



## **GLOBAL AUTOMOTIVE SENSOR MARKET DEMAND, SUPPLY AND OPPORTUNITIES:**

*Estimation and Forecast of (2015–2022)*

Website : [www.bisresearch.com](http://www.bisresearch.com)  
E-mail : [sales@bisresearch.com](mailto:sales@bisresearch.com)  
Call Us : +1-650-228-0182



BIS Research is a leading market intelligence and technology research company. BIS Research publishes in-depth market intelligence reports focusing on the market estimations, technology analysis, emerging high-growth applications, deeply segmented granular country-level market data and other important market parameters useful in the strategic decision making for senior management. BIS Research provides multi-client reports, company profiles, databases, and custom research services.

**Copyright © 2015 BIS Research**

All Rights Reserved. This document contains highly confidential information and is the sole property of BIS Research. Disclosing, copying, circulating, quoting or otherwise reproducing any or all contents of this document is strictly prohibited. Access to this information is provided exclusively for the benefit of the people or organization concerned. It may not be accessed by, or offered whether for sale or otherwise to any third party.

## TABLE OF CONTENTS

<b>1</b>	<b>REPORT SCOPE .....</b>	<b>27</b>
1.1	REPORT COVERAGE.....	27
1.2	BIS RESEARCH METHODOLOGY.....	27
1.3	RESEARCH METHODOLOGY FOR GLOBAL MARKET STUDY .....	29
1.3.1	GEOGRAPHICAL ANALYSIS.....	29
1.3.2	DEMAND SIDE & SUPPLY SIDE ANALYSIS.....	30
1.3.3	DATA SYNTHESIS & BRIDGING .....	30
1.3.4	AUTOMOTIVE MARKET ESTIMATION – A SNAPSHOT .....	30
1.4	REPORT DESCRIPTION .....	33
<b>2</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>35</b>
<b>3</b>	<b>MARKET DYNAMICS.....</b>	<b>39</b>
3.1	DRIVERS.....	39
3.1.1	INCREASING CONSUMER DEMAND FOR SAFETY, SECURITY, COMFORT AND EFFICIENCY .....	39
3.1.2	STRINGENT GOVERNMENT REGULATIONS .....	40
3.1.3	RISING DEMAND FOR HIGH AND MEDIUM END VEHICLES.....	41
3.1.4	EXPANSION OF GLOBAL AUTO-MANUFACTURERS INTO NEW EMERGING MARKETS .....	41
3.1.5	RISING SENSOR CONTENT IN AN AUTOMOBILE AS PER MOORE’S LAW .....	42
3.2	CHALLENGES.....	43
3.2.1	INCREASING PRICING PRESSURES .....	43
3.2.2	UNDERDEVELOPED AFTERMARKET SERVICES .....	44
3.3	OPPORTUNITIES.....	45
3.3.1	ELECTROMOBILITY .....	45
3.3.2	FUTURE DEMAND FOR AUTONOMOUS CARS AND CONNECTED VEHICLES.....	46
3.3.3	EMERGING TECHNOLOGIES SUCH AS COMBO SENSORS: .....	47

<b>4</b>	<b>INDUSTRY ANALYSIS .....</b>	<b>48</b>
<b>4.1</b>	<b>PORTER'S FIVE FORCES ANALYSIS .....</b>	<b>48</b>
4.1.1	THREAT FROM NEW ENTRANTS .....	49
4.1.2	BARGAINING POWER OF BUYERS.....	50
4.1.3	BARGAINING POWER OF SUPPLIERS.....	51
4.1.4	THREAT FROM SUBSTITUTES.....	52
4.1.5	INTENSITY OF COMPETITIVE RIVALRY.....	53
<b>4.2</b>	<b>AUTOMOTIVE CONSORTIUM .....</b>	<b>54</b>
4.2.1	CENTER FOR AUTOMOTIVE RESEARCH (CAR) INDUSTRIAL CONSORTIUM .....	54
4.2.2	GENIVI ALLIANCE .....	56
4.2.3	JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION (JAMA).....	57
4.2.4	OPEN AUTOMOTIVE ALLIANCE .....	57
4.2.5	ALLIANCE OF AUTOMOBILE MANUFACTURERS.....	58
4.2.6	UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH (USCAR) .....	59
<b>5</b>	<b>AUTOMOTIVE MARKET BY SENSOR TYPE.....</b>	<b>61</b>
<b>5.1</b>	<b>INTRODUCTION .....</b>	<b>61</b>
5.1.1	MARKET STATISTICS.....	62
<b>5.2</b>	<b>PRESSURE SENSOR.....</b>	<b>66</b>
5.2.1	PRESSURE SENSOR TYPES –CHASSIS .....	67
5.2.2	PRESSURE SENSOR TYPES -POWER TRAIN .....	68
5.2.3	PRESSURE SENSOR TYPES- BODY SYSTEMS.....	69
5.2.4	KEY TRENDS.....	70
5.2.5	KEY CHALLENGES .....	71
5.2.6	KEY MARKET PLAYERS .....	71
5.2.7	MARKET STATISTICS.....	71
<b>5.3</b>	<b>TEMPERATURE SENSOR .....</b>	<b>73</b>
5.3.1	TEMPERATURE SENSOR IN CHASSIS .....	74
5.3.2	TEMPERATURE SENSOR IN POWER TRAIN .....	74
5.3.3	TEMPERATURE SENSOR IN BODY SYSTEM .....	76
5.3.4	KEY MARKET PLAYERS .....	77
5.3.5	MARKET STATISTICS.....	77

<b>5.4</b>	<b>POSITION SENSOR .....</b>	<b>79</b>
5.4.1	POSITION SENSOR IN CHASSIS .....	80
5.4.2	POSITION SENSOR IN POWER TRAIN.....	81
5.4.3	POSITION SENSOR IN BODY SYSTEM .....	82
5.4.4	KEY TRENDS.....	83
5.4.5	KEY MARKET PLAYERS .....	83
5.4.6	MARKET STATISTICS.....	84
<b>5.5</b>	<b>MOTION SENSOR .....</b>	<b>86</b>
5.5.1	MOTION SENSOR IN CHASSIS .....	87
5.5.2	MOTION SENSOR IN POWER TRAIN .....	87
5.5.3	MOTION SENSOR IN BODY SYSTEM .....	88
5.5.4	KEY TRENDS.....	89
5.5.5	KEY CHALLENGES .....	90
5.5.6	KEY MARKET PLAYERS .....	91
5.5.7	MARKET STATISTICS.....	91
<b>5.6</b>	<b>OPTICAL SENSOR.....</b>	<b>94</b>
5.6.1	OPTICAL SENSOR IN CHASSIS .....	94
5.6.2	OPTICAL SENSOR IN POWER TRAIN .....	95
5.6.3	OPTICAL SENSOR IN BODY SYSTEM .....	95
5.6.4	KEY TRENDS.....	100
5.6.5	KEY CHALLENGES .....	101
5.6.6	KEY MARKET PLAYERS .....	102
5.6.7	MARKET STATISTICS.....	102
<b>5.7</b>	<b>TORQUE SENSOR .....</b>	<b>104</b>
5.7.1	TORQUE SENSOR TYPES -CHASSIS .....	104
5.7.2	TORQUE SENSOR TYPES -POWER TRAIN .....	105
5.7.3	KEY TRENDS.....	106
5.7.4	KEY MARKET PLAYERS .....	107
5.7.5	MARKET STATISTICS.....	107
<b>5.8</b>	<b>GAS SENSOR .....</b>	<b>109</b>
5.8.1	GAS SENSOR IN POWER TRAIN .....	109
5.8.2	KEY TRENDS.....	110
5.8.3	KEY MARKET PLAYERS .....	111
5.8.4	MARKET STATISTICS.....	112
<b>5.9</b>	<b>LEVEL SENSOR.....</b>	<b>113</b>

5.9.1	<b>LEVEL SENSOR TYPES –POWER TRAIN .....</b>	<b>114</b>
5.9.2	<b>MARKET STATISTICS.....</b>	<b>114</b>
<b>5.10</b>	<b>OTHER SENSORS.....</b>	<b>115</b>
5.10.1	<b>ELECTRIC CURRENT SENSOR .....</b>	<b>115</b>
5.10.2	<b>MASS AIR FLOW SENSORS .....</b>	<b>116</b>
5.10.3	<b>MARKET STATISTICS.....</b>	<b>116</b>
<b>6</b>	<b>AUTOMOTIVE SENSOR MARKET BY TECHNOLOGY .....</b>	<b>118</b>
<b>6.1</b>	<b>INTRODUCTION .....</b>	<b>118</b>
<b>6.1.1</b>	<b>MICRO-ELECTRO-MECHANICAL SYSTEMS (MEMS) .....</b>	<b>119</b>
6.1.1.1	MEMS based sensors and automotive applications .....	119
6.1.1.1.1	<i>Fuel Injector Pressure Sensor .....</i>	<i>120</i>
6.1.1.1.2	<i>Tire Pressure Sensor.....</i>	<i>120</i>
6.1.1.1.3	<i>Airbag Sensor.....</i>	<i>120</i>
6.1.1.1.4	<i>Roll Over Detection Sensor .....</i>	<i>121</i>
6.1.1.1.5	<i>Vehicle dynamic control (VDC) sensor .....</i>	<i>121</i>
6.1.1.1.6	<i>Throttle position sensor.....</i>	<i>121</i>
6.1.1.2	Emerging Automotive Applications for MEMS based sensors .....	121
6.1.1.2.1	<i>Vehicle security systems .....</i>	<i>121</i>
6.1.1.2.2	<i>Infotainment .....</i>	<i>122</i>
6.1.1.2.3	<i>Black box for vehicles .....</i>	<i>122</i>
6.1.1.2.4	<i>Vehicle Tracking and Telematics.....</i>	<i>122</i>
6.1.1.3	Market Trends and Developments .....	122
<b>6.1.2</b>	<b>NON-ELECTRO-MECHANICAL SYSTEMS (NON-MEMS)....</b>	<b>125</b>
6.1.2.1	Non-MEMS based technology, sensors and automotive applications.....	125
6.1.2.1.1	<i>Magnetic hall-effect technology .....</i>	<i>125</i>
6.1.2.1.2	<i>Emission Control Technology .....</i>	<i>125</i>
6.1.2.1.3	<i>Battery sensor technology in Start/Stop vehicle .....</i>	<i>126</i>
6.1.2.1.4	<i>Battery sensor technology in Start/Stop vehicle .....</i>	<i>126</i>
6.1.2.1.5	<i>Optical Sensor Technology.....</i>	<i>127</i>
6.1.2.1.6	<i>Others.....</i>	<i>127</i>
6.1.2.2	Market Trends and Developments .....	128

6.1.3	<b>NANO-ELECTRO-MECHANICAL SYSTEMS (NEMS)</b>	129
6.1.3.1	Market Trends	130
<b>7</b>	<b>AUTOMOTIVE SENSOR BY VEHICLE TYPE</b>	<b>131</b>
<b>7.1</b>	<b>INTRODUCTION</b>	<b>131</b>
<b>7.2</b>	<b>CONVENTIONAL FUEL CARS</b>	<b>132</b>
7.2.1	<b>SENSORS IN CHASSIS BY CONVENTIONAL FUEL VEHICLE TYPE</b>	<b>133</b>
7.2.1.1	Market statistics	135
7.2.2	<b>SENSORS IN POWER TRAIN BY CONVENTIONAL FUEL VEHICLE TYPE</b>	<b>136</b>
7.2.2.1	Market statistics	140
7.2.3	<b>SENSORS IN BODY SYSTEM BY CONVENTIONAL FUEL VEHICLE TYPE</b>	<b>141</b>
7.2.3.1	Market statistics	143
<b>7.3</b>	<b>ALTERNATIVE FUEL CAR</b>	<b>145</b>
7.3.1	<b>SENSORS IN CHASSIS BY ALTERNATIVE FUEL VEHICLE TYPE</b>	<b>146</b>
7.3.1.1	Market statistics	147
7.3.2	<b>SENSORS IN POWER TRAIN BY ALTERNATIVE FUEL VEHICLE TYPE</b>	<b>148</b>
7.3.2.1	Market statistics	149
7.3.3	<b>SENSORS IN BODY SYSTEM BY ALTERNATIVE FUEL VEHICLE TYPE</b>	<b>150</b>
7.3.3.1	Market statistics	151
<b>7.4</b>	<b>HEAVY VEHICLES</b>	<b>152</b>
7.4.1	<b>MARKET STATISTICS</b>	<b>153</b>
7.4.2	<b>SENSOR IN TRUCKS</b>	<b>153</b>
7.4.3	<b>SENSORS IN OFF-ROAD VEHICLE</b>	<b>154</b>
<b>8</b>	<b>GLOBAL AUTOMOTIVE SENSOR MARKET BY GEOGRAPHY</b>	<b>155</b>
<b>8.1</b>	<b>INTRODUCTION</b>	<b>155</b>
8.1.1	<b>MARKET STATISTICS</b>	<b>157</b>
<b>8.2</b>	<b>AMERICA</b>	<b>158</b>
8.2.1	<b>MARKET STATISTICS</b>	<b>159</b>
8.2.2	<b>U.S.</b>	<b>159</b>
8.2.2.1	Key market players	161

8.2.2.2	Market statistics .....	162
<b>8.2.3</b>	<b>MEXICO .....</b>	<b>162</b>
8.2.3.1	Market Statistics .....	163
<b>8.3</b>	<b>ASIA PACIFIC (APAC) .....</b>	<b>163</b>
<b>8.3.1</b>	<b>MARKET STATISTICS.....</b>	<b>164</b>
<b>8.3.2</b>	<b>JAPAN.....</b>	<b>165</b>
8.3.2.1	Key Players .....	166
8.3.2.2	Market Statistics .....	167
<b>8.3.3</b>	<b>CHINA.....</b>	<b>167</b>
8.3.3.1	Key Players .....	169
8.3.3.2	Market Statistics .....	170
<b>8.3.4</b>	<b>INDIA .....</b>	<b>170</b>
8.3.4.1	Key Players .....	171
8.3.4.2	Market Statistics .....	171
<b>8.3.5</b>	<b>SOUTH KOREA.....</b>	<b>172</b>
8.3.5.1	Key Players .....	173
8.3.5.2	Market Statistics .....	173
<b>8.4</b>	<b>EUROPE .....</b>	<b>174</b>
<b>8.4.1</b>	<b>MARKET STATISTICS.....</b>	<b>174</b>
<b>8.4.2</b>	<b>GERMANY.....</b>	<b>175</b>
8.4.2.1	Key Market Players .....	176
8.4.2.2	Market Statistics .....	176
<b>8.4.3</b>	<b>U.K.....</b>	<b>177</b>
8.4.3.1	Key Market Players .....	177
8.4.3.2	Market Statistics .....	178
<b>8.5</b>	<b>REST OF THE WORLD .....</b>	<b>179</b>
<b>8.5.1</b>	<b>MARKET STATISTICS.....</b>	<b>179</b>
<b>8.5.2</b>	<b>AFRICA .....</b>	<b>180</b>
8.5.2.1	Key Market Players .....	180
8.5.2.2	Market Statistics .....	180

<b>9</b>	<b>AUTOMOTIVE SENSOR MARKET: KEY DEVELOPMENTS &amp; STRATEGIES (2012-2015) .....</b>	<b>182</b>
<b>9.1</b>	<b>INTRODUCTION .....</b>	<b>182</b>
<b>9.2</b>	<b>MERGERS &amp; ACQUISITIONS.....</b>	<b>182</b>

<b>9.3</b>	<b>NEW PRODUCT LAUNCH/ DEVELOPMENT.....</b>	<b>184</b>
<b>9.4</b>	<b>PARTNERSHIP, COLLABORATION &amp; JOINT VENTURE .....</b>	<b>185</b>
<b>9.5</b>	<b>OTHERS (AWARDS, RECOGNITIONS, EVENTS).....</b>	<b>186</b>
<b>10</b>	<b>COMPANY PROFILES .....</b>	<b>188</b>
<b>10.1</b>	<b>ANALOG DEVICES INC. ....</b>	<b>188</b>
<b>10.1.1</b>	<b>COMPANY OVERVIEW.....</b>	<b>188</b>
<b>10.1.2</b>	<b>PRODUCT PORTFOLIO .....</b>	<b>189</b>
<b>10.1.3</b>	<b>FINANCIALS.....</b>	<b>190</b>
10.1.3.1	Overall Financials .....	190
10.1.3.2	Financials by Segment .....	191
10.1.3.3	Financials by Region .....	192
10.1.3.4	Financials by Product .....	193
<b>10.1.4</b>	<b>KEY DEVELOPMENTS .....</b>	<b>194</b>
<b>10.2</b>	<b>AVAGO TECHNOLOGIES .....</b>	<b>195</b>
<b>10.2.1</b>	<b>COMPANY OVERVIEW.....</b>	<b>195</b>
<b>10.2.2</b>	<b>PRODUCT PORTFOLIO .....</b>	<b>196</b>
<b>10.2.3</b>	<b>FINANCIALS.....</b>	<b>197</b>
10.2.3.1	Overall Financials .....	197
10.2.3.2	Financials By Region .....	198
10.2.3.3	Financials By segment.....	199
<b>10.2.4</b>	<b>KEY DEVELOPMENTS .....</b>	<b>200</b>
<b>10.2.5</b>	<b>ANALYST INSIGHT .....</b>	<b>201</b>
<b>10.3</b>	<b>BOSCH SENSORTec GMBH .....</b>	<b>202</b>
<b>10.3.1</b>	<b>COMPANY OVERVIEW.....</b>	<b>202</b>
<b>10.3.2</b>	<b>PRODUCT PORTFOLIO .....</b>	<b>202</b>
<b>10.3.3</b>	<b>FINANCIALS.....</b>	<b>204</b>
10.3.3.1	Overall Financials .....	204
10.3.3.2	Financials by Segment .....	205
10.3.3.3	Financials by Region .....	206
<b>10.3.4</b>	<b>KEY DEVELOPMENTS .....</b>	<b>207</b>
<b>10.3.5</b>	<b>ANALYST INSIGHT .....</b>	<b>207</b>
<b>10.4</b>	<b>BOURNS INC.....</b>	<b>208</b>
<b>10.4.1</b>	<b>COMPANY OVERVIEW.....</b>	<b>208</b>
<b>10.4.2</b>	<b>PRODUCT PORTFOLIO .....</b>	<b>208</b>

10.4.3	KEY DEVELOPMENTS .....	209
10.4.4	ANALYST INSIGHT .....	211
<b>10.5</b>	<b>CONTINENTAL CORPORATION .....</b>	<b>212</b>
10.5.1	COMPANY OVERVIEW.....	212
10.5.2	PRODUCT PORTFOLIO .....	212
10.5.3	FINANCIALS.....	213
10.5.3.1	Overall Financials .....	213
10.5.3.2	Financials by Segment .....	215
10.5.3.3	Financials by Region .....	216
10.5.4	KEY DEVELOPMENTS .....	217
<b>10.6</b>	<b>CTS CORPORATION.....</b>	<b>219</b>
10.6.1	COMPANY OVERVIEW.....	219
10.6.2	PRODUCT PORTFOLIO .....	219
10.6.3	FINANCIALS.....	221
10.6.3.1	Overall Financials .....	221
10.6.3.2	Financials By Business Segment .....	222
10.6.3.3	Financials By Region .....	223
10.6.4	KEY DEVELOPMENTS .....	223
10.6.5	ANALYST INSIGHT .....	224
<b>10.7</b>	<b>DELPHI AUTOMOTIVE LLP.....</b>	<b>225</b>
10.7.1	COMPANY OVERVIEW.....	225
10.7.2	PRODUCT PORTFOLIO .....	225
10.7.3	FINANCIALS.....	227
10.7.3.1	Overall Financials .....	227
10.7.3.2	Financials By Segments.....	228
10.7.3.3	Financials By Region .....	229
10.7.4	KEY DEVELOPMENTS .....	229
10.7.5	ANALYST INSIGHT .....	231
<b>10.8</b>	<b>DENSO CORPORATION.....</b>	<b>232</b>
10.8.1	COMPANY OVERVIEW.....	232
10.8.2	PRODUCT PORTFOLIO .....	232
10.8.3	FINANCIALS.....	234
10.8.3.1	Overall Financials .....	234
10.8.3.2	Financials By Segments.....	235
10.8.3.3	Financials BY Region .....	236

10.8.4	KEY DEVELOPMENTS .....	236
10.8.5	ANALYST INSIGHT .....	238
10.9	FREESCALE SEMICONDUCTOR HOLDINGS LTD .....	239
10.9.1	COMPANY OEVRVIEW.....	239
10.9.2	PRODUCT PORTFOLIO .....	240
10.9.3	FINANCIALS.....	241
10.9.3.1	Overall Financials .....	241
10.9.3.2	Financials BY Segment .....	242
10.9.3.3	Financials By Region .....	243
10.9.4	KEY DEVELOPMENTS .....	243
10.10	GE MEASUREMENT & CONTROL SOLUTIONS .....	245
10.10.1	COMPANY OVERVIEW.....	245
10.10.2	PRODUCT PORTFOLIO .....	245
10.10.3	FINANCIALS.....	247
10.10.3.1	Overall Financials .....	247
10.10.3.2	Financials BY Segment .....	248
10.10.3.3	Financials By Region .....	249
10.10.4	KEY DEVELOPMENTS .....	249
10.10.5	ANALYST INSIGHT .....	250
10.11	GILL SENSORS & CONTROLS.....	251
10.11.1	COMPANY OVERVIEW.....	251
10.11.2	PRODUCT PORTFOLIO .....	251
10.11.3	KEY DEVELOPMENTS .....	253
10.12	HELLA KGAA HUECK & CO. ....	254
10.12.1	COMPANY OVERVIEW.....	254
10.12.2	PRODUCT PORTFOLIO .....	254
10.12.3	FINANCIALS.....	256
10.12.3.1	Overall Financials .....	256
10.12.3.2	Financials By Segments .....	257
10.12.3.3	Financials By Region .....	258
10.12.4	KEY DEVELOPMENTS .....	259
10.12.5	ANALYST INSIGHT .....	260
10.13	INFINEON TECHNOLOGIES SUMMARY .....	261
10.13.1	COMPANY OVERVIEW.....	261
10.13.2	PRODUCT PORTFOLIO .....	262

<b>10.13.3 FINANCIALS.....</b>	<b>263</b>
10.13.3.1 Overall Financials .....	263
10.13.3.2 Financials By Segment .....	264
10.13.3.3 Financials By Region .....	266
<b>10.13.4 KEY DEVELOPMENTS .....</b>	<b>267</b>
<b>10.13.5 ANALYST INSIGHT .....</b>	<b>268</b>
<b>10.14 MELEXIS MICROELECTRONIC INTEGRATED SYSTEMS.....</b>	<b>269</b>
<b>10.14.1 MELEXIS MICROELECTRONIC INTEGRATED SYSTEMS SUMMARY .....</b>	<b>269</b>
<b>10.14.2 PRODUCT PORTFOLIO .....</b>	<b>270</b>
10.14.2.1 Products by Category .....	270
10.14.2.2 Products By Application .....	271
<b>10.14.3 FINANCIALS.....</b>	<b>272</b>
10.14.3.1 Overall Financials .....	272
10.14.3.2 Financials by Segment .....	273
10.14.3.3 Financials by Region .....	274
<b>10.14.4 KEY DEVELOPMENTS .....</b>	<b>275</b>
<b>10.15 MICRONAS SEMICONDUCTOR INC. ....</b>	<b>276</b>
<b>10.15.1 COMPANY OVERVIEW.....</b>	<b>276</b>
<b>10.15.2 PRODUCT PORTFOLIO .....</b>	<b>276</b>
<b>10.15.3 FINANCIALS.....</b>	<b>278</b>
10.15.3.1 Overall Financials .....	278
<b>10.15.4 FINANCIALS BY SEGMENT .....</b>	<b>279</b>
10.15.4.1 Financials by Region .....	280
<b>10.15.5 KEY DEVELOPMENTS .....</b>	<b>280</b>
<b>10.16 MURATA MANUFACTURING CO. LTD.....</b>	<b>282</b>
<b>10.16.1 OVERVIEW .....</b>	<b>282</b>
<b>10.16.2 PRODUCT PORTFOLIO .....</b>	<b>283</b>
<b>10.16.3 FINANCIALS.....</b>	<b>284</b>
10.16.3.1 Overall Financials .....	284
10.16.3.2 Financials BY Segment .....	285
10.16.3.3 Financials By Region .....	286
<b>10.16.4 KEY DEVELOPMENTS .....</b>	<b>287</b>
<b>10.16.5 ANALYST INSIGHT .....</b>	<b>288</b>
<b>10.17 NGK SPARK PLUGS CO. LTD. SUMMARY .....</b>	<b>289</b>

<b>10.17.1 OVERVIEW .....</b>	<b>289</b>
<b>10.17.2 PRODUCT PORTFOLIO .....</b>	<b>289</b>
<b>10.17.3 FINANCIALS.....</b>	<b>291</b>
10.17.3.1 Overall Financials .....	291
10.17.3.2 Financials BY Segments.....	292
10.17.3.3 Financials By Region .....	293
<b>10.17.4 KEY DEVELOPMENTS .....</b>	<b>293</b>
<b>10.17.5 ANALYST INSIGHT .....</b>	<b>294</b>
<b>10.18 NXP SEMICONDUCTORS.....</b>	<b>295</b>
<b>10.18.1 OVERVIEW .....</b>	<b>295</b>
<b>10.18.2 PRODUCT PORTFOLIO .....</b>	<b>295</b>
<b>10.18.3 FINANCIALS.....</b>	<b>297</b>
10.18.3.1 Overall Financials .....	297
10.18.3.2 Financials by Segment .....	298
10.18.3.3 Financials by Region .....	299
<b>10.18.4 KEY DEVELOPMENTS .....</b>	<b>300</b>
<b>10.19 PANASONIC CORPORATION SUMMARY.....</b>	<b>301</b>
<b>10.19.1 PRODUCT PORTFOLIO .....</b>	<b>302</b>
<b>10.19.2 FINANCIALS.....</b>	<b>303</b>
10.19.2.1 Overall Financials .....	303
10.19.2.2 Financials By Segment .....	304
10.19.2.3 Financials By Region .....	305
<b>10.19.3 KEY DEVELOPMENTS .....</b>	<b>306</b>
<b>10.19.4 SWOT ANALYSIS .....</b>	<b>307</b>
<b>10.20 SENSATA TECHNOLOGIES SUMMARY .....</b>	<b>308</b>
<b>10.20.1 PRODUCT PORTFOLIO .....</b>	<b>308</b>
<b>10.20.2 FINANCIALS.....</b>	<b>310</b>
10.20.2.1 Overall Financials .....	310
10.20.2.2 Financials BY Segments.....	311
10.20.2.3 Financials BY Region .....	312
<b>10.20.3 KEY DEVELOPMENTS .....</b>	<b>313</b>
<b>10.20.4 ANALYST INSIGHT .....</b>	<b>313</b>
<b>10.21 STONERIDGE INC. SUMMARY.....</b>	<b>314</b>
<b>10.21.1 PRODUCT PORTFOLIO .....</b>	<b>314</b>
<b>10.21.2 FINANCIALS.....</b>	<b>316</b>

10.21.2.1 Overall Financials .....	316
10.21.2.2 Financials BY Segments .....	317
10.21.2.3 Financials By Region .....	318
<b>10.21.3 KEY DEVELOPMENTS .....</b>	<b>319</b>
<b>10.21.4 ANALYST INSIGHT .....</b>	<b>319</b>
<b>10.22 TAKATA CORPORATION SUMMARY .....</b>	<b>320</b>
<b>10.22.1 PRODUCT PORTFOLIO .....</b>	<b>320</b>
<b>10.22.2 FINANCIALS.....</b>	<b>322</b>
10.22.2.1 Overall Financials .....	322
10.22.2.2 Financials By Segments .....	323
10.22.2.3 Financials BY Region .....	324
<b>10.22.3 KEY DEVELOPMENTS .....</b>	<b>325</b>
<b>10.22.4 ANALYST INSIGHT .....</b>	<b>326</b>
<b>10.23 TRW AUTOMOTIVE , INC. SUMMARY .....</b>	<b>326</b>
<b>10.23.1 PRODUCT PORTFOLIO .....</b>	<b>327</b>
<b>10.23.2 FINANCIALS.....</b>	<b>329</b>
10.23.2.1 Overall Financials .....	329
10.23.2.2 Financials BY Segments .....	330
10.23.2.3 Financials BY Region .....	331
<b>10.23.3 KEY DEVELOPMENTS .....</b>	<b>332</b>
<b>10.23.4 ANALYST INSIGHT .....</b>	<b>333</b>
<b>10.24 VISHAY INTERTECHNOLOGY SUMMARY .....</b>	<b>334</b>
<b>10.24.1 PRODUCT PORTFOLIO .....</b>	<b>334</b>
<b>10.24.2 FINANCIALS.....</b>	<b>336</b>
10.24.2.1 Overall Financials .....	336
10.24.2.2 Financials BY Segment .....	337
10.24.2.3 Financials BY Region .....	338
<b>10.24.3 KEY DEVELOPMENTS .....</b>	<b>339</b>
<b>10.24.4 ANALYST INSIGHT .....</b>	<b>340</b>

## LIST OF TABLES

TABLE 1	SEMICONDUCTOR CONTENT IN ONE CAR (\$)	32
TABLE 2	MARKET SHARE FOR TOP AUTOMOTIVE SENSOR PLAYERS TILL Q1 2015	37
TABLE 3	AVERAGE NUMBER OF SENSORS IN PASSENGER CARS BY VEHICLE TYPE IN DEVELOPED COUNTRIES	62
TABLE 4	AVERAGE NUMBER OF SENSORS IN PASSENGER CARS BY VEHICLE TYPE IN DEVELOPING COUNTRIES	63
TABLE 5	GLOBAL MARKET VOLUME FOR AUTOMOTIVE SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	64
TABLE 6	GLOBAL MARKET VALUE FOR AUTOMOTIVE SENSORS IN PASSENGER CARS (\$ MILLION), 2015-2022	65
TABLE 7	KEY TRENDS OF PRESSURE SENSOR BODY SYSTEM	70
TABLE 8	GLOBAL MARKET VOLUME FOR AUTOMOTIVE PRESSURE SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	72
TABLE 9	GLOBAL MARKET VALUE FOR AUTOMOTIVE PRESSURE SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	73
TABLE 10	GLOBAL MARKET VOLUME FOR AUTOMOTIVE TEMPERATURE SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	78
TABLE 11	GLOBAL MARKET VALUE FOR AUTOMOTIVE TEMPERATURE SENSORS (\$ MILLION), 2015-2022	79
TABLE 12	KEY TRENDS OF BODY SYSTEM POSITION SENSOR	83
TABLE 13	GLOBAL MARKET VOLUME FOR AUTOMOTIVE POSITION SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	85
TABLE 14	GLOBAL MARKET VALUE FOR AUTOMOTIVE POSITION SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	86
TABLE 15	KEY TRENDS OF MOTION SENSOR IN BODY SYSTEM	89
TABLE 16	GLOBAL MARKET VOLUME FOR AUTOMOTIVE MOTION SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	92
TABLE 17	GLOBAL MARKET VALUE FOR AUTOMOTIVE MOTION SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	93
TABLE 18	KEY TRENDS OF OPTICAL SENSOR MARKET	100
TABLE 19	GLOBAL MARKET VOLUME FOR AUTOMOTIVE OPTICAL SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	103
TABLE 20	GLOBAL MARKET VALUE FOR AUTOMOTIVE OPTICAL SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	104
TABLE 21	KEY TRENDS IN TORQUE SENSOR MARKET	106
TABLE 22	GLOBAL MARKET VOLUME FOR AUTOMOTIVE TORQUE SENSORS IN PASSENGER CARS(MILLION UNITS), 2015-2022	108

TABLE 23	GLOBAL MARKET VALUE FOR AUTOMOTIVE TORQUE SENSORS IN PASSENGER CARS(\$MILLION), 2015-2022	109
TABLE 24	KEY TRENDS IN POWER TRAIN GAS SENSORS	111
TABLE 25	GLOBAL MARKET VOLUME FOR AUTOMOTIVE GAS SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	112
TABLE 26	GLOBAL MARKET VALUE FOR AUTOMOTIVE GAS SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	113
TABLE 27	GLOBAL MARKET VOLUME FOR AUTOMOTIVE LEVEL SENSORS IN PASSENGER CARS(MILLION UNITS), 2015-2022	114
TABLE 28	GLOBAL MARKET VALUE FOR AUTOMOTIVE LEVEL SENSORS IN PASSENGER CARS (\$MILLION), 2015-2022	115
TABLE 29	GLOBAL MARKET VOLUME FOR AUTOMOTIVE OTHER SENSORS IN PASSENGER CARS (MILLION UNITS), 2015-2022	116
TABLE 30	GLOBAL MARKET VALUE FOR AUTOMOTIVE OTHER SENSORS IN PASSENGER CARS(\$MILLION), 2015-2022	117
TABLE 31	KEY DEVELOPMENTS IN AUTOMOTIVE MEMS SENSOR MARKET	124
TABLE 32	KEY DEVELOPMENTS IN AUTOMOTIVE MEMS SENSOR MARKET	128
TABLE 33	AVERAGE NUMBER OF SENSORS IN CHASSIS FOR CONVENTIONAL VEHICLES IN DEVELOPED REGIONS	133
TABLE 34	AVERAGE NUMBER OF SENSORS IN CHASSIS FOR CONVENTIONAL VEHICLES IN DEVELOPING REGIONS	134
TABLE 35	GLOBAL MARKET VOLUME OF SENSORS IN CHASSIS OF CONVENTIONAL FUEL CARS (MILLION UNITS), 2015-2022	135
TABLE 36	GLOBAL MARKET VALUE OF SENSORS IN CHASSIS OF CONVENTIONAL FUEL CARS (\$ MILLION), 2015-2022	136
TABLE 37	AVERAGE NUMBER OF SENSORS IN POWER TRAIN FOR CONVENTIONAL VEHICLES IN DEVELOPED REGIONS	138
TABLE 38	AVERAGE NUMBER OF SENSORS IN POWER TRAIN FOR CONVENTIONAL VEHICLES IN DEVELOPING REGIONS	139
TABLE 39	GLOBAL MARKET VOLUME OF SENSORS IN POWER TRAIN OF CONVENTIONAL FUEL CARS (MILLION UNITS)	140
TABLE 40	GLOBAL MARKET VALUE OF SENSORS IN POWER SYSTEM OF CONVENTIONAL FUEL CARS (\$ MILLION), 2015-2022	140
TABLE 41	AVERAGE NUMBER OF SENSORS IN BODY SYSTEM FOR CONVENTIONAL VEHICLES IN DEVELOPED REGIONS	142
TABLE 42	AVERAGE NUMBER OF SENSORS IN BODY SYSTEM FOR CONVENTIONAL VEHICLES IN DEVELOPING REGIONS	142
TABLE 43	GLOBAL MARKET VOLUME OF SENSORS IN BODY SYSTEM OF CONVENTIONAL FUEL CARS (MILLION UNITS), 2015-2022	143
TABLE 44	GLOBAL MARKET VALUE OF SENSORS IN BODY SYSTEM OF CONVENTIONAL FUEL CARS (\$ MILLION), 2015-2022	144

TABLE 45	AVERAGE NUMBER OF SENSORS IN CHASSIS OF ALTERNATIVE FUEL VEHICLES BY REGION TYPE	147
TABLE 46	GLOBAL MARKET VOLUME OF SENSORS IN CHASSIS OF ELECTRIC CARS (MILLION UNITS), 2015-2022	147
TABLE 47	GLOBAL MARKET VALUE OF SENSORS IN CHASSIS OF ELECTRIC CARS (\$MILLION), 2015-2022	148
TABLE 48	AVERAGE NUMBER OF SENSORS IN POWER TRAIN OF ALTERNATIVE FUEL VEHICLES BY REGION TYPE	149
TABLE 49	GLOBAL MARKET VOLUME OF SENSORS IN POWER TRAIN OF ELECTRIC CARS(MILLION UNITS), 2015-2022	149
TABLE 50	GLOBAL MARKET VALUE OF SENSORS IN POWER TRAIN OF ELECTRIC CARS (\$ MILLION), 2015-2022	150
TABLE 51	AVERAGE NUMBER OF SENSORS IN BODY SYSTEM OF ALTERNATIVE FUEL VEHICLES BY REGION TYPE	151
TABLE 52	GLOBAL MARKET VOLUME OF SENSORS IN BODY SYSTEM OF ELECTRIC CARS (MILLION UNITS), 2015-2022	151
TABLE 53	GLOBAL MARKET VALUE OF SENSORS IN BODY SYSTEM OF ELECTRIC CARS (\$ MILLION), 2015-2022	152
TABLE 54	GLOBAL MARKET VALUE OF SENSORS IN HEAVY VEHICLES (\$MILLION), 2015-2022	153
TABLE 55	GLOBAL AUTOMOTIVE SENSOR MARKET VALUE (\$ MILLION) FOR PASSENGER CAR, BY GEOGRAPHY, 2015-2022	157
TABLE 56	GLOBAL AUTOMOTIVE SENSOR MARKET VALUE (\$ MILLION) FOR HEAVY VEHICLES, BY GEOGRAPHY, 2015-2022	158
TABLE 57	AMERICA AUTOMOTIVE SENSORS MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	159
TABLE 58	THE U.S. AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CARS (\$ MILLION), 2015-2022	162
TABLE 59	MEXICO AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CARS(\$ MILLION), 2015-2022	163
TABLE 60	APAC AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	164
TABLE 61	JAPAN AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	167
TABLE 62	CHINA AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	170
TABLE 63	INDIA AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	171
TABLE 64	SOUTH KOREA AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR(\$ MILLION), 2015-2022	173
TABLE 65	EUROPE AUTOMOTIVE SENSOR MARKET VALUE IN PASSENGER CAR (\$ MILLION), 2015-2022	174

TABLE 66	GERMANY AUTOMOTIVE SENSOR MARKET VALUE (\$ MILLION), 2015-2022	176
TABLE 67	THE U.K. AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	178
TABLE 68	REST OF THE WORLD AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR(\$ MILLION), 2015-2022	179
TABLE 69	AFRICA AUTOMOTIVE SENSOR MARKET VALUE FOR PASSENGER CAR (\$ MILLION), 2015-2022	180

Sample

## LIST OF FIGURES

FIGURE 1	BIS RESEARCH METHODOLOGY	28
FIGURE 2	DIFFERENT PHASES OF RESEARCH METHODOLOGY FOR GLOBAL MARKET	29
FIGURE 3	AUTOMOTIVE SEMICONDUCTOR PRODUCT CATEGORIES	31
FIGURE 4	GLOBAL AUTOMOTIVE SENSOR MARKET VALUE (\$ MILLION) BY VEHICLE TYPE, 2015-2022	35
FIGURE 5	GLOBAL AUTOMOTIVE SENSOR MARKET VALUE (\$ MILLION) BY GEOGRAPHY, 2015-2022	36
FIGURE 6	COMPARING THE MARKET VALUE FOR PASSENGER CARS SENSOR MARKET VALUE, BY SENSOR TYPE (2014 AND 2022)	38
FIGURE 7	PORTER'S FIVE FORCES ANALYSIS FOR THE GLOBAL AUTOMOTIVE INDUSTRY	49
FIGURE 8	BENEFITS CAR PROVIDES TO ITS MEMBERS	55
FIGURE 9	BENEFITS OF GENIVI MEMBERSHIP	56
FIGURE 10	BENEFITS OF OAA MEMBERSHIP	58
FIGURE 11	PRINCIPLES FOLLOWED BY AUTO ALLIANCE	59
FIGURE 12	USCAR MILESTONES	60
FIGURE 13	PRESSURE SENSOR AND AUTOMOTIVE APPLICATIONS	66
FIGURE 14	CHASSIS PRESSURE SENSORS	67
FIGURE 15	POWER TRAINPRESSURE SENSORS	68
FIGURE 16	BODY SYSTEMPRESSURE SENSOR	69
FIGURE 17	PRESSURE SENSOR PERCENTAGE BREAK UP: BY FUNCTIONAL APPLICATION	71
FIGURE 18	KEY APPLICATIONS OF AUTOMOTIVE TEMPERATURE SENSORS	74
FIGURE 19	POWER TRAINTEMPERATURE SENSOR	75
FIGURE 20	BODY SYSTEMTEMPERATURE SENSOR	76
FIGURE 21	TEMPERATURE SENSOR PERCENTAGE BREAK UP: BY FUNCTIONAL APPLICATION	77
FIGURE 22	KEY APPLICATIONS OF AUTOMOTIVE POSITION SENSORS	80
FIGURE 23	CHASSISPOSITION SENSOR	80
FIGURE 24	POWER TRAINPOSITION SENSOR	81
FIGURE 25	BODY SYSTEMPOSITION SENSOR	82
FIGURE 26	POSITION SENSOR PERCENTAGE BREAK UP: BY FUNCTIONAL APPLICATION	84
FIGURE 27	CHASSISMOTION SENSORS	87

FIGURE 28	POWER TRAINMOTION SENSOR	88
FIGURE 29	CHALLENGES FOR MOTION SENSOR BASED AUTOMATION SYSTEM	90
FIGURE 30	MOTION SENSORPERCENTAGE BREAK UP: BY FUNCTIONAL APPLICATION	91
FIGURE 31	KEY APPLICATIONS OF AUTOMOTIVE OPTICAL SENSORS	94
FIGURE 32	CHASSIS OPTICAL SENSORS	95
FIGURE 33	BODY SYSTEMOPTICAL SENSOR	96
FIGURE 34	OPTICAL SENSORS IN A MODERN VEHICLE	99
FIGURE 35	REAL TIME ON-ROAD VISION BASED SYSTEM	101
FIGURE 36	OPTICAL SENSOR PERCENTAGE BREAK UP : BY FUNCTIONAL APPLICATION	102
FIGURE 37	CHASSIS TORQUE SENSOR	105
FIGURE 38	POWER TRAINTORQUE SENSOR	106
FIGURE 39	TORQUE SENSOR PERCENTAGE BREAK UP: BY FUNCTIONAL APPLICATION	107
FIGURE 40	POWER TRAINGAS SENSOR	110
FIGURE 41	AUTOMOTIVE SENSOR BY TECHNOLOGY	118
FIGURE 42	AUTOMOTIVE VEHICLE TYPE	132
FIGURE 43	CHASSIS OF AN ELECTRIC VEHICLE	146
FIGURE 44	GEOGRAPHICAL ANALYSIS BREAKDOWN FOR THE GLOBAL AUTOMOTIVE SENSOR MARKET	156
FIGURE 45	KEY MERGERS & ACQUISITIONS:	183
FIGURE 46	KEY PRODUCT LAUNCH & DEVELOPMENT:	184
FIGURE 47	KEY PARTNERSHIPS, COLLABORATIONS & JOINT VENTURES:	186
FIGURE 48	OTHER KEY STRATEGIES	187
FIGURE 49	ANALOG DEVICES PRODUCT	189
FIGURE 50	ANALOG DEVICES OVERALLFINANCIALS (\$MILLION), 2011-2014	190
FIGURE 51	NET REVENUE BY SEGMENTS, 2011-2014	191
FIGURE 52	NET REVENUE BY REGION, 2011-2014	192
FIGURE 53	NET REVENUE BY PRODUCT, 2011-2014	193
FIGURE 54	AVAGO TECHNOLOGIES MARKETS	196
FIGURE 55	AVAGO TECHNOLOGIES OVERALL FINANCIALS (\$MILLION), 2011-2014	197
FIGURE 56	NET REVENUE BY REGION, 2011-2014	198
FIGURE 57	NET REVENUE BY SEGMENT, 2011-2014	199
FIGURE 58	BOSCH SENSORTEC PRODUCTS	203
FIGURE 59	BOSCH OVERALL FINANCIALS (\$ MILLION), 2011-2014	204
FIGURE 60	NET REVENUE BY SEGMENT, 2011-2014	205

FIGURE 61	NET REVENUE BY REGION, 2011-2014	206
FIGURE 62	BOURNS INC. PRODUCTS	209
FIGURE 63	CONTINENTAL CORPORATION DIVISION	213
FIGURE 64	CONTINENTAL CORPORATION OVERALL FINANCIALS (\$MILLION), 2011-2014	213
FIGURE 65	NET REVENUE BY SEGMENT, 2011-2014	215
FIGURE 66	NET REVENUE BY REGION, 2011-2014	216
FIGURE 67	CTS CORPORATION PRODUCT SEGMENT	220
FIGURE 68	OVERALL FINANCIALS (\$MILLION), 2011-2013	221
FIGURE 69	NET REVENUE BY BUSINESS SEGMENTS, 2011-2013	222
FIGURE 70	NET REVENUE BY REGION, 2011-2013	223
FIGURE 71	DELPHI AUTOMOTIVE PRODUCT SEGMENTS	226
FIGURE 72	DELPHI AUTOMOTIVE LLP OVERALL FINANCIALS (\$MILLION), 2011-2014	227
FIGURE 73	NET REVENUE BY OPERATING SEGMENTS, 2011-2014	228
FIGURE 74	NET REVENUE BY REGION, 2011-2013	229
FIGURE 75	DENSO CORPORATION SEGMENTS	233
FIGURE 76	DENSO CORPORATION OVERALL FINANCIALS (\$MILLION), 2011-2014	234
FIGURE 77	NET REVENUE BY OPERATING SEGMENTS, 2011-2014	235
FIGURE 78	NET REVENUE BY REGION, 2011-2013	236
FIGURE 79	FREESCALE SEGMENTS SNAPSHOT	240
FIGURE 80	OVERALL FINANCIALS (\$ MILLION), 2011-2014	241
FIGURE 81	NET REVENUE BY SEGMENT, 2011-2014	242
FIGURE 82	NET REVENUE BY REGION, 2011-2013	243
FIGURE 83	GENERAL ELECTRIC MEASUREMENT AND CONTROL PRODUCTS	246
FIGURE 84	OVERALL FINANCIALS (PARENT COMPANY), (\$ MILLION), 2011-2013	247
FIGURE 85	NET REVENUE BY SEGMENT, 2011-2013	248
FIGURE 86	NET REVENUE BY REGION, 2011-2013	249
FIGURE 87	GILL SENSORS PRODUCTS SNAPSHOT	252
FIGURE 88	HELLA KGAA HUECK & CO PRODUCT DIVISION	255
FIGURE 89	HELLA OVERALL FINANCIALS (\$MILLION), 2011-2014	256
FIGURE 90	NET REVENUE BY SEGMENT, 2011-2013	257
FIGURE 91	NET REVENUE BY REGION, 2011-2014	258
FIGURE 92	INFINEON BUSINESS SEGMENT SNAPSHOT	262
FIGURE 93	OVERALL FINANCIALS(\$ MILLION), 2011-2014	263
FIGURE 94	NET REVENUE BY SEGMENTS, 2011-2014	264
FIGURE 95	NET REVENUE BY REGION, 2011-2014	266

FIGURE 96	MELEXIS PRODUCTS BY APPLICATION SNAPSHOT	271
FIGURE 97	OVERALL FINANCIALS (\$ MILLION), 2011-2014	272
FIGURE 98	NET REVENUE BY SEGMENT, 2011-2013	273
FIGURE 99	NET REVENUE BY REGION, 2011-2014	274
FIGURE 100	MICRONAS SEMICONDUCTORS OPERATING SEGMENTS	277
FIGURE 101	MICRONAS OVERALL FINANCIALS (\$ MILLION), 2011-2014	278
FIGURE 102	NET REVENUE BY SEGMENT, 2011-2014	279
FIGURE 103	NET REVENUE BY REGION, 2011-2014	280
FIGURE 104	MURATA MANUFACTURING CO., LTD. PRODUCT SNAPSHOT	283
FIGURE 105	OVERALL FINANCIALS (\$MILLION), 2011-2014	284
FIGURE 106	NET REVENUE BY SEGMENT, 2011-2014	285
FIGURE 107	NET REVENUE BY REGION, 2011-2014	286
FIGURE 108	NGK SPARK PLUGS CO. LTD. PRODUCT SNAPSHOT	290
FIGURE 109	NGK SPARK PLUGS CO. LTD.: OVERALL FINANCIALS (\$MILLION), 2011-2014	291
FIGURE 110	NET REVENUE BY SEGMENTS, 2011-2014	292
FIGURE 111	NET REVENUE BY REGION, 2011-14	293
FIGURE 112	OVERALL FINANCIALS (\$ MILLION), 2011-2014	297
FIGURE 113	NET REVENUE BY SEGMENT, 2011-2014	298
FIGURE 114	NET REVENUE BY REGION, 2011-2013	299
FIGURE 115	PANASONIC CORPORATION SEGMENTS	302
FIGURE 116	OVERALL FINANCIALS,(\$ MILION), 2012-2014	303
FIGURE 117	NET REVENUE BY SEGMENT, 2012-2014	304
FIGURE 118	NET REVENUE BY REGION, 2012-2014	305
FIGURE 119	SENSATA TECHNOLOGIES PRODUCTS	309
FIGURE 120	TYPES OF SENSORS	309
FIGURE 121	SENSATA TECHNOLOGIES, INC. OVERALL FINANCIALS (\$MILLION), 2011-2014	310
FIGURE 122	NET REVENUE BY SEGMENTS, 2011-2014	311
FIGURE 123	NET REVENUE BY REGIONS, 2011-2014	312
FIGURE 124	STONERIDGE INC. PRODUCTS	315
FIGURE 125	OVERALL FINANCIALS (\$MILLION), 2011-2014	316
FIGURE 126	NET REVENUE BY SEGMENT, 2011-2013	317
FIGURE 127	NET REVENUE BY REGION, 2011-2014	318
FIGURE 128	TAKATA CORPORATION PRODUCT DIVISIONS	321
FIGURE 129	TAKATA CORPORATION OVERALL FINANCIALS (\$ MILLION), 2011-2014	322
FIGURE 130	NET REVENUE BY SEGMENTS, 2011-2014	323

FIGURE 131 NET REVENUE BY REGION, 2011-2014	324
FIGURE 132 TRW AUTOMOTIVE BUSINESS SEGMENT	327
FIGURE 133 TRW AUTOMOTIVE OVERALL FINANCIALS (\$MILLION), 2011-2014	329
FIGURE 134 SALES BY BUSINESS SEGMENTS, 2011-2014	330
FIGURE 135 SALES BY REGION, 2011-2013	331
FIGURE 136 VISHAY INTERTECHNOLOGY PRODUCTS	335
FIGURE 137 VISHAY INTERTECHNOLOGY, INC. OVERALL FINANCIALS (\$MILLION), 2011-2014	336
FIGURE 138 NET REVENUE BY OPERATING SEGMENTS, 2011-2014	337
FIGURE 139 NET REVENUE BY REGION, 2011-2013	338

# 1 REPORT SCOPE

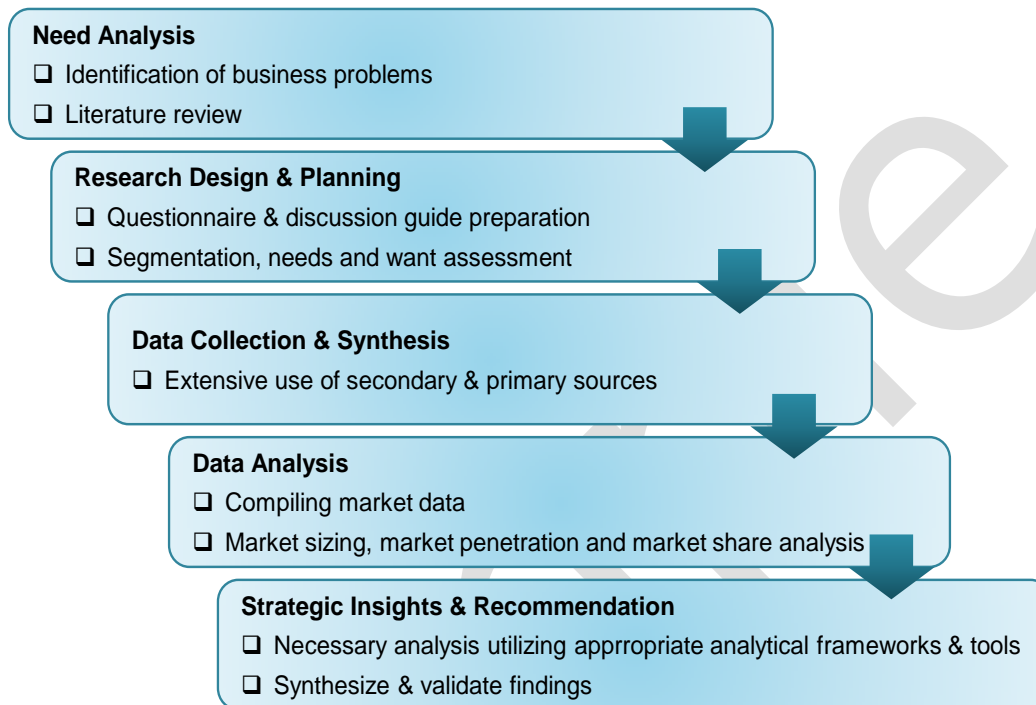
---

## 1.1 REPORT COVERAGE

- Global passenger car segments including conventional and alternate fuel (electric vehicles)
- Global heavy vehicle segment includes trucks and off-road vehicles
- Market by sensor types covers all the sensors being used across global automotives
  - The chapter presents market statistics of sensors used in passengers cars but doesn't include the sensors in other segments, i.e. heavy vehicles
- Market By vehicle types covers a detailed analysis of sensors being used across different types of vehicle and maps it to end use point in the passenger cars
  - The chapter also presents a total market value for heavy vehicle segment
- Market by technology qualitatively covers the emerging MEMS and NEMS sensor
- Market by geography presents a detailed market statistics for global passenger car across each country under study
  - The market value for sensors in heavy vehicle is presented by regions

## 1.2 BIS RESEARCH METHODOLOGY

We exhaustively use both primary sources (in-house experts, industry thought leaders, market players, and independent consultants) and secondary sources (a host of paid and unpaid databases) along with analytical tools to build our forecast and predictive models.

**FIGURE 1****BIS RESEARCH METHODOLOGY**

Source: BIS Research

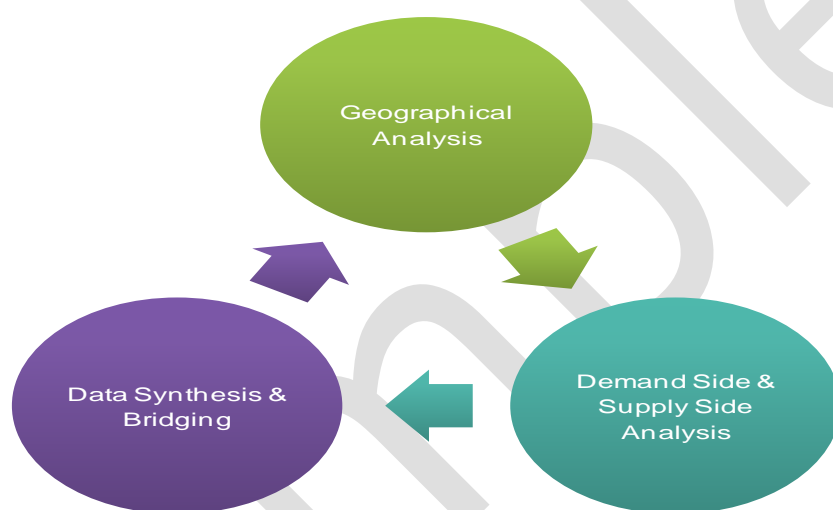
The primary sources are comprised of industry experts from automotive and sensor industries as well as preferred suppliers, manufacturers, distributors, administrators, solution providers, technology developers, alliances, consortiums, and other organizations related to the segments of this industry's value chain. All primary sources were interviewed to obtain and verify critical qualitative & quantitative information and assess the future prospects.

The research study also involves the usage of extensive secondary sources, directories, company websites, and annual reports. It also makes use of databases such as IEEE, Hoovers, Bloomberg, Business-week, Factiva, and One-Source to collect useful and effective information for an extensive, technical, market-oriented, and commercial study of the global market.

## 1.3 RESEARCH METHODOLOGY FOR GLOBAL MARKET STUDY

FIGURE 2

### DIFFERENT PHASES OF RESEARCH METHODOLOGY FOR GLOBAL MARKET



Source: BIS Research Analysis

#### 1.3.1 GEOGRAPHICAL ANALYSIS

The Geographical Analysis of the report covers the region-wise trends in the market. The market statistics for each of the major geographies are also given in this chapter. Besides identifying the key growth enablers in the market based on a detailed “push and pull” forces analysis, the chapter also undertakes an extensive Porters Five Forces analysis.

In estimating and forecasting the geographical market size and potential, purchasing power parity GDP (Gross Domestic Product) estimates for the benchmark year (2015) is derived from a host of sources such as the national income and products accounts from the Organization for Economic Co-Operation and Development (OECD), the European Bank for Reconstruction and Development (EBRD), the World Bank, Eurostat, the U.S. Central Intelligence Agency (CIA) and statistical bureaus of individual countries. The GDP data for individual countries are then

converted to the U.S. dollars by valuing each country's output at the U.S. prices for the benchmark year, thereby addressing the issue of fluctuating exchange rate.

### **1.3.2 DEMAND SIDE & SUPPLY SIDE ANALYSIS**

As the goal of the study was to estimate demand and identify growth opportunity in the market segment, a thorough analysis of demand side dynamics was undertaken. In this process various suppliers were interviewed and probed to understand the buying behavior across different demography. With detailed analysis (both primary and secondary) of suppliers (manufacturers, and channel partners), the supply side dynamics were understood to get a complete picture of the market and triangulate the market data.

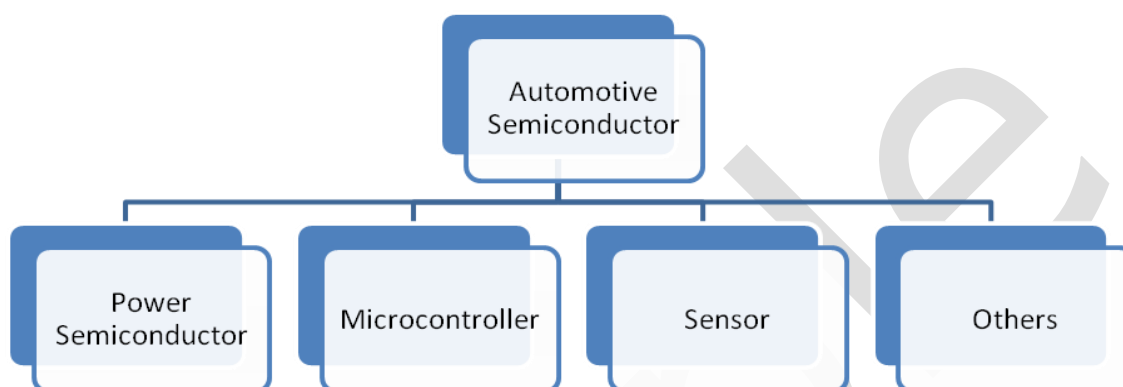
For each of the sensor types and end-use application types, a detailed secondary and primary (suppliers) research was done to understand the dynamics of the industry leading players. Some of the key factors that were probed during this process include market size (volume & value), market share (by sensor types, technology, vehicle type, and by geography), market channels and key segments, and regulations among others.

### **1.3.3 DATA SYNTHESIS & BRIDGING**

Following comprehensive market engineering which involves calculations of market statistics, its crackdown, its size estimations, its share analysis, its forecast, and data triangulation further primary research was undertaken to gather missing information, verify, and validate the critical numbers arrived at industry trends, and key players of each type of product and application market. Extensive qualitative and further quantitative analysis are also undertaken from all the numbers arrived at in the complete market engineering process, in order to list key information throughout the study.

### **1.3.4 AUTOMOTIVE MARKET ESTIMATION – A SNAPSHOT**

In the past few years, semiconductor market continues to grow at a rate faster than the global GDP and automotive segment of semiconductor industry promises to be one of the key drivers for such growth. As more preference is given to safety, security and comfort, the application of semiconductor in vehicles is growing at a fast rate. The global market of automotive semiconductor has increased by almost XX% from \$XX billion in 2013 to \$XX billion in 2014. The semiconductor content in an automobile comprise of the following four segments.

**FIGURE 3****AUTOMOTIVE SEMICONDUCTOR PRODUCT CATEGORIES**

Source: BIS Research

Sensors comprise of a significant percentage i.e. XX% for an average vehicle, and are imperative in ensuring security and other features for any vehicle. Sensors being a part of semiconductor in vehicles will grow with the rise in automotive semiconductor market. One way of computing the market size of global automotive sensors is to determine the sensor content in semiconductor of an automobile.

The semiconductor content as well as the fraction of sensor in semiconductors varies not only with the type of vehicle but also with the models of automobiles. For example, if we talk about cars, the semiconductor content in a high end car is about four times that of mid and low end car.

The amount of semiconductor content across various automobiles by types was estimated by taking weighted average using the following formula:

Average Semiconductor (\$) =  $\sum$  (Number of Car Models Produced  $\times$  Semiconductor content in the model (\$))

**TABLE 1****SEMICONDUCTOR CONTENT IN ONE CAR (\$)**

Car Types	Car Models	2012	2013	2014
Conventional Fuel Car	High End Car(\$)	XX	XX	XX
	Mid and Low end Car (\$)	XX	XX	XX
Alternate Fuel Car	Electric Car (\$)	XX	XX	XX
	Hybrid Electric Car	XX	XX	XX

Source: BIS Research Market Estimates

The above estimate was verified through primary participants and subsequently through secondary research.

## 1.4 REPORT DESCRIPTION

The count of sensors used in automobiles has increased significantly, owing to the increasing demand of safety and environmental concerns both from the perspective of governmental agencies and end-users. Sensors such as pressure, temperature, motion, and position sensors are used across the key end-point applications within an automobile, viz. chassis, power train, and body system. The involvement of semiconductor monoliths such as Bosch, Infineon, and Sensata among others have resulted in a highly competitive market place, raising price wars and rapid technological advancement in the global market.

The report is a meticulous compilation of the different aspects of the automotive sensor market including the porter's five forces analysis, market dynamics, key consortiums, , market breakdown by vehicle and sensor types and key geographical locations. The market values form a critical part of the report, therefore, the revenue generated from sales of automotive sensors for different passenger car types and heavy vehicles have been mentioned separately. The scope of the report has been limited to passenger cars and heavy vehicles; however, special emphasis has been given to the significant vehicle types, i.e. conventional fuel cars and electric cars. However, qualitative analysis of heavy vehicles along with market estimation and forecast by region has been included in the report.

The passenger cars segment has been segmented by different vehicle type namely-high, medium, and low end vehicles along with electric cars. The market value and volume for different sensor types have been estimated and forecasted on the basis of these vehicle types only.

The report has profiled the key market players operating in the global automotive sensor market such as Bosch, Delphi, Denso, Infineon, and Sensata among others. Moreover, the report has a separate segment for the key market developments and strategies that the market players are adopting to sustain and grow in the global automotive sensor market.

The global automotive sensor market is expected to grow over \$XX billion by 2022, at an estimated CAGR of XX% from 2015 to 2022. While APAC will continue to lead the global market through the forecast period, significant revenue flow are expected from Europe and America. Optical sensors will continue to be the largest revenue generating sensor type, however, temperature sensor will be closely following and reach \$XX billion by 2022. Motion sensors have been identified as the fastest growing sensor type with a CAGR of XX% through the forecast period. The increasing demand of electric vehicles, owing to its potential to cut down consumption of imported fuel and being environmental friendly makes it the fastest growing vehicle type for automotive sensors globally.

## 2 MARKET DYNAMICS

---

### 2.1 DRIVERS

The automotive sensor market bounced back to a growth trajectory, owing to a host of factors such as: increasing consumer demand for safety, security, comfort and efficiency; stringent government regulations, rising demand for high end and mid end vehicles owing to increasing disposable income in the developing countries, expansion of global auto-manufacturers into new emerging markets, and increasing sensor content in automobile as per Moore's law.

The following section explains in detail about each driver faced by automotive sensor market

#### 2.1.1 INCREASING CONSUMER DEMAND FOR SAFETY, SECURITY, COMFORT AND EFFICIENCY

While safety and security features come first in heavy duty on and off road vehicle operation, the performance demands (efficiency as well as comfort) by customers to increase productivity and minimize vehicle downtime are driving OEMs (Original Equipment Manufacturers) to utilize more sensors in passenger vehicles to achieve all of these important goals. Such diverse portfolio of vehicle control and management sensors helps vehicles operate safely, increase productivity and maximize vehicle uptime.

Migration of safety and comfort attributes from high-end segment vehicles to mid-range vehicles, growth of new and more complex safety features and advanced driver assistance systems (ADAS) is increasing the average semiconductor content (sensor content) per vehicle.

Leading automotive sensor manufactures such as Bosch, Denso, and Infineon Technologies are active working to provide technologically advanced, safer and secure sensor based products for various automotive applications.

For example, Denso is working towards developing two core technologies for improving passenger safety and security: "Sensing technology" that monitors the driving environment/driver/automobile condition on a real time basis; and human machine interface

(HMI) technology to provide drivers with requisite video and audio content at the right time and in an easily interpreted format.

### **2.1.2 STRINGENT GOVERNMENT REGULATIONS**

Demand for automotive sensor in automobiles is also increasing due to strict government regulations for automobile safety and emissions. These regulations are increasing demand for sensors in applications such as engine management System (EMS), tire pressure monitoring system (TPMS), electronic stability control (ESC) system, occupant detection and advanced driver assistant systems (ADAS).

For instance, the Corporate Average Fuel Economy (CAFE) standards are driving OEMs (Original Equipment Manufacturers) to raise overall fleet miles per gallon (MPG) to XX MPG for cars and light-duty trucks by model year 2025.

Leading automotive sensor and semiconductor manufacturers across the world are introducing latest engine management system and micro controller units (MCUs) that incorporate large number of different sensors, to comply with CAFE vehicle emission standard regulations.

On December, 2014, Delphi introduced latest Delphi Multec Gasoline Direct Injection (GDi) Engine Management Systems (EMS) to comply with existing and future vehicle emission standards including CAFE, Euro IV, Euro V and Euro VI, and the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) standards, such as Tier 2, LEV, ULEV II, SULEV and PZEV and other regulatory bodies such as European Automobile Manufacturers Association (ACEA) for greenhouse gas emissions requirements.

On August 2014, leading Japanese supplier of advanced semiconductor solution, Renesas Electronics Corporation introduced latest RH850/C1x Series of 32-bit microcontrollers (MCUs) for motor control in hybrid electric vehicles (HEVs) and electric vehicles (EVs). The MCUs are designed as per CAFE vehicle emission standards and ISO 26262 functional safety standards.

## 3 AUTOMOTIVE MARKET BY SENSOR TYPE

### 3.1 INTRODUCTION

**TABLE 2**

**AVERAGE NUMBER OF SENSORS IN PASSENGER CARS BY VEHICLE TYPE IN DEVELOPING COUNTRIES**

Particulars	2014	2015	2016	2018	2020	2021	2022
High End	XX	XX	XX	XX	XX	XX	XX
Medium End	XX	XX	XX	XX	XX	XX	XX
Low End	XX	XX	XX	XX	XX	XX	XX
Electric	XX	XX	XX	XX	XX	XX	XX

Source: ME-BIS Research

While the average count of sensors for high end vehicles was XX in developed regions, the number dropped to XX for developing countries such as India and Middle East countries among others. The average number of sensors for each vehicle type is expected to double by the end of forecast period. The increase will be most visible in medium end and electric vehicles.

**TABLE 3**

**GLOBAL MARKET VOLUME FOR AUTOMOTIVE SENSORS IN  
PASSENGER CARS (MILLION UNITS), 2015-2022**

Type of Car	2014	2015	2016	2018	2020	2021	2022	CAGR
High End	XX	XX	XX	XX	XX	XX	XX	XX%
Mid End	XX	XX	XX	XX	XX	XX	XX	XX%
Low End	XX	XX	XX	XX	XX	XX	XX	XX%
Electric	XX	XX	XX	XX	XX	XX	XX	XX%
Total	XX	XX	XX	XX	XX	XX	XX	XX%

Source: ME-BIS Research

The global market volume for automotive sensors was XX billion units in 2014 which is expected to grow over XX billion at a CAGR of XX% through 2015 to 2022. With medium end vehicles dominating the global automotive market, the revenue from sensors going into this vehicle type will be maximum, growing over XX billion units by 2022 at a CAGR of XX% through the forecast period.

Market value from sensors going into high end models from BMW, Audi, and Jaguar among others will grow at a CAGR of XX% through the forecast period, to reach XX billion units by 2022.

**TABLE 4**

**GLOBAL MARKET VALUE FOR AUTOMOTIVE SENSORS IN PASSENGER CARS (\$ MILLION), 2015-2022**

Type of Car	2014	2015	2016	2018	2020	2021	2022	CAGR
High End	XX	XX	XX	XX	XX	XX	XX	XX%
Mid End	XX	XX	XX	XX	XX	XX	XX	XX%
Low End	XX	XX	XX	XX	XX	XX	XX	XX%
Electric	XX	XX	XX	XX	XX	XX	XX	XX%
Total	XX	XX	XX	XX	XX	XX	XX	XX%

Source: ME-BIS Research

Automotive sensors for medium end vehicles dominated the global market in 2014 with a share of \$XX billion which is expected to grow over \$XX billion by the end of the forecast period. The global market value for automotive sensors was \$XX billion in 2014 which is expected to grow over \$XX billion by the end of the forecast period, at a CAGR of XX% through 2015 to 2022.

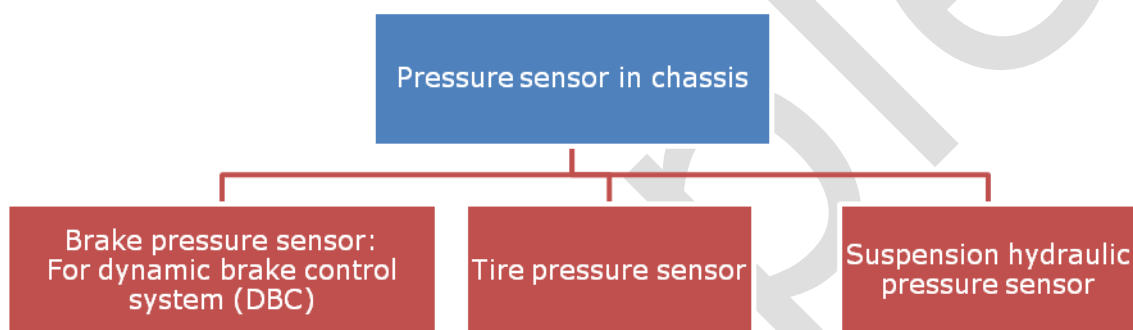
Electric vehicles will be increasingly using different sensor types, generating \$XX million by 2022 at an estimated CAGR of XX% through 2015 to 2022.

## 3.2 PRESSURE SENSOR

### 3.2.1 PRESSURE SENSOR TYPES –CHASSIS

**FIGURE 4**

**CHASSIS PRESSURE SENSORS**



Source: BIS Research

Brake pressure sensors are designed for dynamic brake control in vehicle stability system to measure high pressure, improve brake effectiveness during emergency braking situations.

Tire pressure sensors are part of electronic tire monitoring system (TPMS) designed for measuring tire air pressure which is reported to electronic control unit and finally to the driver. Schrader International Inc. (US) is considered a global leader in TPMS technology. In 2014, Schrader invested \$XX million at its Springfield, Tenn. (US) tire pressure monitoring system sensors plant for serving markets in US, Europe, Russia and in several Asia-Pacific countries, considering the demand for TPMS technology in vehicles is rising and becoming a global safety legislation.

In 2014, Malaysian company Salutica Allied Solutions Sdn. Bhd introduced world's first Bluetooth-operated (compatible with android as well iOS operating system ) advanced tire pressure monitoring system, FOBO tire for in-car monitoring applications of intelligent vehicles such as hybrid cars, plug-in cars among others.

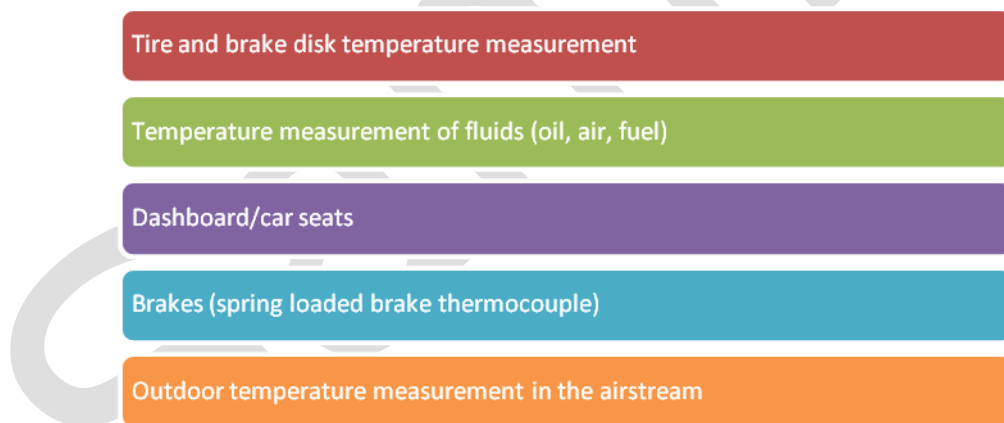
### 3.3 TEMPERATURE SENSOR

Temperature sensor monitors temperature of fluids, gases, other physical components that are involved in running an automobile. Temperature sensors are used in chassis, power train as well as in body system applications. Such sensors are increasingly being used in emerging emission control technologies such as SCR (Selective catalytic reduction) for a regular checkup of the exhaust temperature. According to the EPA (Environmental Protection Agency), all heavy duty diesel engines developed post January 1, 2010 have been compelled to bring harmful emissions such as nitrogen oxides (NOx) and particulate matter (PM) to nearly zero levels.

Following figure lists the key applications of temperature sensors in automobiles:

**FIGURE 5**

#### KEY APPLICATIONS OF AUTOMOTIVE TEMPERATURE SENSORS



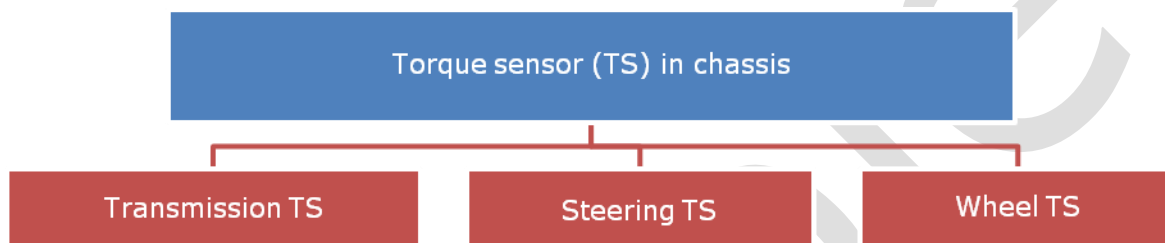
Source: BIS Research

The subsequent sections will provide detailed insights about the automotive temperatures sensor market along with key players and market statistics.

### 3.4 TORQUE SENSOR

**FIGURE 6**

#### **CHASSIS TORQUE SENSOR**



Source: BIS Research

Transmission torque sensor measures engine output torque as well transmission input torque while the wheel torque sensor or driveshaft torque sensor monitors transmission output torque. Both the torque sensors are important for vehicle traction control as well analysis of the gearbox efficiency. On the other hand, steering torque sensor measures how much steering assistance is required by feeding output to the electronic control unit of EPS system.

#### **3.4.1 TORQUE SENSOR TYPES -POWER TRAIN**

Torque sensors are used for various torque sensing applications in the power train (engine applications) of a vehicle. The figure below shows different types of torque sensors in a power train.

## 4 AUTOMOTIVE SENSOR BY VEHICLE TYPE

### 4.1 HEAVY VEHICLES

The heavy vehicle segments in the report includes two vehicle types- trucks and off-road (off-highway vehicles).

#### 4.1.1 MARKET STATISTICS

**TABLE 5**

**GLOBAL MARKET VALUE OF SENSORS IN HEAVY VEHICLES  
(\$MILLION), 2015-2022**

Type	2014	2015	2016	2018	2020	2021	2022	CAGR
Truck	XX	XX	XX	XX	XX	XX	XX	XX%
Off-Road	XX	XX	XX	XX	XX	XX	XX	XX%
Total	XX	XX	XX	XX	XX	XX	XX	XX%

Source: ME-BIS Research

The above table presents the estimated global market value of sensors in heavy vehicles from 2014 to 2022. The total market value of sensors in heavy vehicles in 2014 was \$ XX million, out of which sensors in trucks accounted for \$XX million which is expected to grow at a CAGR of XX% from 2015 to 2022. The value of off-road vehicles was \$XX million in 2014 and is predicted to increase to \$XX million by 2022.

#### 4.1.2 SENSOR IN TRUCKS

Similar to the application of sensors in passenger cars, trucks makers are increasingly adopting sensors to ensure safety and better driving experience. Trucks are further segmented into Low Commercial Vehicles (LCV) and Heavy Commercial Vehicle (HCV). LCVs are the goods and carriage vehicles with Gross Vehicle Weight (GVW) below 6 tons while HCVs are the ones with

more than 6 tons GVW. Out of the total XX million unit commercial vehicles on road in 2014, the HCVs accounted for XX Million while the share of LCVs remained relatively lesser. However, it is expected that the growth of LCV will be higher owing to increased demand from market such as India.

Factors driving the demand of this segment in various emerging countries are increased need of LCV & HCV truck safety systems, hot spots ABS (Anti lock breaking system), ESC (Electronic Stability Control), and active braking. Whereas, in the developed countries, the rising adoption of telematics based integrated safety system is assisting this segment to grow. However, factors such as rising importance of supply chain optimization involving vehicle tracking, critical event alerts, operations management back office automation, scheduling and delivery confirmation among others, are together driving this market in all the regions.

## 4.2 CTS CORPORATION

### 4.2.1 COMPANY OVERVIEW

Particular	Specifications(as of 2014)
Website	www.ctscorp.com
Contact Details	CTS Automotive Products 1142 W. Beardsley Ave. Elkhart, IN 46514 USA Tel:574-389-2700 Fax: 574-295-7810
Year of Establishment	1896
Ownership Type	Public
Company Type	Designer and Manufacturer
Number of Employees	187400
Subsidiaries	CTS Electronic Components Inc., CTS Components Taiwan Ltd., CTS Japan Inc.
Competitors	Murata Manufacturing Co. Ltd., Delphi Automotive LLC

Source: CTS Corporation website, LinkedIn, BIS Research

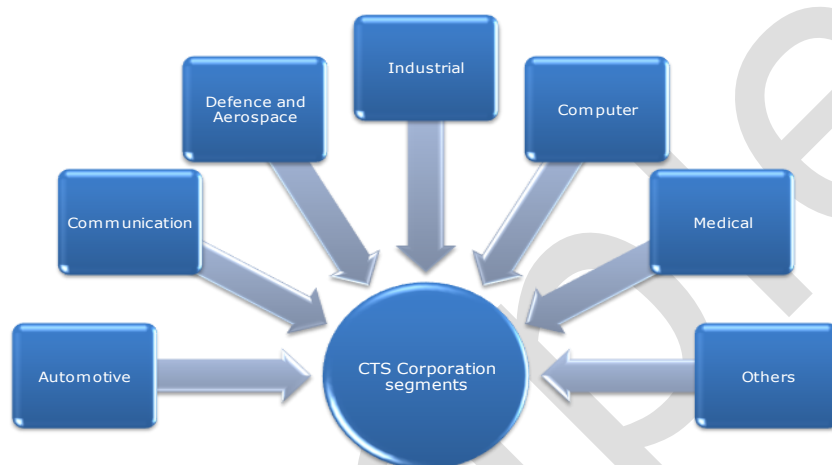
### 4.2.2 PRODUCT PORTFOLIO

CTS Corporation design, manufacture and sell a broad line of electronic component and sensors to original equipment manufacturers.

The company targets the following markets:

**FIGURE 7**

**CTS CORPORATION PRODUCT SEGMENT**



Source: BIS Research

The company's major market consists of automotive sensors and actuators used in consumer and commercial vehicles.

The company manufactures electronic components, switches, resistor networks, and potentiometers for communication infrastructure and computer markets.

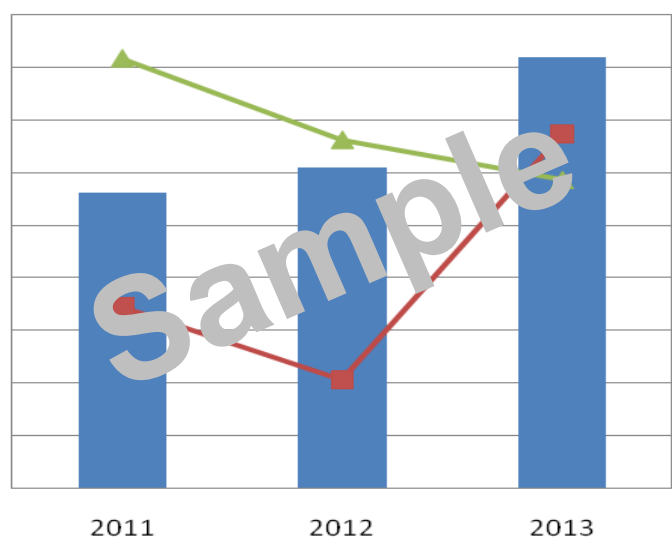
For the industrial, defense and aerospace markets, the company's main products are piezoelectric materials and substrates.

### 4.2.3 FINANCIALS

#### 4.2.3.1 Overall Financials

**FIGURE 8**

**OVERALL FINANCIALS (\$MILLION), 2011-2013**

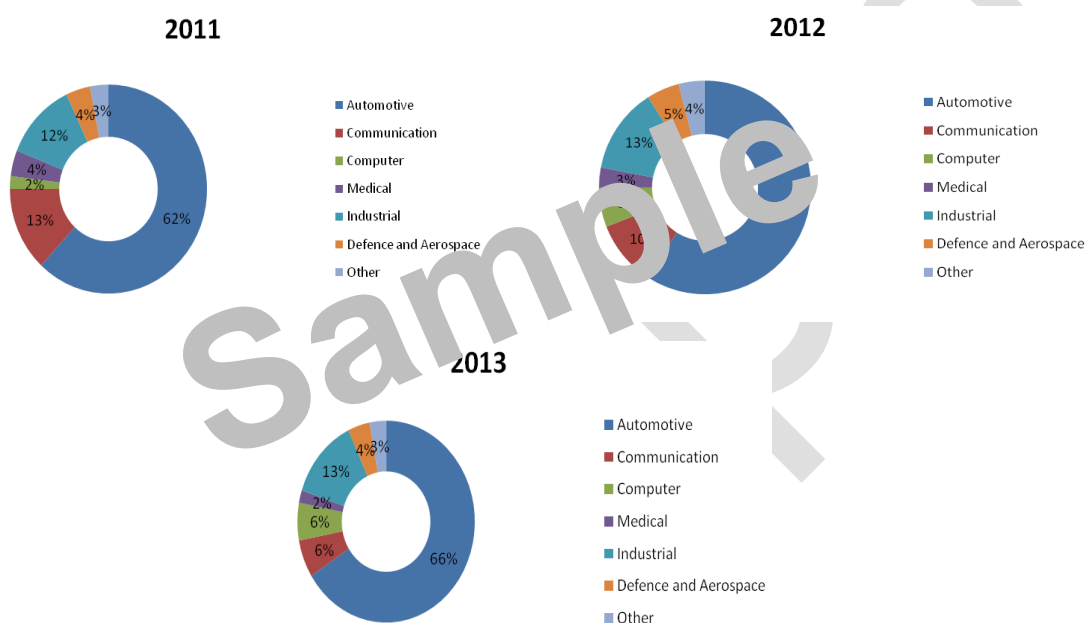


Source: BIS Research

#### 4.2.3.2 Financials By Business Segment

**FIGURE 9**

#### NET REVENUE BY BUSINESS SEGMENTS, 2011-2013

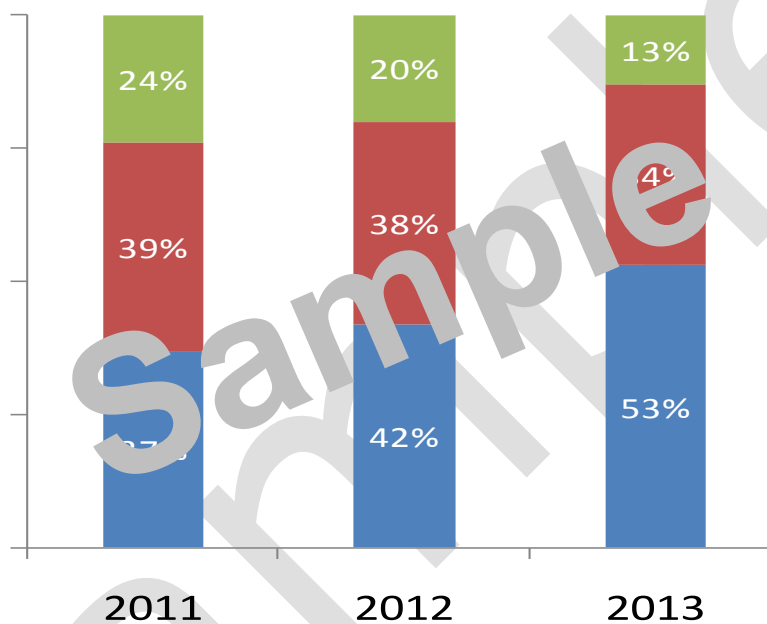


Source: BIS Research

#### 4.2.3.3 Financials By Region

**FIGURE 10**

#### NET REVENUE BY REGION, 2011-2013



Source: BIS Research

#### 4.2.4 KEY DEVELOPMENTS

Date	Strategy	Description
February 2015	Event	CTS Corporation announced that it had been awarded a new production program to supply accelerator pedal modules to a German automobile manufacturer
January 2015	Product Launch	CTS Corporation announced the addition of tactile switches to our product portfolio of DIP switches, mechanical encoders, optical encoders, precision potentiometers, position sensors and rotary switches.

Date	Strategy	Description
May 2014	Product Launch	CTS Corporation through its subsidiary announced new ClearPlex Waveguide Duplexer, delivering performance capable to air cavity with 2x to 4x smaller size for cellular infrastructure
May 2014	Product Development	CTS Corporation through its subsidiary developed new ultra jitter and excellent phase noise oscillators
January 2014	Collaboration	CTS Corporation collaborated with Microsemi to offer ultra-low Jitter solutions at lower cost by combining high performance crystal clock oscillators with ultra-low additive Jitter Fan-out Buffers
May 2013	Product Development	CTS Corporation developed oven controlled crystal oscillators (OCXOs), which used the unique internal heated resonator (IHR) technologies to significantly reduce power consumptions
May 2013	Product Launch	CTS Corporation introduced the ClearPlex Waveguide Ceramic Filter, a revolutionary RF ceramic filter that offered space and cost saving features as well as superior performance
February 2013	Event	CTS Electronic Manufacturing Solutions was awarded a second production program to provide printed circuit board assemblies for a leading global medical orthopedics firm
January 2013	Event	CTS Corporation Automotive products was awarded a second production program to supply brushless motor-driven actuators for active air-grill shutter systems
December 2012	Acquisition	CTS Corporation acquired D&R Technology and expanded its leadership position in automotive sensors

Source: CTS Corporation Website, BIS Research

#### 4.2.5 ANALYST INSIGHT

CTS Corporation is a global leader in the design and manufacturing of electronic components, sensors and actuators. The company experienced a significant increase in sales since 2012

after the acquisition of D&R Technology. This explains the company's strategy of development by acquiring others whenever there is a need.

Sample

## DISCLAIMER

---

BIS Research provides valuable market intelligence to an exclusive group of customers in response to orders. The report is licensed for the customer's internal use only and is subject to restrictions set henceforth. This document and its contents are confidential and may not be further distributed, published or reproduced, in whole or in part, by any medium or in any form for any purpose, without the express written consent of BIS Research. Customer will not disclose the contents of the report, whether directly in any media or indirectly through incorporation in a database, marketing list, report or otherwise, or use or permit the use of Information to generate any statistical or other information that is or will be provided to third parties; or voluntarily produce Information in legal proceedings.

Market reports are based on expectations, estimates and projections as of the date such information is available. Any recommendation contained in this report may not be suitable for all investors or businesses. The market conclusions drawn are necessarily based upon a number of estimates and assumptions that, while considered reasonable by BIS Research as of the date of such statements, are inherently subject to market fluctuations and business, economic and competitive uncertainties and contingencies

For more details regarding permission, please contact us:

**Email: [sales@bisresearch.com](mailto:sales@bisresearch.com)**

**Tel: +1 650 228 0182**