grow at a CAGR of 97.84% during the forecast period 2017–2022
- In 2017, it was announced that the EU will invest nearly US$0.59 million in the ORgan-on-CHip In Development (ORCHID) project

2017: US$24 million

2022: US$740 million

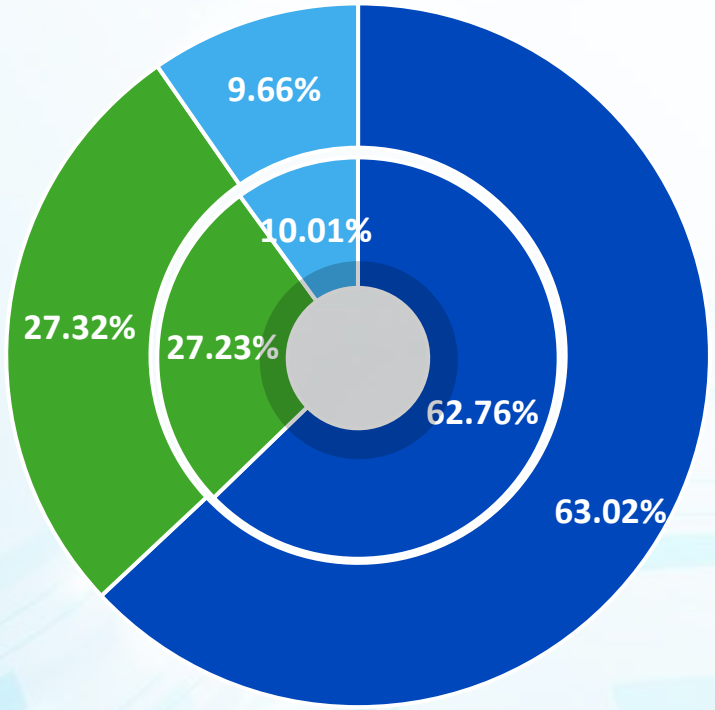
- **APAC** is expected to grow at a CAGR of 96.57% during the forecast period 2017–2022
- In 2017, South Korea invested around US$447 million in nanotechnology development, which one of the leading country in the region

2017: US$20 million

2022: US$583 million

Note: The market size of nanosensors is derived based on the investments made by companies, organizations, and other institutions for the development of nanosensors

Investment in the Global Nanosensors Market: By Product



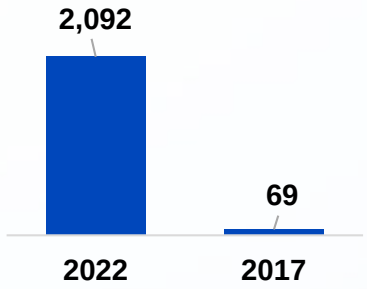
- Chemical nanosensors
- Mechanical nanosensors
- Biological nanosensors

Inner circle: 2017
Outer circle: 2022

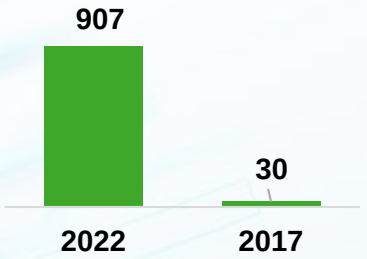
2017: US$110 million

2022: US$3,319 million

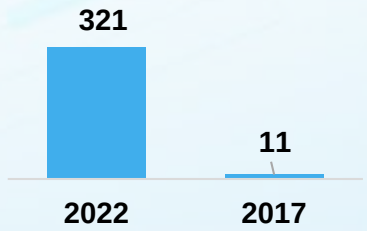
- The chemical nanosensors market is expected to grow at a CAGR of 97.74% over the forecast period 2017-2022
- Chemical nanosensors largely finds application in healthcare, environmental monitoring and food and beverage industry
- Carbon nanotube based nanosensors are the most preferred chemical nanosensors across various industry



- The mechanical nanosensors market is expected to grow at a CAGR of 97.70% over the forecast period 2017-2022
- Mechanical nanosensors are preferred due to their ability to detect the mechanical and electrical changes in the environment with minimal power consumption



- The biological nanosensors market is expected to grow at a CAGR of 96.19% over the forecast period 2017-2022
- Biological nanosensors are used to detect biomolecular process such as DNA, antibody, and enzymatic interaction to monitor the process at cellular level
- These nanosensors are largely in development phase and will witness steady growth due to the increasing focus on environmental, water treatment, and healthcare sector



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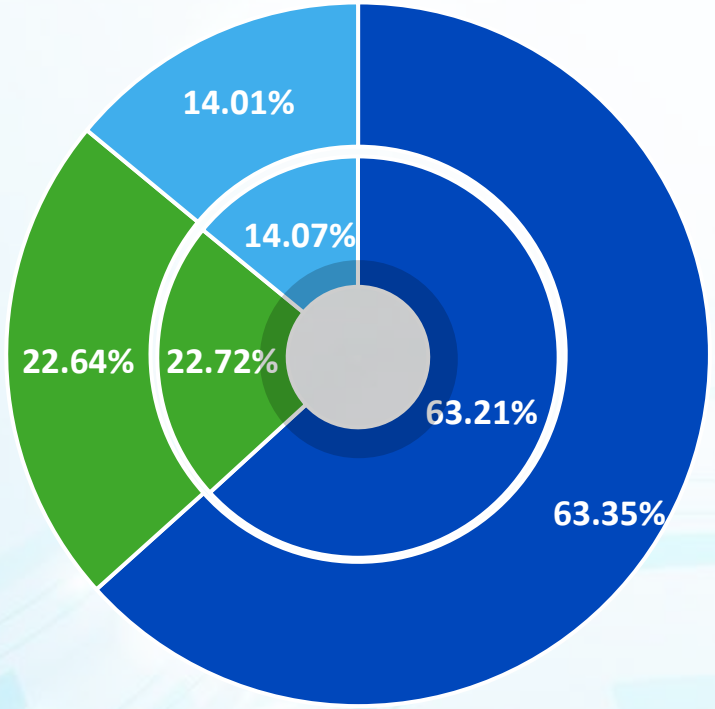
Global Nanosensors Market: By End-user



2017: US$110 million

2022: US$3,319 million

- **The healthcare** sector is expected to grow at a CAGR of 97.66% over the forecast period 2017-2022
- It is expected to witness more investment from several private entities and government for R&D
- In 2017, Tokyo Institute of Technology set up base in Cambridge to foster cancer diagnostic collaboration with the university

2017	US$70 million
2022	US$2,103 million

- The defense and military sector is expected to grow at a CAGR of 97.43% over the forecast period 2017-2022
- The major prerequisites to adopt nanosensors by defense and military are reliability, small size, durability, precision, low energy consumption, and ruggedness
- The defense and military sector is focused on the development of integration of nanosensors in advanced warfare weaponry, security surveillance devices including drones, and detection of explosives and environmental chemicals

2017	US$25 million
2022	US$751 million

- The other segments is expected to grow at a CAGR of 97.41% over the forecast period 2017-2022
- The others segment include industries such as environmental monitoring, automotive, construction, food, and aerospace industries

2017	US$16 million
2022	US$465 million

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Global Nanosensors Market: TDC

Trends

Opportunity for the use of nanosensors across various applications such as:

- Adele Health is striving to finalize the development of TruPosture, a smart shirt designed to promote healthy back posture and help reduce back pain
- Disruptive and Sustainable Technologies for Agricultural Precision research group aims to develop nanosensor-based detection technologies to be used in agriculture to measure the flow of nutrients and hormones within plants
- Tyndall National Institute is engaged in developing new integrated electrochemical nanosensors. The nanosensors are highly sensitive for a wide range of molecules where the sensors detect number of antibody and viral targets in plants

Emergence of nanomedicine in diagnostic and treatment areas such as cancer treatment

Development of Internet of Nano Things to enhance the speed of data communication, to expand data storage, and to improve process capabilities

Drivers

Increasing development in nanotechnology

- For example, nanosensors are embedded into the building (to monitor the condition of the structure, impact of the weather on the structure, and cracks), healthcare devices, automotive components, and in development of advanced weapon in defense sector

Rising demand for nanosensors due to the increasing adoption of automation in the automobile industry

Growing applications of nanosensors in the healthcare sector

Increasing demand for miniaturized electronic devices

Investment by government and private organization in the R&D process of nanosensors

Challenges

High cost of raw materials such as silicon, nanowires, and carbon nanotube is hindering the adoption of nanosensors

Manufacturers of nanosensors require a high degree of precision to manufacturer nanosensors due to the compact size, thus resulting in an increase in the design complexity of the product

Stringent regulations on development standards of nanosensors used in medical industry

Potential Applications of Nanosensors in Healthcare Industry

Healthcare sector is the major end-user of nanosensor technology. The sector attracts high investment from government and private companies/institutions due to the research and innovation progress in the sector as mentioned below:

Early detection of cancer cell in the blood vessels by mobile nanosensors (MNSs)

- MNSs can be used for early stage anomaly detection. For example, researchers from Sharif University of Technology, Tehran, Iran and University of Erlangen-Nuremberg in Germany studied the detection of cancer cells located in a particular region of a blood vessel that produce and emit biomarkers, which is the molecule produced due to the anomaly in blood vessels
- The detection of these cancer biomarkers is difficult in the early stages using the traditional diagnostic methods due to its low concentration. Hence, MNSs are injected into the blood vessels to detect the concentration of biomarkers around the cancerous cells
- Further, the fusion center collects the MNSs, where the activation levels of MNSs are read and the presence of anomaly is detected

Tracking and tracing movement of proteins

- The researchers at the Biozentrum University of Basel have developed a process for tracing the movement of proteins within the cell, where the proteins are tagged with nanosensors called nanobodies
- The nanobodies enable the clinicians to live track and trace the proteins' pathway through the cell in order to detect the biomarker's presence, indicating a blood clot area as well as the dimensions

Adoption of nanosensors in breath analyzer

- In 2017, Levl developed a breathalyzer device called the LEVLhome. The device has a built-in nanosensors which measures acetone concentration in the person’s breath to determine if the person’s body is adequately burning fat
- Researchers at the Technion-Israel Institute of Technology in Haifa, Israel, have developed nanosensors that can detect specific molecular compounds in breath samples. The breath samples are examined for disease

Evolution of health care wearables with smart clothing with nanosensors

- The smart clothes are designed with nanosensors to promote fitness among the users. For instance,
    - Nanowear Inc., has integrated nanosensors into clothes. The technology ensures continuous electrophysiological, audible, hemodynamic, and biochemical monitoring and provides an accurate diagnostics data by virtue of a cost-effective and non-invasion cloth based deployment. In January 2018, Nanowear signed a supply-chain partnership agreement with The Secant Group for manufacturing and production of its medical-grade cloth-based nanosensor technology

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Market Entry and Commercialization Strategies for the High-tech Industry

Market and Product Planning Support

- Market Sizing, Segmentation, Forecasting, Market Share etc.
- Trends, Drivers, Opportunities, Technologies, Competitive and Regulatory Environment, etc.

Market Entry and Exploration Support

- Route-to- entry Assessment
- Entry Barriers, Challenges and Opportunities
- Legal and Regulatory Requirements
- Risk Assessment
- Partner Identification

Go-to-market Planning Support

- Emerging Market Analysis
- R&D/ Innovation Research Support
- M&A Due Diligence
- Country Specific Channel Structure
- Competitive and Customer Analysis
- Best Practices and Margins

Customer Strategy Support

- Competitive Marketing Activities
- Customer Perception, Needs and Gaps
- Brand Awareness
- Prospect Identification and Sales Opportunities
- On Demand Market Trackers

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Thank You

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