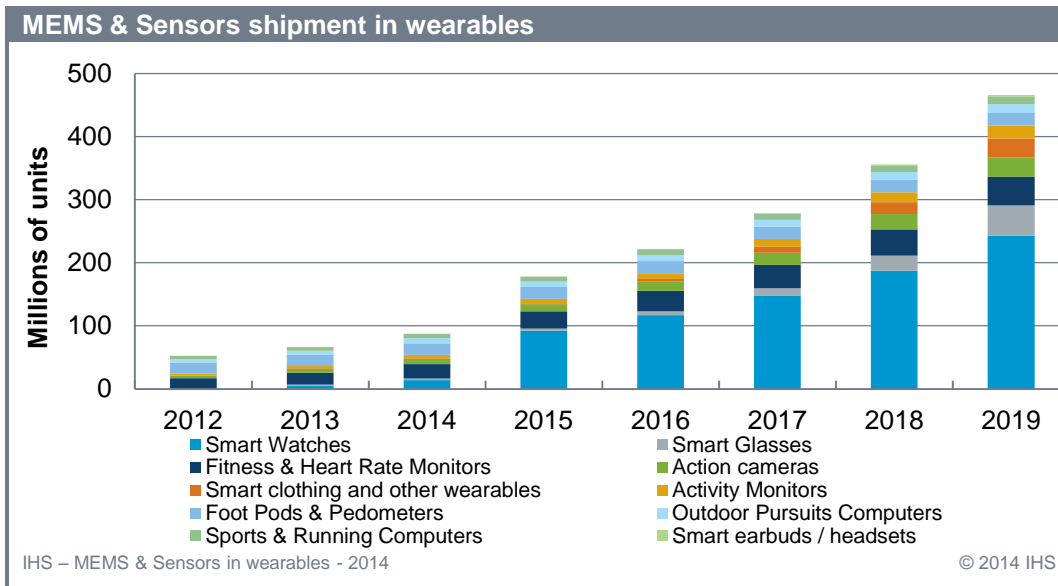




Consumers wearing close to 500 million sensors by 2019

Wearable electronics has rapidly emerged as the next big wave for MEMS & sensors in consumer electronics after smartphones and tablets. Accelerometers are already found in most wearable product devices today. The MEMS content in smart watches, activity monitors, smart glasses, etc., is rapidly increasing as these become a natural extension of smartphones. Gyroscopes, magnetometers, and pressure sensors contribute to an improved activity and context monitoring. Always on MEMS microphones, low-power MEMS displays and MEMS timing devices are also finding their way into wearable technology. Finally, new generations of sensors for environmental monitoring start improving our outdoor experience.



This report examines the use cases, penetration and ASP trends for sensors across all types of wearable electronics. The impact of the ecosystem on the adoption of sensors is assessed in depth e.g. the influence of dedicated operation systems and sensor hubs.

Key Issues Addressed

- How big is the opportunity for sensor suppliers? Is wearable just a hype or is it a long-lasting opportunity?
- What is the opportunity for sensor hubs?
- How will specific requirements of wearable in term of power, size etc impact the sensor development.?
- Is there an opportunity for bio-sensors / health monitoring in large volume wearable electronics?
- Which sensors will be placed in wearables, which sensors will remain in smartphones, how will they interact?
- Who are the emerging sensor suppliers and wearable device makers to watch?

Applicable To

- Sensor manufacturers
- Wearable electronics manufacturers
- Handset manufacturers
- Processors, connectivity ICs suppliers
- Semiconductor and MEMS foundries

Actuals and Forecast

Frequency, Time Period

- 2 years historical (2012-2013)
- 6-year annual forecast (2014 - 2019)

Measures

- Wearable device shipment
- Sensor units and revenue forecast
- Sensor ASP
- Sensor market shares in units and revenue
- Sensor hub forecast by processor type

Products Covered

- Smart Watches
- Smart Glasses
- Fitness & Heart Rate Monitors
- Action cameras
- Activity Monitors
- Foot Pods & Pedometers
- Outdoor Pursuits Computers
- Sports & Running Computers
- Smart earbuds / headsets
- Smart clothing and other wearables

Technologies Covered

- Motion: Accelerometer, gyroscope, magnetometer, pressure, 6-axis compass, 6-axis IMU, 9-axis IMU
- UI MEMS / Sensors: Microphones, Ambient Light, Proximity sensors, MEMS flat panel displays
- Health sensors: Pulse, pulse-oximeters, skin temperature, hydration sensors
- Environmental sensors: Humidity, temperature, UV, gas sensors

Other Topics Covered

- Sensor hubs

Lead Analyst

Seppo Nissilä, PhD – Senior Consultant

Seppo Nissilä is working as a senior consultant for IHS. He has been a MEMS technology expert at Nokia from 2004 to 2012 where he was assessing suppliers as well as new MEMS technologies from the performance and manufacturability point of view. Prior to Nokia he was working at Polar Electro Oy (a global and leading heart rate monitor company) as Director, Technical and physiological research, IC design; IPR manager. In 2012 he created his own company - SilverBlip Ltd. – focused on Sensor Technology and Patent Consulting

Seppo Nissilä is an expert in measurement and sensing-electronics and he has a profound understanding of motion, environmental, medical and HMI sensors for mobile devices.

He holds his PhD in Opto and Measurement electronics from the University of Oulu, Finland. He also holds an eMBA, from Helsinki University of Technology, Finland.

Jérémie Bouchaud – Director and Senior Principal Analyst, MEMS and Sensors

Jérémie Bouchaud is responsible for the MEMS service area. His breadth of MEMS device and application knowledge is unmatched. He was a founder and head of MEMS research for Wicht Technologie Consulting.

In the course of his career, he has led more than 100 MEMS-related market research endeavors. Prior to WTC, he oversaw technology transfer for sensors and MEMS at the German office of CEA-LETI.

Bouchaud is a graduate of the Munich University of Applied Sciences and of Ecole Supérieur de Commerce of Grenoble.

Marwan Boustany – Senior Analyst, MEMS and Sensors

Marwan covers the areas of MEMS and sensors for mobile and consumer technologies. His work includes the tracking of sensors in handsets, tablets, laptops, and sports and fitness products.

Marwan is a graduate of the National University of Ireland, UCC, where he graduated with Qualifications in Engineering and Physics. He has worked in various roles within the Wireless communications industry including Operations and Engineering before joining IHS.

About IHS (www.ihs.com)

IHS (NYSE: IHS) is the leading source of information, insight and analytics in critical areas that shape today's business landscape. Businesses and governments in more than 165 countries around the globe rely on the comprehensive content, expert independent analysis and flexible delivery methods of IHS to make high-impact decisions and develop strategies with speed and confidence. IHS has been in business since 1959 and became a publicly traded company on the New York Stock Exchange in 2005. Headquartered in Englewood, Colorado, USA, IHS is committed to sustainable, profitable growth and employs 8,000 people in 31 countries around the world.

Table of Contents

- Table of Contents
- Foreword
- Executive Summary
- Research Scope
- Sensor needs by key wearable device category
 - Activity monitors
 - Fitness & Heart Rate Monitors
 - Sports and Outdoor Computers
 - Footpods and pedometers
 - Smart Watches
 - Smart Glasses and Head-Mounted Displays
 - Smart Earbuds and Headsets
 - Wearable cameras
 - Smart Clothing
 - Other wearables
- MEMS & Sensor technology trends
 - Accelerometer
 - Magnetometer
 - Gyroscope
 - Air pressure sensor
 - Light sensors
 - Environmental sensors
 - Heart rate sensors
 - Health and medical sensors
- Technical challenges of sensors in Wearables
- Sensor hub market for wearables
- Wearable ecosystem
 - Operating systems
 - Third party sensor fusion and software algorithms providers
 - Regulatory issue by FDA and European MD

Database content

- Market pivot table in units and revenue with sensor forecast by sensor type and by wearable device (cross analysis)
- Market forecast by sensor type:
 - Motion: Accelerometer, gyroscope, magnetometer, pressure, 6-axis compass, 6-axis IMU, 9-axis IMU
 - UI MEMS / Sensors: Microphones, Ambient Light, Proximity sensors, MEMS flat panel displays
 - Health sensors: Pulse, pulse-oximeters, skin temperature, hydration sensors
 - Environmental sensors: Humidity, temperature, UV, gas sensors
- Market forecast by wearable device categories:
 - Smart Watches
 - Smart Glasses
 - Fitness & Heart Rate Monitors
 - Action cameras
 - Activity Monitors
 - Foot Pods & Pedometers
 - Outdoor Pursuits Computers
 - Sports & Running Computers
 - Smart earbuds / headsets
 - Smart clothing and other wearables
- Sensor market shares in units and revenue
- Sensor hub forecast by processor type