



Global Internet of Things (IoT) in Oil and Gas (O&G) Market- Analysis and Forecast: 2017-2026

(Focus on: IoT solutions such as platforms and analytics, Applications such as Upstream, Midstream and Downstream)

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 © 2017 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

Executive Summary	15
1 Research Scope and Methodology	23
1.1 Scope of the Report	23
1.2 Global IoT in oil and gas Industry Research Methodology	25
1.2.1 Primary Data Sources	26
1.2.2 Secondary Data Sources	27
1.3 Assumptions and Limitations for Market Estimation and Forecasting.....	27
1.3.1 Assumptions	27
1.3.2 Limitations	28
2 Market Dynamics	29
2.1 Market Drivers.....	29
2.1.1 Increasing Operational Efficiency Amidst Declining Oil Prices.....	30
2.1.2 Increasing Cyber-Attacks Leveraging the Information and Communication Technology (ICT) Spending by Oil and Gas Industry	33
2.1.3 Shortage of Skilled Labor	33
2.2 Market Challenges	35
2.2.1 Privacy and Security Concerns	35
2.2.2 Lack of Awareness and IoT Complexities in Operations	36
2.2.3 Deficit of Resources with Technical Expertise	36
2.3 Market Opportunities.....	37
2.3.1 Introduction of Next Generation Sensors, Edge Computing Devices and Software to Oil and Gas Industry.....	37
2.3.2 Growth Opportunity for IoT Analytics Market Players ..	39
3 Competitive Insights	40

3.1	Key Market Strategies and Developments	40
3.1.1	Mergers and Acquisitions	41
3.1.2	Contracts, Collaborations, Partnerships, and Agreements.....	42
3.1.3	Product Launches and Development	46
3.1.4	Awards.....	48
3.2	Market Share Analysis	48
4	Industry Attractiveness.....	50
5	Industry Analysis	58
5.1	Regulatory Bodies/Acts.....	58
5.2	Associations/Consortiums/Alliances	60
5.3	Patent Analysis.....	63
5.4	Supply and Value Chain Analysis	65
6	Global IoT in Oil and Gas, Analysis & Forecast (2016-2026)	69
6.1	Assumptions and Limitations for Analysis and Forecast of the Global IoT in Oil and Gas	69
6.2	Market Overview	70
7	Global IoT in oil and gas Industry by Solutions	75
7.1	Platforms.....	78
7.1.1	IoT Platform by Product Type	78
7.1.2	IoT Platform by Application Type	80
7.1.3	IoT Platform by Region	81
7.2	Analytics.....	82
7.2.1	IoT Analytics by Product Type.....	83
7.2.2	IoT Analytics by Application Type	84
7.2.3	IoT Analytics by Region	85
8	Global IoT in oil and gas Industry by Application	87
8.1	Upstream.....	88
8.1.1	IoT in Upstream by Product Type.....	89

8.1.2	IoT in Upstream by Platform	90
8.1.3	IoT in Upstream by Analytics Type	92
8.1.4	IoT in Upstream by Region	93
8.2	Midstream	94
8.2.1	IoT in Midstream by Platform Type	95
8.2.2	IoT in Midstream by Analytics Type	96
8.2.3	IoT in Midstream by Region	97
8.3	Downstream	98
8.3.1	IoT in Downstream by Platform Type	99
8.3.2	IoT in Downstream by Analytics Type	100
8.3.3	IoT in Downstream by Region	101
9	Global IoT in oil and gas Industry by Region	103
9.1	North America	105
9.1.1	IoT in North America by Product Type	105
9.1.2	IoT in North America by Application Type	106
9.2	Europe	107
9.2.1	IoT in Europe by Product Type	107
9.2.2	IoT in Europe by Application Type	108
9.3	Asia Pacific	108
9.3.1	IoT in Asia Pacific by Product Type	109
9.3.2	IoT in Asia Pacific by Application Type	109
9.4	Rest of the World (RoW)	110
9.4.1	IoT in RoW by Product Type	111
9.4.2	IoT in RoW by Application Type	112
10	Company Profiles	113
10.1	ABB Ltd	113
10.1.1	Overview	113
10.1.2	Financials	114
10.1.2.1	Financial Summary	115
10.1.3	SWOT Analysis	116

10.2	AGT International	117
10.2.1	Overview	117
10.3	C3 IoT.....	118
10.3.1	Overview	118
10.3.2	Corporate Summary	119
10.3.3	SWOT Analysis	119
10.4	Carriots S.L.....	120
10.4.1	Company Overview	120
10.5	Cisco Systems.....	121
10.5.1	Overview	121
10.5.2	Financials.....	121
10.5.2.1	Financial Summary	123
10.5.3	SWOT Analysis	124
10.6	Davra Networks.....	125
10.6.1	Company Overview	125
10.7	Eurotech SpA	126
10.7.1	Overview.....	126
10.7.2	Financials.....	127
10.7.2.1	Financial summary.....	129
10.7.3	SWOT Analysis	129
10.8	General Electric Company	130
10.8.1	Company Overview	130
10.8.2	Financials.....	130
10.8.2.1	Financial Summary	132
10.8.3	SWOT Analysis	133
10.9	Honeywell International Inc.....	134
10.9.1	Company Overview	134
10.9.2	Financials.....	134
10.9.2.1	Financial Summary	136
10.9.3	SWOT Analysis	137
10.10	International Business Machines Corporation	138

10.10.1 Overview.....	138
10.10.2 Financials.....	138
10.10.2.1 Financial Summary.....	140
10.10.3 SWOT Analysis.....	141
10.11 Intel Corporation.....	142
10.11.1 Overview.....	142
10.11.2 Financials.....	142
10.11.2.1 Financial Summary.....	144
10.11.3 SWOT Analysis.....	145
10.12 Kore Telematics.....	146
10.12.1 Overview.....	146
10.13 Microsoft Corporation.....	147
10.13.1 Overview.....	147
10.13.2 Financials.....	147
10.13.2.1 Financial Summary.....	149
10.13.3 SWOT Analysis.....	150
10.14 Numerex Corp.	151
10.14.1 Overview.....	151
10.14.2 Financials.....	151
10.14.2.1 Financial summary.....	153
10.14.3 SWOT Analysis.....	154
10.15 Parametric Technology (PTC).....	155
10.15.1 Overview.....	155
10.15.2 Financials.....	155
10.15.2.1 Financial Summary.....	157
10.15.3 SWOT Analysis.....	158
10.16 Pertex Management and Technology Consulting LLC.....	159
10.16.1 Overview.....	159
10.16.2 Summary	159
10.17 SAP SE.....	160
10.17.1 Overview.....	160

10.17.2 Financials	160
10.17.2.1 Financial Summary	162
10.17.3 SWOT Analysis	163
10.18 Schneider Electric	164
10.18.1 Overview	164
10.18.2 Financials	164
10.18.2.1 Financial Summary	166
10.18.3 SWOT Analysis	167
10.19 Siemens AG	168
10.19.1 Overview	168
10.19.2 Financials	169
10.19.2.1 Financial Summary	170
10.19.3 SWOT Analysis	171
10.20 Telit	172
10.20.1 Overview	172
10.20.2 Financials	173
10.20.2.1 Financial summary	175
10.20.3 SWOT Analysis	176
10.21 Wind River	177
10.21.1 Company Overview	177

List of Tables

Table 3.1 Mergers and Acquisitions	41
Table 3.2 Key Contracts, Collaborations, Partnerships, Agreements and Joint Ventures	43
Table 3.3 Key Product Launches	46
Table 3.4 Awards Received by Various Organizations	48
Table 4.1 Analyzing Threat from New Entrants in Global IoT in Oil and Gas Industry	51
Table 4.2 Analyzing Threat from Substitute Products or Services in Global IoT in Oil and Gas Industry	53
Table 4.3 Analyzing Bargaining Power of Suppliers in Global IoT in Oil and Gas Industry	54
Table 4.4 Analyzing Bargaining Power of Buyers in Global IoT in Oil and Gas Industry	55
Table 4.5 Analyzing Intensity of Competitive Rivalry in Global IoT in Oil and Gas Industry	56
Table 5.1 Few Regulatory Bodies/Acts	58
Table 5.2 Privacy Laws in Countries	59
Table 5.3 Examples of Some Associations/Consortiums	60
Table 5.4 Examples of Some Recent Patents	63
Table 5.5 IoT Enabled Value Creation in Oil and Gas Value Chain	67
Table 7.1 Global IoT in Oil and Gas Market Value, by Product Type, 2016-2023	76
Table 7.2 Global IoT Platform in Oil and Gas Market Value, by Product Type, 2016-2026	79
Table 7.3 Global IoT Platforms in Oil and Gas Market Value, by Application Type, 2016-2026	80
Table 7.4 Global IoT Platforms in Oil and Gas Market Value, by Region, 2016-2026	81
Table 7.5 Global IoT Analytics in Oil and Gas Market Value, by Product Type, 2016-2026	83
Table 7.6 Global IoT Analytics in Oil and Gas Market Value, by Application Type, 2016-2026	85
Table 7.7 Global IoT Analytics in Oil and Gas Market Value, by Region, 2016-2026	86
Table 8.1 Global IoT in Oil and Gas Market by Application, 2016-2026	87
Table 8.2 Global IoT in Upstream Oil and Gas Market Value, by Product Type, 2016-2023	89
Table 8.3 Global IoT in Upstream Oil and Gas Market Value, by Platform, 2016-2026	91
Table 8.4 Global IoT in Upstream Oil and Gas Market Value, by Analytics, 2016-2026	92
Table 8.5 Global IoT in Upstream Oil and Gas Market Value, by Region, 2016-2026	93
Table 8.6 Global IoT in Midstream Oil and Gas Market Value, by Product Type, 2016-2026	95
Table 8.7 Global IoT in Midstream Oil and Gas Market Value, by Platforms, 2016-2026	95
Table 8.8 Global IoT in Midstream Oil and Gas Market Value, by Analytics, 2016-2026	96
Table 8.9 Global IoT in Midstream Oil and Gas Market Value, by Region, 2016-2026	97
Table 8.10 Global IoT in Downstream Oil and Gas Market Value, by Product, 2016-2026	99
Table 8.11 Global IoT in Downstream Oil and Gas Market Value, by Platform, 2016-2026	99

Table 8.12 Global IoT in Downstream Oil and Gas Market Value, by Analytics, 2016-2026	100
Table 8.13 Global IoT in Downstream Oil and Gas Market Value, by Region, 2016-2026	101
Table 9.1 Global IoT in Oil and Gas Market Value, by Region, 2016-2026	104
Table 9.2 North America IoT in Oil and Gas Industry Value, by Product Type: 2016-2026	105
Table 9.3 North America IoT in Oil and Gas Industry Value, by Application Type: 2016-2026	106
Table 9.4 Europe IoT in Oil and Gas Industry Value, by Product Type: 2016-2026	107
Table 9.5 Europe IoT in Oil and Gas Industry Value, by Application Type: 2016-2026	108
Table 9.6 Asia Pacific IoT in Oil and Gas Industry Value, by Product Type: 2016-2026	109
Table 9.7 Asia Pacific IoT in Oil and Gas Industry Value, by Application Type: 2016-2026	110
Table 9.8 RoW IoT in Oil and Gas Industry Value, by Product Type: 2016-2026	111
Table 9.9 RoW IoT in Oil and Gas Industry Value, by Application Type: 2016-2026	112

List of Figures

Figure 1 Top Drivers Attracting IoT Investments	16
Figure 2 Global IoT in Oil and Gas Market Size Snapshot, 2016 & 2023	17
Figure 3 Market Share by Product Type, 2016-2026	18
Figure 4 Global IoT in Oil and Gas Market by Application Type Snapshot	20
Figure 5 Global IoT in Oil and Gas Market Snapshot by Geography, 2016	21
Figure 1.1 Global IoT in Oil and Gas Industry Scope	23
Figure 1.2 Research Overview	24
Figure 1.3 Top Down and Bottom up Approach for Market Estimation	26
Figure 2.1 Global IoT in Oil and Gas: Market Dynamics	29
Figure 2.2 Impact Analysis of Market Drivers for IoT in Oil and Gas Market	30
Figure 2.3 Global Crude Oil Price Trend, Jan 2014-June 2016	30
Figure 2.4 Natural Gas Price Trend Analysis Across Different Geographies, Jan 2014-June 2016	31
Figure 2.5 Various Sectors Achieving Operational Efficiency with the Use of IoT Products	32
Figure 2.6 Workforce of Oil and Gas Industry in Numbers Snapshot	34
Figure 2.7 Impact Analysis of Market Challenges for IoT in Oil and Gas Market	35
Figure 2.8 Impact Analysis of Market Opportunities for IoT in Oil and Gas Market	37
Figure 2.9 Applications of Wireless Sensor Networks across Oil and Gas Industry	38
Figure 3.1 Percentage Share of Strategies Adopted by the Market Players, 2014-2017	40
Figure 3.2 Market Share Analysis of Major Companies in IoT for Oil and Gas Industry, by Percentage, 2016	49
Figure 4.1 Porter's Five Forces Analysis of Global IoT in Oil and Gas Industry	50
Figure 5.1 Certain Examples of Regulatory Laws for Oil and Gas Industry	60
Figure 5.2 Oil and Gas Supply Chain	65
Figure 5.3 IoT Supply Chain	65
Figure 5.4 Positive Impact by IoT Usage in Oil and Gas Industry	67
Figure 6.1 Certain Major Factors Affecting Profitability of Oil and Gas Industry	70
Figure 6.2 Examples of Critical Requirements of Oil and Gas Industry	71
Figure 6.3 Potential Digital Technologies in which Oil and Gas Industry Plans to Invest	72
Figure 6.4 Drivers Likely to Increase Investment for IoT Solutions, by Percentage Share, 2016	73
Figure 6.5 Global IoT in Oil and Gas Industry Classification	74
Figure 7.1 Major Drivers of IoT Adoption by Oil and Gas Industry	75
Figure 7.2 IoT Solutions to Oil and Gas Industry	76
Figure 7.3 Global IoT in Oil and Gas Market Value, by Product Type, 2016-2023	77

Figure 7.4 Global IoT Platform in Oil and Gas Market Value, by Product Type, 2016-2026	79
Figure 7.5 Global IoT Analytics in Oil and Gas Market Value, by Product Type, 2016-2026	84
Figure 8.1 IoT Solutions Across Applications of Oil and Gas Industry, by Percentage Share, 2016	87
Figure 8.2 Global IoT Platforms in Oil and Gas Market Value, by Application Type, 2016-2026	88
Figure 8.3 Opportunities in Upstream phase for IoT Solutions	89
Figure 8.4 Global IoT in Upstream Oil and Gas Market Value, by Product Type, 2016-2023	90
Figure 8.5 Global IoT in Upstream Oil and Gas Market Value, by Region, 2016-2026	93
Figure 8.6 Global IoT in Midstream Oil and Gas Market Value, by Region, 2016-2026	97
Figure 8.7 Global IoT in Downstream Oil and Gas Market Value, by Region, 2016-2026	102
Figure 9.1 Global IoT in Oil and Gas Market and Growth Snapshot	103
Figure 9.2 Global IoT in Oil and Gas Market Value, by Region, 2016-2026	104
Figure 10.1 ABB Ltd.: Overall Financials (2014-2016)	114
Figure 10.2 ABB Ltd.: Net Revenue by Region (2014-2016)	114
Figure 10.3 ABB Ltd.: Net Revenue by Business Segment (2014-2016)	115
Figure 10.4 ABB Ltd.: SWOT Analysis	116
Figure 10.5 C3IoT: SWOT Analysis	119
Figure 10.6 Cisco Systems: Overall Financials (2014-2016)	122
Figure 10.7 Cisco Systems: Net Revenue by Business Segment (2014-2016)	122
Figure 10.8 Cisco Systems: Net Revenue by Region (2014-2016)	123
Figure 10.9 Cisco Systems: SWOT Analysis	124
Figure 10.10 Eurotech: Overall Financials (2014-2016)	127
Figure 10.11 Eurotech: Net Revenue by Business Segment (2014-2016)	128
Figure 10.12 Eurotech: Net Revenue by Region (2014-2016)	128
Figure 10.13 Eurotech: SWOT Analysis	129
Figure 10.14 General Electric Company: Overall Financials (2014-2016)	131
Figure 10.15 General Electric Company: Net Revenue by Business Segment, 2014-2016	131
Figure 10.16 General Electric Company: Net Revenue by Different Geographies	132
Figure 10.17 General Electric: SWOT Analysis	133
Figure 10.18 Honeywell International Inc. – Overall Financials, 2014-2016	135
Figure 10.19 Honeywell International Inc. – Net Revenue by Business Segment, 2014-2016	135
Figure 10.20 Honeywell International Inc. – Net Revenue by Different Geographies, 2014-2016	136
Figure 10.21 Honeywell International Inc. – SWOT Analysis	137
Figure 10.22 International Business Machines Corporation: Overall Financials (2014-2016)	139
Figure 10.23 International Business Machines Corporation: Net Revenue, (\$Billion), by Business Segment (2015-2016)	139

Figure 10.24 International Business Machines Corporation: Net Revenue, by Region (2014-2016)	140
Figure 10.25 International Business Machines Corporation: SWOT Analysis	141
Figure 10.26 Intel Corporation: Overall Financials (2014–2016)	143
Figure 10.27 Intel Corporation: Net Revenue by Business Segment (2014-2016)	143
Figure 10.28 Intel Corporation: Net Revenue by Region (2014-2016)	144
Figure 10.29 Intel Corporation: SWOT Analysis	145
Figure 10.30 Microsoft Corporation: Overall Financials (2014–2016)	148
Figure 10.31 Microsoft Corporation: Net Revenue by Business Segment (2014-2016)	148
Figure 10.32 Microsoft Corporation: Net Revenue by Region (2014-2016)	149
Figure 10.33 Microsoft Corporation: SWOT Analysis	150
Figure 10.34 Numerex: Overall Financials (2014-2016)	152
Figure 10.35 Numerex: Net Revenue by Business Segment (2014-2016)	152
Figure 10.36 Numerex: Net Revenue by Region (2014-2016)	153
Figure 10.37 Numerex: SWOT Analysis	154
Figure 10.38 PTC: Overall Financials (2014–2016)	156
Figure 10.39 PTC: Net Revenue by Business Segment (2014-2016)	156
Figure 10.40 PTC: Net Revenue by Region (2014-2016)	157
Figure 10.41 PTC: SWOT Analysis	158
Figure 10.42 SAP SE: Overall Financials (2014–2016)	161
Figure 10.43 SAP SE: Net Revenue by Business Segment (2014-2016)	161
Figure 10.44 SAP SE: Net Revenue by Region (2014-2016)	162
Figure 10.45 SAP SE: SWOT Analysis	163
Figure 10.46 Schneider Electric: Overall Financials (2014–2016)	165
Figure 10.47 Schneider Electric: Net Revenue by Region (2014-2016)	165
Figure 10.48 Schneider Electric: Net Revenue by Business Segment (2014-2016)	166
Figure 10.49 Schneider Electric: SWOT Analysis	167
Figure 10.50 Siemens AG: Overall Financials (2014–2016)	169
Figure 10.51 Siemens AG: Net Revenue by Region (2014-2016)	169
Figure 10.52 Siemens AG: Net Revenue by Business Segment (2014-2016)	170
Figure 10.53 Siemens AG: SWOT Analysis	171
Figure 10.54 Telit: Overall Financials (2014-2016)	173
Figure 10.55 Telit: Net Revenue by Business Segment (2014-2016)	174
Figure 10.56 Telit: Net Revenue by Region (2014-2016)	174
Figure 10.57 Telit: SWOT Analysis	176

Executive Summary

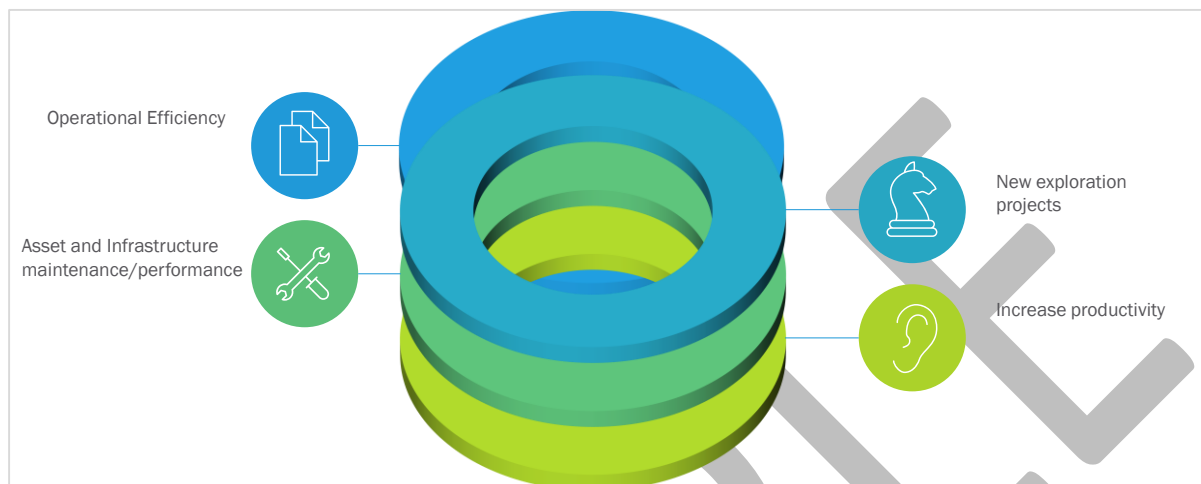
Owing to low rate of demand of crude oil globally as compared to supply rate, prices of crude oil have considerably declined, by more than XX% since 2014. Several factors such as growth in number of electric vehicles, increased production of shale oil in the U.S., low rate of demand in China, and the prospect of increased supply from Iran after lifting of the global sanctions, among others indicates that the prices of crude oil is not expected to gain momentum in the same manner over the next decade. Due to these factors, revenue of the global top five major oil and gas companies decreased by approximately XX% on an average in 2016 as compared to 2015. This has forced the oil and gas industry (O&G industry) to maximize their operational efficiency, productivity, and improve asset portfolio to remain competitive in the market. In response to declining crude oil prices and increase operational efficiency, it was witnessed that companies reduced capital investment by approximately XX% on an average in 2016. This has led to disastrous consequences such as filing of bankruptcies by oil and gas companies in recent years.

These above mentioned challenges has led to widespread acceptance of Internet of Things (IoT) solutions by entire value chain of oil and gas industry, in order to tackle prevailing tight margin business environment. Oil and gas companies have been using IT infrastructure systems such as Supervisory Control and Data Acquisition (SCADA) from past many years. In addition to that, number of sensors are also being used for various purposes in oil and gas industry. Moreover, use of new advanced drilling technologies such as hydraulic fracturing has increased production but has also increased complexities related to operations. This has created silos of data which needs to be handled effectively and analytically for improved communication and actionable insights in order to achieve maximum efficiency. Thus, IoT solutions such as platforms namely Predix and SAP HANA among others coupled with analytics have gained significant traction in the oil and gas industry.

It has been witnessed that owing to the benefits of the IoT solutions such as increased rig time and high production of oil among others, many oil and gas industries have started investing in IoT products, solutions and services. Oil and gas companies such as British Petroleum (BP) and Shell among others have reported in their annual reports that they plan to invest in big data and automation in the upcoming years. Companies have recognized the importance of analytics and it will be a major opportunity for analytics solution providers to tap the industry. Analytics software is anticipated to be a major solution in oil and gas industry wherein investors are expected to actively invest in the upcoming years.

Following figure depicts the key drivers which will drive the investment in IoT solutions for oil and gas industry during the forecast period:

Figure 1
Top Drivers Attracting IoT Investments



Source: Secondary Research Analysis, BIS Research Analysis

Major Trends Driving the Market Growth

Currently, in terms of evolution, use of IoT solutions in O&G industry is on a nascent stage. IoT adoption in oil and gas industry is expected to grow mainly because of the focus on achieving operational excellency, owing to low crude oil price environment. Moreover, increasing cyber-attacks over the past few years have raised concerns over the data security which can be tackled by using security solutions. In addition to that, with approximately half of the global workforce retiring from oil and gas industry in next 3-5 years, their absence of experience and domain knowledge will create a huge gap for information in order to operate efficiently. This can further drive the demand for IoT solutions in order to fill the missing information gap.

Factors Slowing Down the Growth of Global IoT in Oil and Gas Market

Increased use of IoT solutions will drive the growth of software, IT infrastructure and hardware equipment in oil and gas industry. This has raised concerns over the data privacy and security as there has been an increase in the number of cyber-attacks recently. It has been witnessed that approximately XX% of the oil and gas companies had faced at least one successful cyber-attack in 2015. The oil and gas sector is the backbone of the economy for any country, and with increasing cyber-attack threats being reported, oil and gas companies may not be too willing to invest in IoT solutions owing to data security concerns. Moreover, lack of technical expertise, awareness, and knowledge in relation to IoT solutions are the major barriers for IoT solutions to gain momentum in the oil and gas industry. Different definitions and solutions of IoT across the globe has made it more difficult for oil and gas companies to select a right solution for addressing their needs.

Untapped Opportunities of the Global IoT in Oil and Gas Market

The above mentioned barriers are expected to provide a viable opportunity to majority of the IoT solutions and service providers, to consult and gain benefits in terms of profitability from oil and gas industry. Moreover, next generation IoT solutions such as wireless networks, edge computing devices and platforms among others are expected to provide all- in- one solution which will be more cost effective and easy to use. Oil and gas companies are expected to leverage on these technologies during the forecast period to reap their benefits over the traditional IoT solutions.

Role of Regulatory Bodies and Consortia

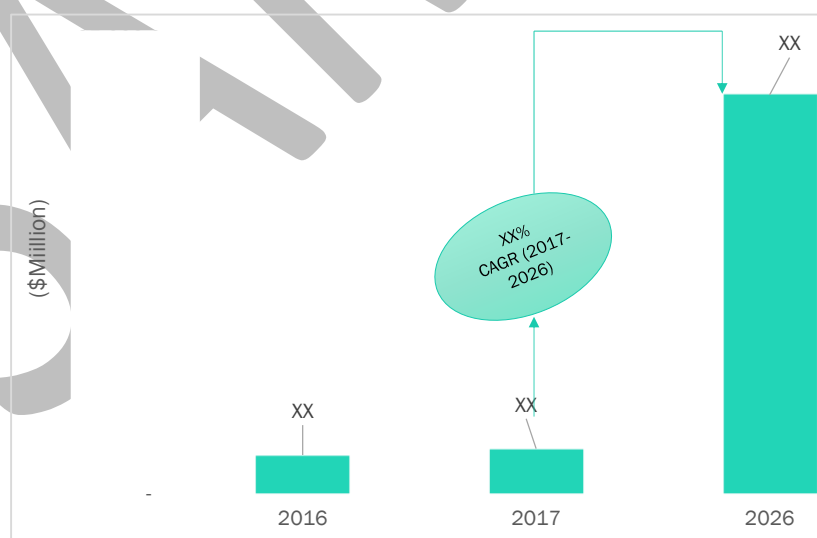
It has been witnessed that there are no certain regulatory bodies and acts which regulate the internet of things solutions and services. However, many countries such as Canada and Australia among others have formulated privacy laws which are applicable to the data generated by IoT solutions and services. Nevertheless, it has been anticipated that in future there may be certain laws regulating the free flow of data and authentication among others. These anticipated laws will also be applicable to the IoT solutions in oil and gas industry.

Oil and gas industry has specific regulations pertaining to its domain. Laws related to human safety, equipment failure monitoring and pipeline monitoring among others coupled with pressure to improve operations is expected to drive the market for IoT solutions.

Global IoT in Oil and Gas Market Size

The following figure exhibits the global IoT in oil and gas market size snapshot:

Figure 2
Global IoT in Oil and Gas Market Size Snapshot, 2016 & 2023



Source: BIS Research Analysis

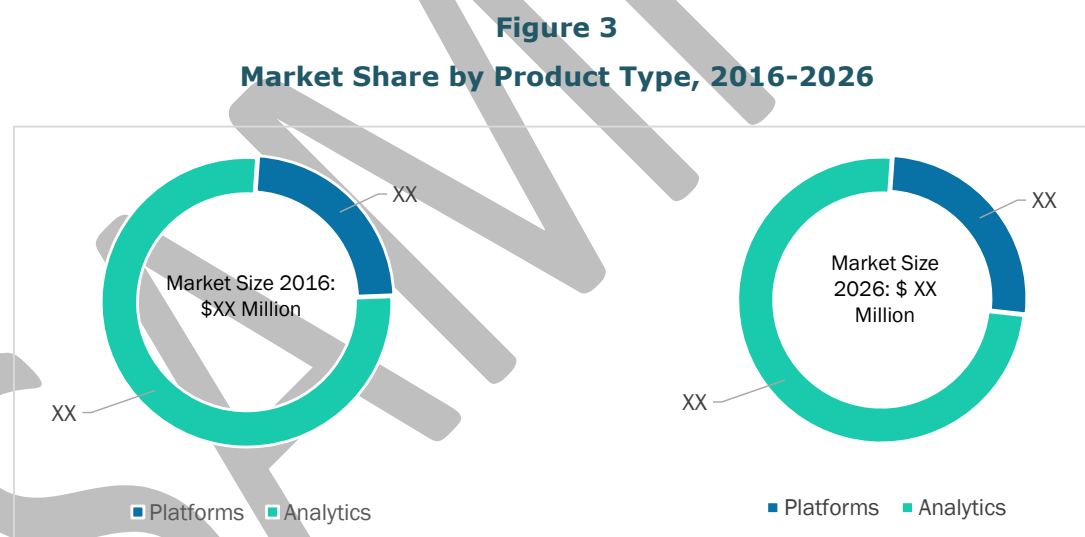
The global IoT in oil and gas market is expected to reach a market size of \$XX billion by 2026. Urgent requirements to meet operational excellency, maintaining aging asset portfolio, and increasing use of sensors among others are some of the key factors which act as major drivers for the growth of this market.

Analytics is expected to drive the market for IoT solutions in oil and gas industry as huge amounts of data generated from various sensors and other devices will be used to analyze to get actionable insights. These insights will then be implemented to make different business processes more efficient.

Global IoT in Oil and Gas Market Size by Product Type and Application

Tons of data had been generated by oil and gas industry from past 1980s. This data needs to be stored and analysed effectively to get meaningful insights. Due to need to improve and make business process reliable, oil and gas companies are leveraging on IoT solutions such as platforms and analytics among others. Platforms such as Predix and Thingworx among others provide additional features such as application enablement, device management and analytics among others to oil and gas industry customers which help them to scale up their business. On the contrary, analytics help in predictive maintenance and analysis of data generated.

The following figure compares the market share by product type, (2016 to 2026):



Source: BIS Research Analysis

Platform segment accounted for a share of approximately XX% in 2016. It was valued at \$XX million in 2016 and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period i.e. 2017-2026. Major factors contributing to the growth of platforms segment globally are as follows:-

- Need to store data and analyze it by developing applications
- Increasing use of sensors and devices will drive the need for device management

- Intrusion detection in any network or connectivity and
- Security needs to protect data among others

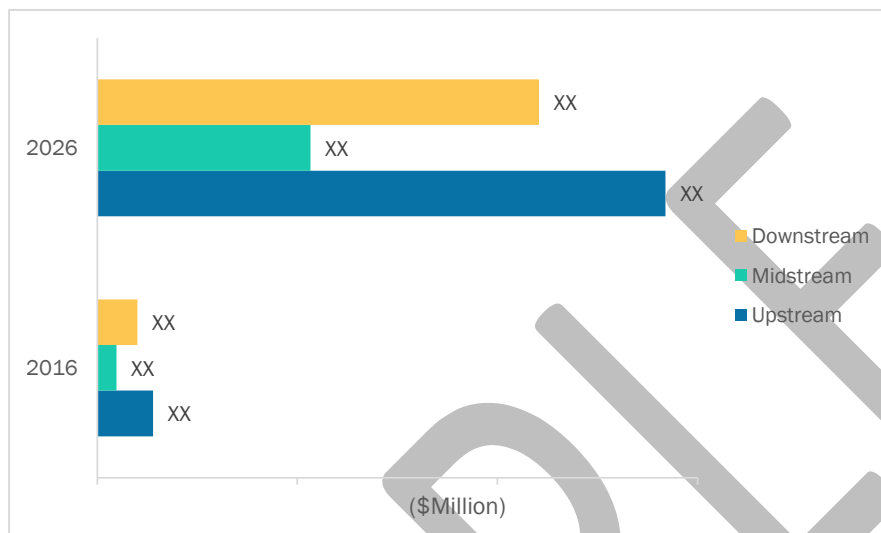
Analytics accounted for a major share of approximately XX% in 2016. It was valued at \$XX billion in 2016 and is expected to reach \$XX billion in 2026 at a CAGR of XX% during forecast period 2017-2026. Major factors driving the need for analytics are as follows:-

- Oil and gas industry is an asset intensive industry. More than half of the infrastructure is aging. Therefore, the need to maintain the assets is of prime importance.
- Use of new advanced technologies such as 3D and 4D seismic technologies among others for exploration
- Increased use of sensors will generate huge amount of data which needs to be organized and maintained to gain better insights. For instance, it has been witnessed that a LNG train generates approximately 30 megabytes of data per minute.
- Realization of tangible asset benefits among others

It has been witnessed that upstream industry loses billions of dollars per year due to lack of streamlined data and spending time in search of data. Owing to boom in shale oil production in the U.S., midstream companies have witnessed an increase in the complexity of their business model by transporting various volumes of grades of oil and gas to end users. Moreover, oil thefts and fuel leakages result in heavy losses to midstream companies. Margins of the downstream business have gone higher since the downfall of crude oil prices, but at the same time, it has increased competition between refineries for low wholesale refined product prices. To avoid such situations, there are various types of IoT solutions such as integrated device and asset-management analytics among others available which can be leveraged across various parts of oil and gas supply chain such as upstream, midstream and downstream.

The following figure depicts the global IoT in oil and gas market by application type (2016-2026):

Figure 4
Global IoT in Oil and Gas Market by Application Type Snapshot



Source: BIS Research Analysis

Upstream accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016 and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. Major factors contributing to the growth of IoT solutions in upstream phase are as follows:-

- Use of advanced technologies during exploration and drilling phase such as hydraulic manufacturing and 3D seismic technologies among others
- Boom in the U.S. for shale oil production
- Need to maintain assets and aging infrastructure
- Need to improve operational efficiency and bring the production cost down to stay competitive in the low crude oil price environment
- Reduction of capital expenditures on new projects for exploration and drilling
- And increase rig uptime among others

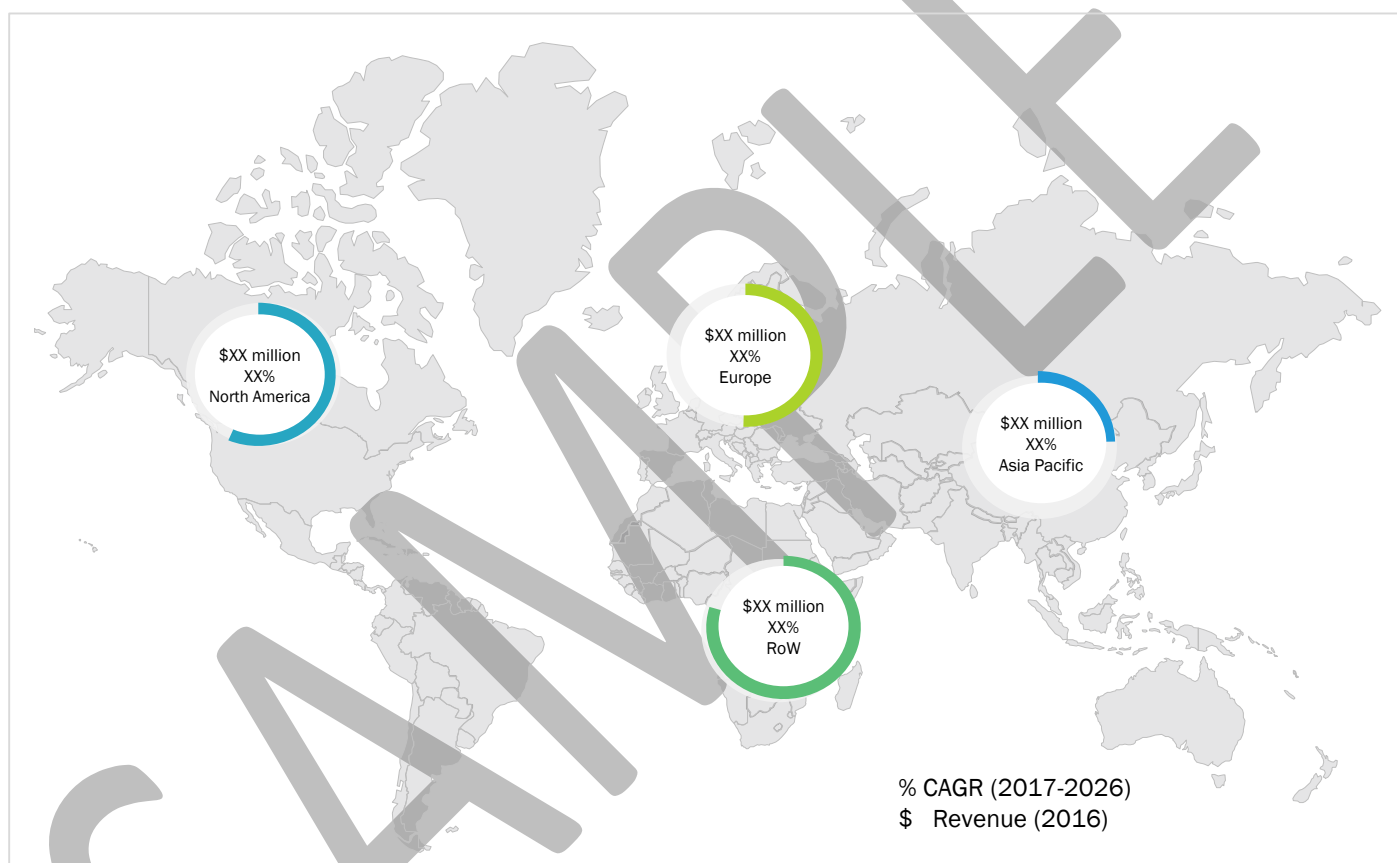
Global IoT in oil and gas market size by geography

Oil and gas companies are working across all major regions. However, it has been witnessed that majority of the upstream companies are focused mainly in North America, Middle East, Latin America, Russia and RoW region. Midstream companies and downstream companies are mainly focused in European region and Asia Pacific. In 2016, North America dominated the IoT in oil and gas market and accounted for approximately XX% of the market share.

Adoption of IoT solutions by oil and gas industry is expected to grow globally mainly attributable to low crude oil price environment which will drive the need to increase operational efficiency across all the phases of oil and gas value chain.

Following figure exhibits global IoT in oil and gas market snapshot by geography:

Figure 5
Global IoT in Oil and Gas Market Snapshot by Geography, 2016



Source: BIS Research Analysis

North America was valued at \$XX million in 2016 and is expected to reach \$XX million by 2026 at a CAGR of XX% during the forecast period 2017-2026. Major factors contributing to the growth of IoT solutions in North America are as follows -:

- Growth of unconventional energy sources such as shale oil and tight oil among others
- Increasing use of electric vehicles
- Recent announcement for expansion of pipelines and offshore shipping to transport oil which will drive the midstream market in the U.S.

- Majority of the IoT solution providers and global O&G companies located in North American region
- High level of awareness, knowledge and technical advancements in the region among others

Competitive Landscape

Key Development Strategy

The competitive landscape for the IoT in oil and gas market exhibits an inclination towards organizations adopting strategies such as mergers, acquisitions, partnerships and product launches, among others.

Contracts, collaborations, partnerships, agreements and joint ventures were the key business development strategies, and accounted for XX % share from 2014 to 2017 among all developmental strategies in order to grow and expand business. The second major strategy adopted by the significant market players was product launches which accounted for XX%. Mergers and acquisitions strategy accounted for XX% of overall developments. Organizations entered into this strategy to gain further access in oil and gas industry market and enhance their product portfolio.

Major organizations working as IoT solution providers in oil and gas space are GE digital, SAP SE, Cisco, IBM, Microsoft, and OSIsoft, among others. Currently, market penetration of IoT solutions is very low and there has been no major IoT player which has been able to make its way in oil and gas industry. Few players such as GE and SAP SE among others have been able to build partnership with oil and gas companies for their IoT offerings. However, several other public and private players are coming up with next generation IoT solutions for oil and industry which is expected to revolutionize the oil and gas industry. For instance, recently launched products such as digital core platforms and edge computing devices among others are expected to gain traction in oil and gas industry. SAP accounts for approximately XX% of the major market share for all types of services provided to oil and gas industry. Based on its experience, SAP is currently developing a new platform or solution specifically for oil and gas industry which is believed to revolutionize the use of IoT solutions in O&G market. OSIsoft has a number of operational databases for oil and gas industry and the company is currently in talks with PTC to collaborate to expand their offering. With numerous partnerships, collaborations and product launches, it will be an interesting horse race to witness among the IoT solution providers in next 3-5 years.

1 Research Scope and Methodology

1.1 Scope of the Report

The report constitutes of an in-depth study of the global IoT in oil and gas industry, including a thorough analysis of the different products and geographical perspectives. The study also presents a detailed analysis of the push and pull forces of the market along with analysis and forecast for market size over the forecast period, 2017 to 2026.

The key elements considered for the study:

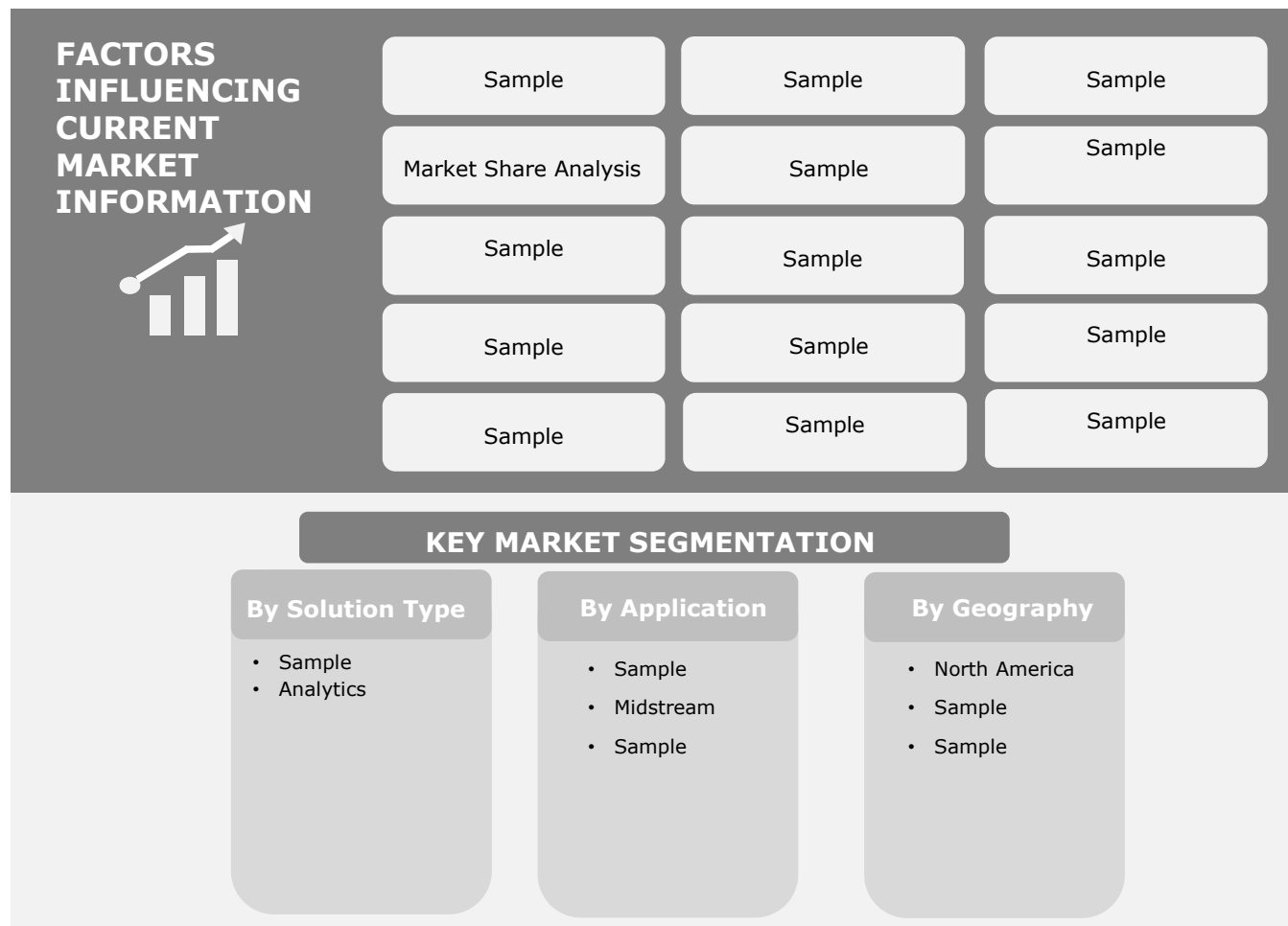
Figure 1.1
Global IoT in Oil and Gas Industry Scope



Source: BIS Research Analysis

The scope of this report is related to a detailed study of the value chain associated with global IoT in oil and gas industry. The market has been identified and segmented into solutions type, applications and geography. The market dynamics chapter discusses various major drivers, restraints and opportunities faced by market players in this field. This study is designed to analyze and estimate the performance as well as demand of IoT solutions in oil and gas industry at the global level.

Figure 1.2
Research Overview



Source: BIS Research Analysis

An exhaustive competitive insights chapter is also included in this study in order to provide a thorough analysis about the competitive status of the current IoT in oil and gas industry. The research provides an exhaustive analysis of key developmental strategies adopted by companies globally. The research covers major products and solutions such as platforms and analytics, applications of IoT in various segments of oil and gas value chain; comprehensive analysis and statistically derived forecast for the solutions are included in this study.

In terms of geography, the IoT in oil and gas industry has been segmented into four major geographical regions: North America, Europe, Asia Pacific and Rest of the World (RoW). The study encompasses the emerging economies on the path of development and regional opportunities in the forthcoming years. In addition to this, the research also includes the other regional factors that will influence the growth or decline of the market in these regions.

Market revenue (\$million) for each of these products has been provided in the research for the period of 2016 to 2026 in terms of \$million, with CAGR for the forecast period 2017 to 2026, taking into account 2016 as the base year. This represents several aspects such as the political, economic, environmental, legal factors as well as growth of economy and reimbursement in various national markets.

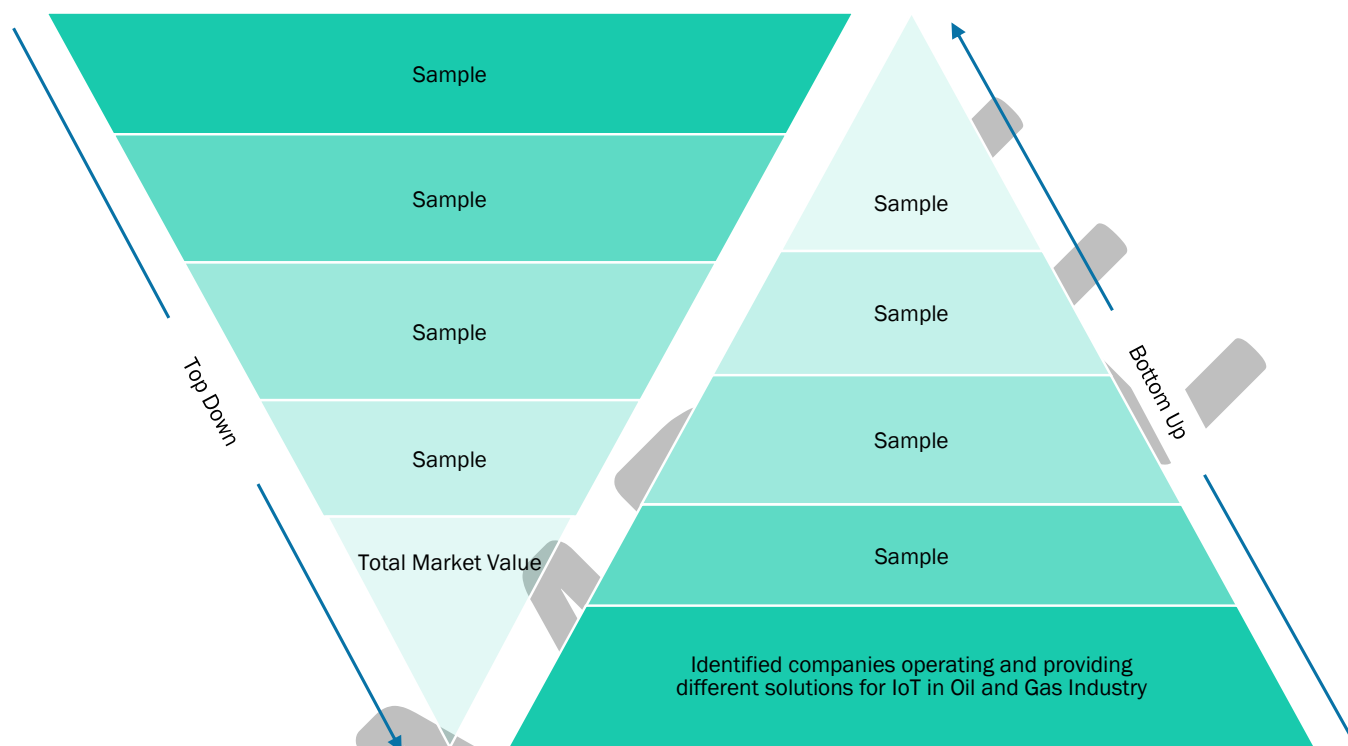
Moreover, the study provides company profiles of leading players operating in the global biofuel market. Furthermore, thorough market share analysis of the key players operating in the biofuel industry is provided which includes organizations such as Cisco, SAP SE, GE, Microsoft and IBM, among others.

1.2 Global IoT in oil and gas Industry Research Methodology

The purpose of this study on global IoT in oil and gas industry was to quantify the market size, provide information on the characteristics of market and determination of current and future market prospects of IoT and its applications across the globe with respect to oil and gas industry. The scope of this study includes few major types of solutions related to IoT such as platforms and analytics, by applications such as upstream, midstream and downstream. The information obtained in the study was gained through extensive secondary research, third party databases, and primary research.

The following figure exhibits the top down and bottom up approach for the global IoT in oil and gas industry estimation:

Figure 1.3
Top Down and Bottom up Approach for Market Estimation



Source: BIS Research Analysis

1.2.1 Primary Data Sources

The primary sources involve various industry experts from the IoT industry coupled with experts from oil and gas industry. All resources have been interviewed in order to obtain and verify both qualitative and quantitative aspects of this research study.

The key data points taken from primary sources include:

- Validation and triangulation of all the numbers and graphs
- Validation of reports segmentation and key qualitative findings
- Understanding the competitive landscape
- Current and proposed production values of a particular product by market players
- Validation of the numbers related to IoT solution in oil and gas industry
- Percentage split of individual markets for geographical analysis

1.2.2 Secondary Data Sources

This research study involves the usage of extensive secondary sources, directories, company websites, and annual reports. It also makes use of databases such as Hoovers, Bloomberg, Business-week, Factiva, scholarly articles, and research papers by various universities to collect useful and effective information for an extensive technical study of the global IoT in oil and gas industry. In addition to the data sources mentioned above, the study has been completed with the help of other data sources and websites of such as oilandgas360, OECD data, ambyint blogs, press releases and articles, among others.

The key data points taken from secondary sources include:

- Segmentation breakups, split-ups, and percentage shares
- Data for market size
- Key industry trends of the top players of the market
- Qualitative insights into various aspects of the market, key trends, and emerging areas of innovation
- Quantitative data for mathematical and statistical calculations

1.3 Assumptions and Limitations for Market Estimation and Forecasting

1.3.1 Assumptions

To estimate the market size for IoT solutions used in oil and gas industry, following parameters (proxy indicator) have been considered:-

- Energy demand by country
- IoT has been defined for classical IoT solutions and software as well as automated IoT solutions and software. The companies which are providing analytics services have been considered as a part of IoT products and solution providers
- Energy and utilities revenue has also been considered to reach the IOT revenue in the oil and gas segment of a particular organization. As there is not an specific definition for IoT globally, revenues has been calculated on the basis of classical software used for analytics, SCADA and automation IoT
- Developments have been taken into account for oil and gas industry. Although, the industry is in nascent stage, therefore, developments have also been considered which can be related to the oil and gas industry. For instance, developments related to energy industry have also been considered for its relative proximity with the oil and gas industry.

- Companies whose IoT solutions are not yet commercialized in the market have also been profiled in the report
- Companies which are providing both platforms and analytics as a part of their IoT offering to oil and gas industry has been profiled only in the report
- At places where the information was not available in US\$, the conversion rate for that particular year in US\$ was considered to estimate the value. The conversion rates for historical years were calculated using the website Oanda.

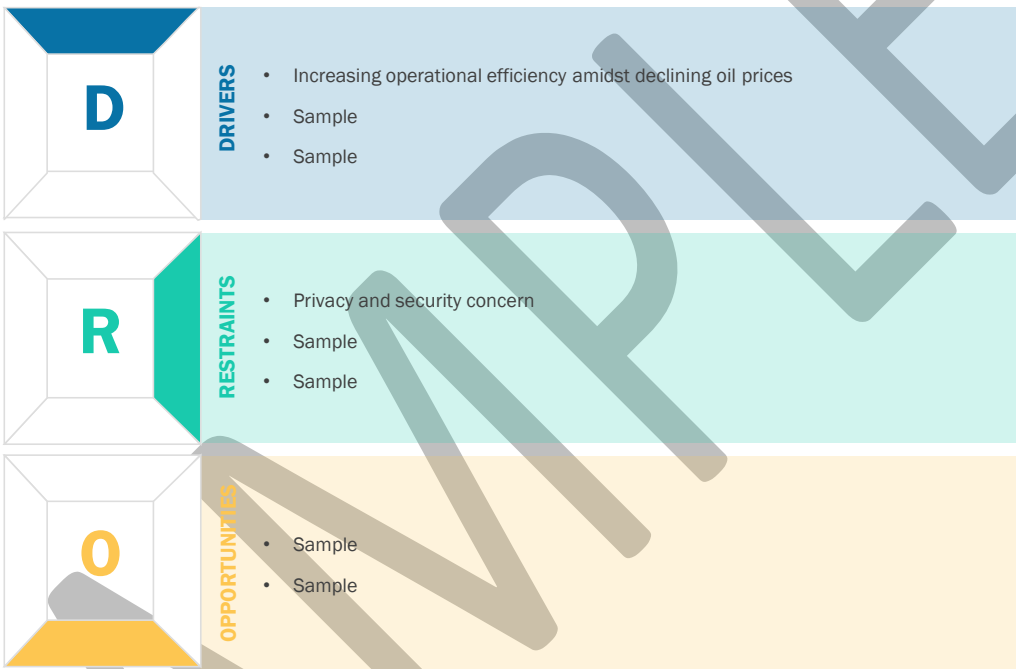
1.3.2 Limitations

- Many of the IoT platforms are operating on cloud provided by companies such as Amazon, Google and Microsoft, among others. Therefore, these companies have not been considered for cloud services. However, Microsoft has been considered being an IoT platform provider.
- Solutions such as hardware equipment and services has not been considered as a part of IoT and thus, has not been considered
- BIS Research explored all major opportunities for data mining relevant to the project. Where relevant information was not available, proxy indicators and extrapolation was employed
- The economic downturn and uncertain policies in future was not taken under consideration for market estimation and forecast calculation

2 Market Dynamics

This section provides an in-depth analysis of the driving factors which are impacting the growth of IoT in oil and gas market. The chapter also discusses the factors which are challenging and possess threat to slow down the market growth. Additionally, the opportunity section, discusses the untapped factors which are expected to drive the market growth through the forecast period.

Figure 2.1
Global IoT in Oil and Gas: Market Dynamics



Source: BIS Research Analysis

2.1 Market Drivers

The following section will provide a brief about the market driving trends, which enables the growth of the global solid waste management market. The current section provides an in-depth analysis of the driving factors which are positively affecting the growth of the market.

The following figure depicts the impact analysis of the market drivers for IoT in oil and gas market.

Figure 2.2
Impact Analysis of Market Drivers for IoT in Oil and Gas Market

Drivers	1 – 2 years	3 – 4 years	5+ years
Increasing operational efficiency amidst declining oil prices	★★★★★	★★★★★	★★★★★
Increasing cyber attacks leveraging the ICT spending by oil and gas industry	★★★★★	★★★★★	★★★★
Shortage of skilled labor	★★★★★	★★★★★	★★★★
	★★★★★ High	★★★★ Medium	★★★ Low

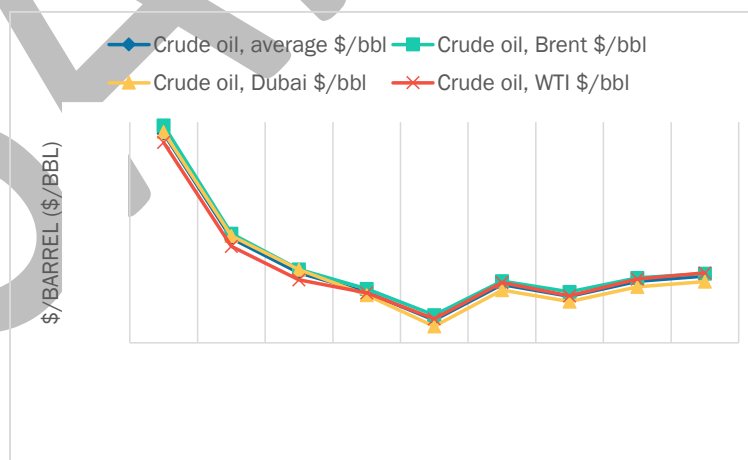
BIS Research Analysis

Note: Scale from 1 to 5 has been considered to measure the impact where 5 is the highest and 1 is the lowest.

2.1.1 Increasing Operational Efficiency Amidst Declining Oil Prices

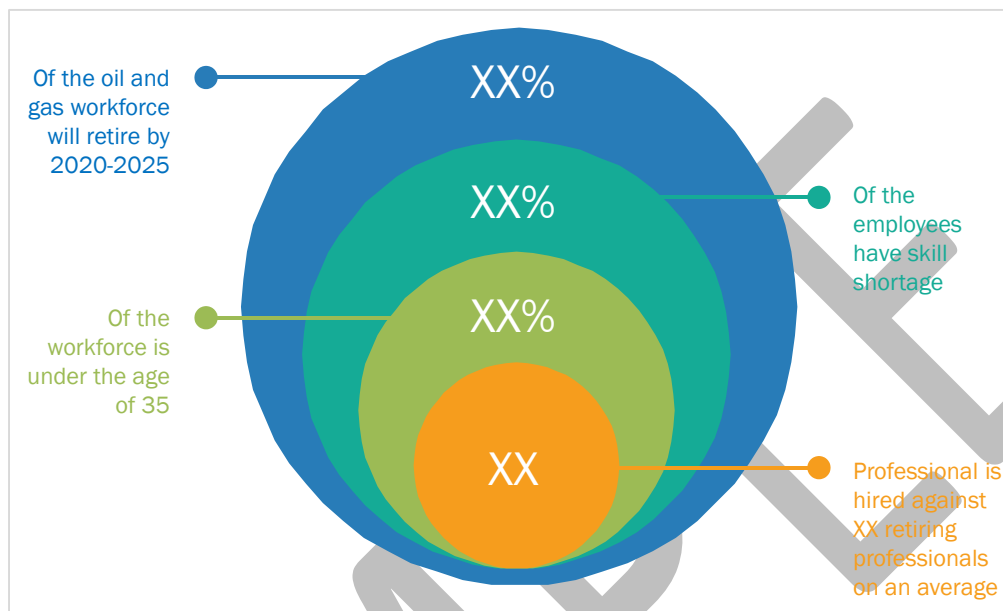
The recent drop in crude oil prices owing to increased supply and decrease in demand, has forced many exploration and production companies to increase their operational efficiency. The following figure depicts the prices of crude oil from January 2014 to June 2016.

Figure 2.3
Global Crude Oil Price Trend, Jan 2014-June 2016



Source: World Bank and BIS Research Analysis

Figure 2.6
Workforce of Oil and Gas Industry in Numbers Snapshot



Source: Secondary Analysis and BIS Research Analysis

According to the U.S. Bureau of Labor statistics, approximately XX% of the energy workforce will retire this decade. The U.S. oil and gas industry relies heavily on the workforce above XX. It has been estimated that approximately XX% of the workforce is under 35 years of age. Approximately XX% of the U.S. oil and gas workforce have skill shortages and only one young professional is hired against the 4 retiring professionals.

In addition to that, low oil prices and companies cutting down on their capital budgets, have accelerated departures of the professionals due to cost cutting measures, creating difficulties for the oil and gas companies to operate successfully. It has been witnessed that the percentage of employees working in the global top five major oil and gas companies decreased by approximately XX% on an average in 2016 as compared to 2015. Moreover, it has been anticipated that approximately XX% of the global oil and gas workforce will retire between 2020 and 2025. Shortage of skilled labor and younger professionals may not fill up the gap, creating pressure on companies. Current financial pressures may force the oil and gas companies to halt or delay hiring which for sure will not be in the favour of successful operations.

This shortage may result into several issues such as lack of data on operational excellence, assets information, and poor recording of incidents among others which may hamper with the productivity and operational efficiency of oil and gas companies. Therefore, to cope up with this arising situation, there will be an increased need for oil and gas

growth of IoT security market in North America. At present, the demand for trained and skilled IoT security professionals has far exceeded the supply side which has posed a challenge to the growth of this market.

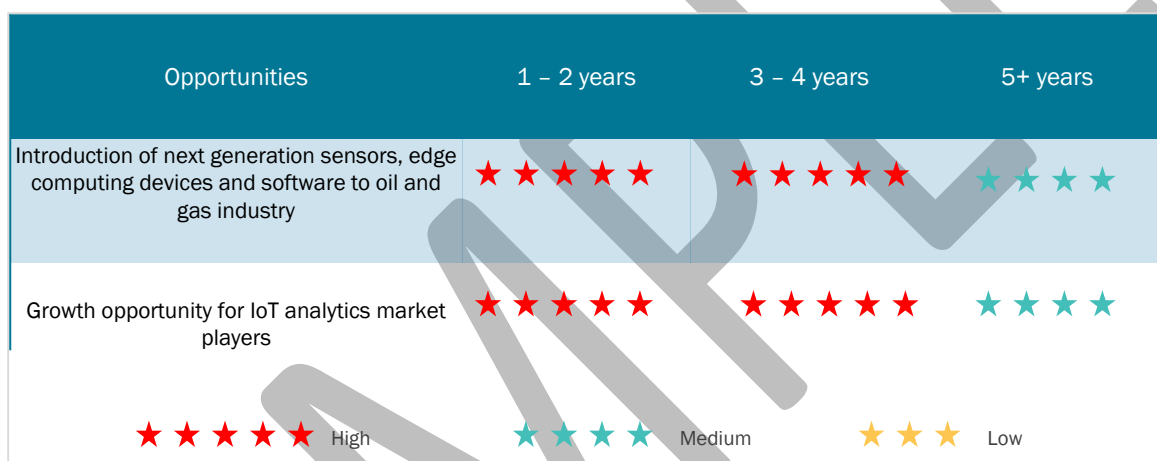
2.2 Market Opportunities

Market opportunities can be defined as favorable conditions which an industry can capitalize upon for the growth of that particular market. The opportunities for global IoT in O&G market are listed and detailed below.

The following figure depicts the impact analysis of the market opportunities for IoT in oil and gas market.

Figure 2.8

Impact Analysis of Market Opportunities for IoT in Oil and Gas Market



Source: BIS Research Analysis

Note: Scale from 1 to 5 has been considered to measure the impact where 5 is the highest and 1 is the lowest.

2.2.1 Introduction of Next Generation Sensors, Edge Computing Devices and Software to Oil and Gas Industry

Owing to volatility in crude oil prices, there may be a worst case scenario where the prices may even fall below the current prevailing prices. There is an increased need for oil and gas companies to gear up and prepare for escalating prices in advance. The next generation of sensor network such as wireless sensor network has the potential to enhance productivity, efficiency and profitability for oil and gas exploration and production companies. The following figure depicts the applications of wireless sensor networks which are used across the oil and gas industry.

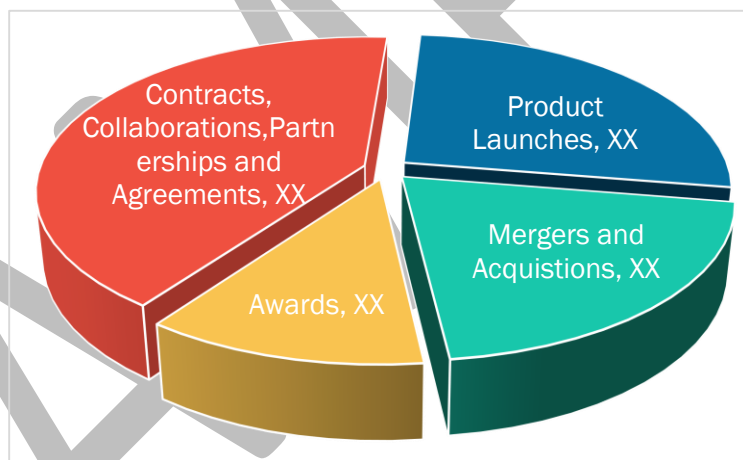
3 Competitive Insights

The strategies employed to gain a significant market share in this growing industry, has been varying from mergers to business expansions as well as from acquisitions to partnerships. This segment provides comprehensive insights regarding the different market development activities that the key players in the industry are adopting in order to compete with each other directly. To lead the market as well as engage in the process of overall market growth, a company needs to introduce new products and services to the market, improve the existing products' framework, work in collaboration with the top market leaders or win new contracts and acquire the relatively weaker companies into its stronghold. Some of the organic and inorganic strategies undertaken by the key market players are listed below:

3.1 Key Market Strategies and Developments

The following figure represents the share of key strategies and developments:

Figure 3.1
Percentage Share of Strategies Adopted by the Market Players, 2014-2017



Source: Secondary Research, BIS Research Analysis

The above figure illustrates the percentage share of strategies adopted by the market players. The prominent players in the IoT for oil and gas market adopted a strategy of collaborations and partnerships to expand their business. Contracts, collaborations, partnerships and agreements strategy accounted for the largest market of XX% from the period 2014-2017 followed by product launches.

The following table lists certain developments in the global IoT in O&G market:

Table 3.2
Key Contracts, Collaborations, Partnerships, Agreements and Joint Ventures

Company Name	Company Name	Strategy	Description	Date
Darktrace	Siemens	Partnership	Both the companies partnered to create cyber security solutions for oil and gas companies	May-17
GE	Saudi Aramco	Agreement	GE and Saudi Aramco signed a Memorandum of Understanding (MoU) to digitally transform the operations related to oil and gas business of Saudi Aramco. GE will help deploy its Predix platform, industry specific applications and a group of employees to Saudi Aramco. This partnership is expected to save \$XX billion annually for Saudi Aramco.	May-17
Honeywell	Aereon	Partnership	Honeywell collaborated with Aereon to expand IIoT products and services in industries especially in oil and gas sector	Mar-17
Hitachi	ENTEKA AG	Partnership	Entega AG is a supplier of green electricity and natural gas across Europe. Hitachi and Antega entered into partnership to further develop the operational expertise of both the companies for technical equipment and automated energy trading.	Mar-17
IFS	Marsden Group	Collaboration	Both the companies collaborated to provide IoT solutions to oil and gas sector which would help them to monitor, capture, and analyze relevant IoT data, enabling timely action and take optimized decision	Feb-17
WellAware	Halliburton	Collaboration	WellAware collaborated with Halliburton to distribute its WellAware Integrated Radio and Controller globally. Integrated radio and controller is an IIoT oilfield solution which will help oil and gas companies to make real time and data driven decisions to optimize operational process.	Dec-16
GE Digital	Reliance Industries	Partnership	Both the companies signed a partnership agreement to develop joint applications on GE's Predix platform. Together, they will provide Industrial IoT solutions to	Nov-16

Company Name	Company Name	Strategy	Description	Date
			industries such as oil and gas, healthcare and agriculture among others. GE will provide Predix platform to Reliance, its data science expertise and RIL will develop solutions on Predix as an Independent Software Vendor (ISV).	

Table 4.4
Analyzing Bargaining Power of Buyers in Global IoT in Oil and Gas Industry

S.No.	Analyzing Factors	Impact	Description
1	Buyer Volume	Sample	The number of oil and gas companies globally is low when compared to the number of suppliers. Moreover, increasing proliferation of cyber-attacks in oil and gas industries and an increased need to improve operational efficiency and reduce costs leaves oil and gas industry no choice but to integrate IoT solutions with their business. Therefore, the rating of this factor is kept medium to high.
2	Buyer's switching cost	Sample	Owing to compatibility issues when integrating components to application system and price sensitive nature of buyers such as oil and gas companies, the purchasing decision of the buyer is influenced and they prefer to stick to conventional systems. Therefore, the rating of this factor is kept low.
3	Price Sensitivity	Sample	Global IoT in O&G market is highly price sensitive. Oil and gas companies possess a lot of negotiating power over the suppliers owing to high concentration ratio of suppliers to buyers. Therefore, the rating of this factor is kept high.
4	Buyer's Information about Supplier's Product	Sample	There is lack of awareness and information about latest IoT devices and methods. Benefits of industrial platforms with IoT enabled solutions and services are also not familiar among customers. Moreover lack of skilled resources makes it more complicated for oil and gas industries to integrate IoT solutions with their business. Therefore, the rating for this factor has been kept medium.

Source: BIS Research Analysis

Intensity of Competitive Rivalry

The overall intensity of competitive rivalry has been identified as medium.

The following table analyses the factors under intensity of competitive rivalry in global IoT in O&G market and the risk ratings are assigned accordingly.

Table 4.5
Analyzing Intensity of Competitive Rivalry in Global IoT in Oil and Gas Industry

S.No.	Analyzing Factors	Impact	Description
1	Number of Players	Sample	Global IoT market consists of a number of major firms. They have a high number of offerings and services to various industries such as automotive and O&G companies among others. Moreover, with growing IoT market globally, the number of players is expected to increase in the nearby future with more product offerings. Therefore, the impact of this factor is kept high.
2	Entry and Exit barriers	Sample	Any IoT company requires a huge amount of capital investment for its setup. Leaving the industry without incurring a considerable amount of loss is not easy either. Therefore, it is kept medium.
3	Brand identity	Sample	Oil and gas companies have a strong perception of the strength of the brands present globally. However, upcoming new ventures are gaining a significant market share in the global IoT market. Therefore, the impact of this factor is medium.
4	Customer's Loyalty towards Brand	Sample	The preference for a trusted brand prevails among oil and gas companies in this market, although this effect is compensated by the price and IoT security sensitive companies
5	Switching Cost	Sample	The lower the switching costs, the easier it will be for customers to change suppliers and the higher the risk of competitor rivalry. However, the switching costs for the oil and gas companies has been identified high accompanied with production and operational losses. Therefore, the rating of this factor has been kept medium.

Source: BIS Research Analysis

4 Industry Analysis

Industry analysis helps an organization in an attempt to understand the key elements of a business environment of a particular industry.

4.1 Regulatory Bodies/Acts

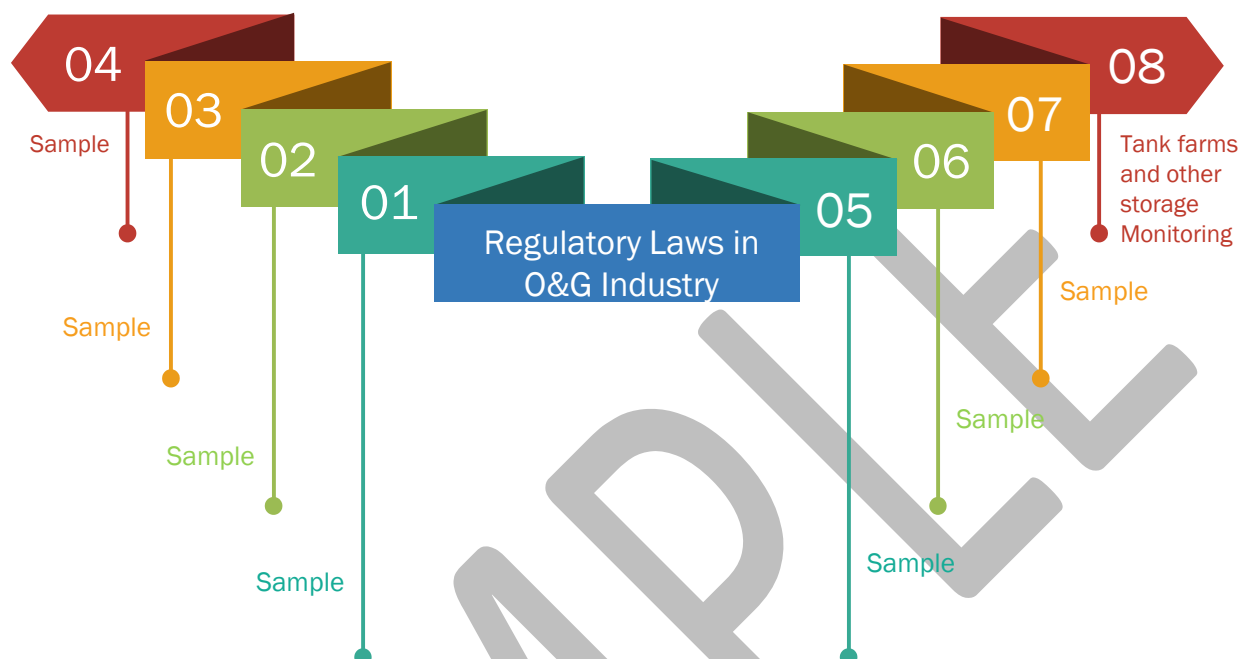
Regulatory bodies have established a significant position and the future market growth is largely reliant on a proper regulatory framework. The following section highlights some of these prominent regulatory bodies.

Table 5.1
Few Regulatory Bodies/Acts

Regulation/Act/Regulatory Body	Region	Description
Cyber Security Act of 2015	North America	Established in 2015, this act is designed by the U.S. Federal Law in order to improve cyber security in the country. This law promotes the exchange of information between the U.S. government and technology, security and manufacturing companies
Cyber Security Workforce Assessment Act of 2014	North America	Established in 2014, this act is formulated by the U.S. Federal Law in order to improve cyber security technical expertise and to conduct an assessment of cyber security workforce of all industries in every three years
Cyber Security Information Sharing Act of 2015	North America	Established in 2015, this act is formulated by the U.S. Federal Law which allows sharing of internet traffic information between the industrial companies and institutions with technology companies. The act created a system for federal agencies to receive threat information from private companies.
Data Privacy and Protection including Cybersecurity	Europe	European Union cybersecurity law requires member countries to establish national frameworks and effective cooperation in developing and maintaining programs to address data privacy
Ministry of Electronics and Information Technology	India	The Ministry drafted a policy related to Internet of Things solutions and devices with a vision to develop connected and secure IoT based system for India

Source: Secondary Analysis and BIS Research Analysis

Figure 5.1
Certain Examples of Regulatory Laws for Oil and Gas Industry



Source: Secondary Analysis and BIS Research Analysis

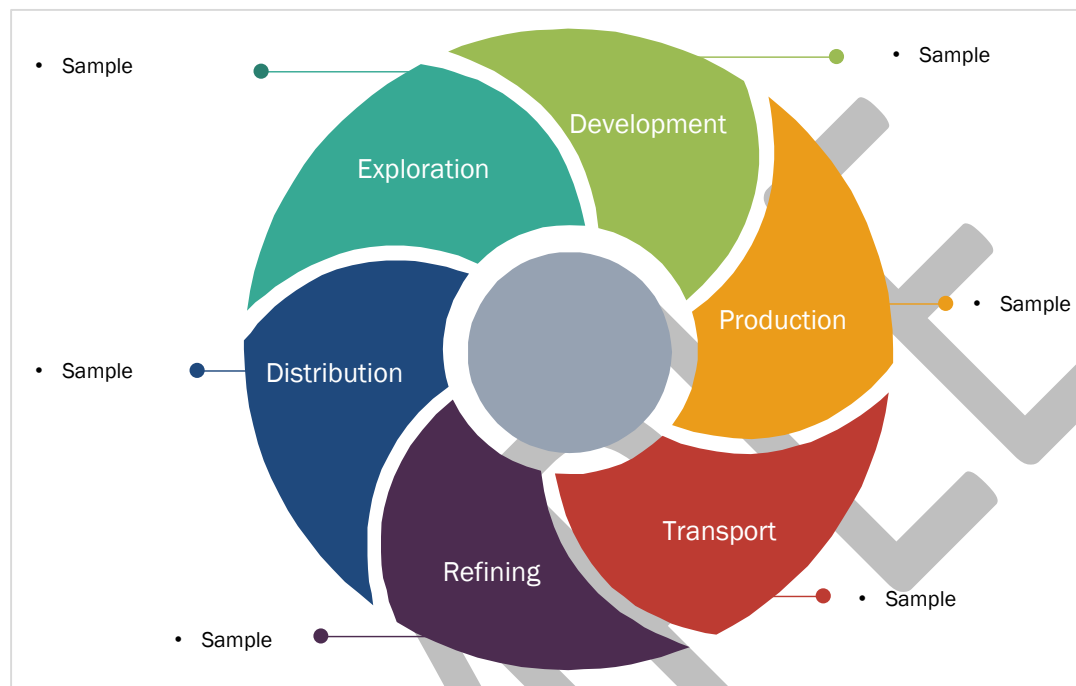
4.2 Associations/Consortiums/Alliances

As the industry evolves, the role of consortiums and regulatory bodies becomes pivotal to shape the future trajectory. The following section highlights some of these prominent consortiums/associations, impacting the evolution of the industry at a global level.

Table 5.3
Examples of Some Associations/Consortiums

Consortium/Association/Alliances	Headquarters	Description
Internet of Things Consortium	U.S.	Established in 2012, the consortium provides a platform to connect, facilitate partnership and promote knowledge between various global companies which build internet of things solutions and services

Figure 5.4
Positive Impact by IoT Usage in Oil and Gas Industry



Source: Secondary Research and BIS Research Analysis

Apart from the above mentioned impact, the following figure depicts few examples of significant value created across different stages of oil and gas industry with the use of IoT solutions and services.

Table 5.5
IoT Enabled Value Creation in Oil and Gas Value Chain

	Upstream	Midstream	Downstream
Strategic	<ul style="list-style-type: none"> Predictive Analytics Upstream Capability Analytics Data Summarization and Filtering 	<ul style="list-style-type: none"> Demand signal management Route profitability Supply chain network design 	<ul style="list-style-type: none"> Data summarization and filtering Downstream competitive analytics Downstream customer analytics
Tactical	<ul style="list-style-type: none"> Assets Performance and data 	<ul style="list-style-type: none"> Asset lifecycle management Predictive maintenance support 	<ul style="list-style-type: none"> Assets performance and data

	Upstream	Midstream	Downstream
	<ul style="list-style-type: none"> • Repair Ops Performance and data • Engineering performance and data 		<ul style="list-style-type: none"> • Repair Ops Performance and data • Engineering performance and data
Operational	<ul style="list-style-type: none"> • Operations data • Spares and services data • Rig parts data 	<ul style="list-style-type: none"> • Global services data • Predictive Analytics • In process data 	<ul style="list-style-type: none"> • Logistics data • Retail service data • Spares and services data

Source: Secondary Analysis and BIS Research Analysis

5 Global IoT in Oil and Gas, Analysis & Forecast (2016-2026)

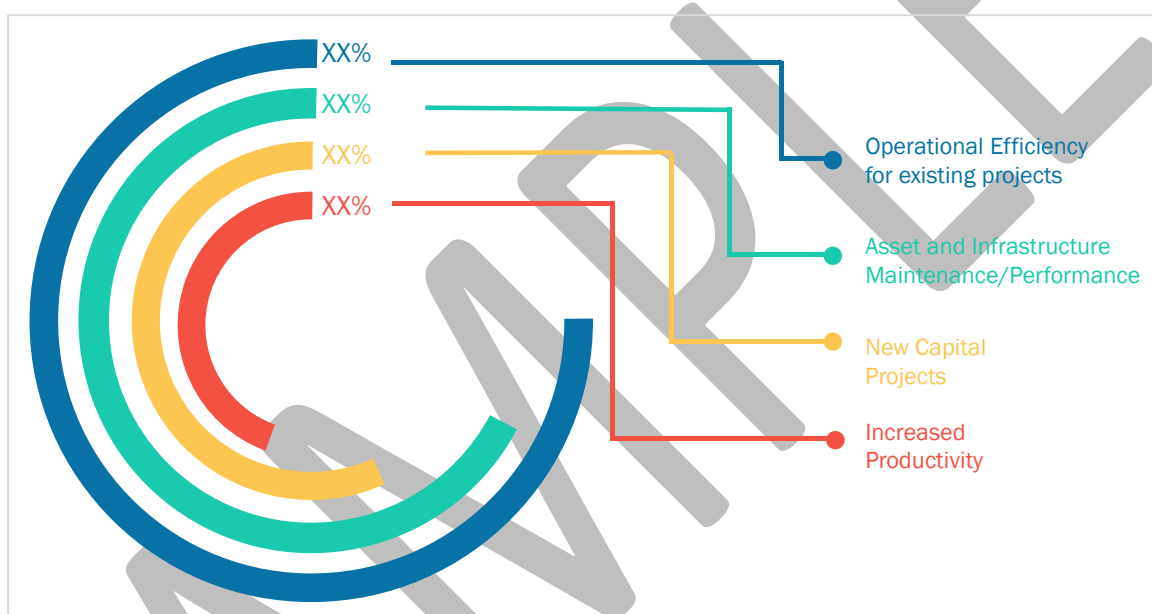
5.1 Assumptions and Limitations for Analysis and Forecast of the Global IoT in Oil and Gas

1. Energy and utilities revenue has been taken into account to estimate the IoT revenue in the oil and gas industry
2. Revenue for the platforms and analytics has been considered only. Sensors have been excluded from the report on the basis of the fact that globally, majority of the people know sensors as IoT devices and there is less awareness about the solutions and services related to IoT.
3. Revenue for the platforms has been considered as a whole. Revenue earned by supplying various components and services to build a platform has not been considered
4. Owing to the different definitions used for IoT globally, BIS Research has defined classical software for analytics, and automation IoT as a part of IoT as a whole for this report. Revenues has have been calculated taking classical software for analytics and automation IoT solutions into account.
5. Revenue of the vendors providing services related to IoT to oil and gas industry has not been taken into account
6. The IoT revenue of the organizations has been calculated on the basis of their annual reports and key developments analysis (Jan 2014-May 2017)
7. Where splits were not possible, calculation has been done on the basis of developments in a particular region and solutions provided to oil and gas industry
8. Developments have been taken into account for oil and gas industry specifically. Although, the industry is at a nascent stage, therefore, developments for oil and gas industry and energy industry has have been taken into account owing to the similar nature of both the industries.
9. Refining analytics has been considered only in downstream phase and midstream analytics has been considered on midstream phase of oil and gas value chain. Asset management analytics has been considered across all the three phases of oil and gas value chain.
10. Midstream analytics include asset management, pipeline management and fleet management
11. Asset performance analytics has been included in all the three segments of oil and gas analytics
12. Asset performance and management analytics has been considered as a single solution
13. Solutions such as hardware equipment, SCADA and services has not been considered as a part of IoT and has not been taken into account

It is expected that consumer demand for oil and gas will also increase by 2025. Increasing consumer demand and high production of oil and gas at low prices will help boost the economy of a country to boost, thus increase in global GDP. According to a Cisco study, an oil and gas company with a revenue scale of \$XX billion can improve its profitability by approximately XX% primarily driven by production costs, increased rig time and reduced capital expenditures among others.

Following figure depicts the percentage share of major drivers which is expected to increase investments for oil and gas industry for IoT solutions and services.

Figure 6.4
Drivers Likely to Increase Investment for IoT Solutions, by Percentage Share, 2016



Source: Secondary Analysis and BIS Research Analysis

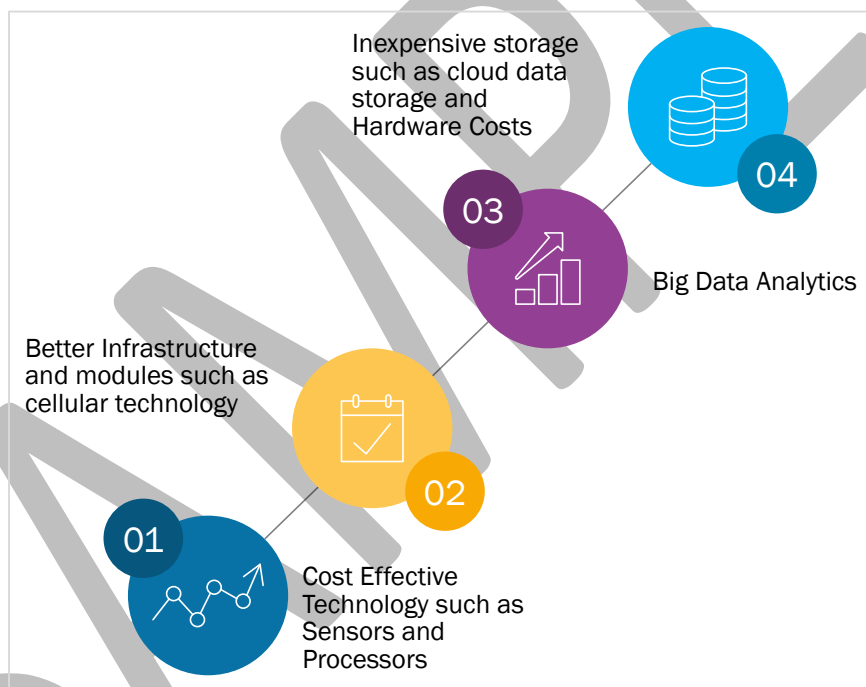
Various oil and gas companies have started integrating IoT solutions and services as a part of their business operations. For Instance, Exxonmobil, in 2014, started using a leak detection system which uses software to analyze infrared camera images. Similarly, several oil and gas companies are using analytic platform which is being delivered by Osprey Data. Royal Dutch Shell, an E&P company saved approximately \$XX million on an investment of approximately \$XX million with the use of IoT solutions for its oil fields in Nigeria. In 2016, BP started incorporating sensors in its oil well and using GE's predix platform to increase efficiency. In 2017, GE partnered with Reliance industries and Saudi Aramco for its predix platform. Repsol has collaborated with IBM for its cognitive computing to its upstream business. With many a number of oil and gas companies leveraging IoT solutions and services in the past few years, it is a clear indicator that oil and gas industry has started to adopt the IoT solutions and services to improve reliability, make business processes efficient and improve productivity among others.

6 Global IoT in oil and gas Industry by Solutions

Internet of Things is the next industrial revolution which enables all the devices and machines to connect and exchange all types of information with users. IoT solutions can be used across various verticals such as automotive, and healthcare among others. IoT solutions are being used in oil and gas industry also to make business processes more efficient and reliable. Major focus of oil and gas industry has been witnessed on the usage of sensors and devices, but other solutions such as platforms and analytics are also increasing. Various companies such as GE, SAP SE, and Cisco are providing IoT solutions to oil and gas industries.

The following figure depicts the major drivers of IoT adoption in oil and gas industry.

Figure 7.1
Major Drivers of IoT Adoption by Oil and Gas Industry



Source: Secondary Analysis and BIS Research Analysis

The following figure depicts IoT solutions which provides various benefits to the complete supply chain of oil and gas industry.

Table 7.2
Global IoT Platform in Oil and Gas Market Value, by Product Type, 2016-2026

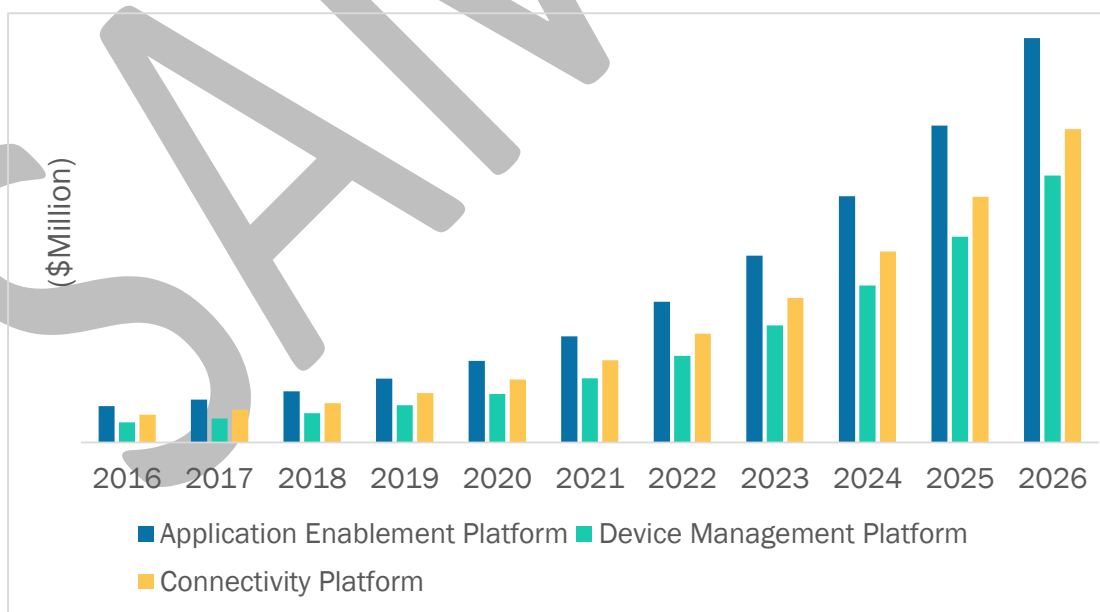
\$Million

Platforms	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
Application Enablement Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Device Management Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Connectivity Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

The following figure depicts the global IoT platform in oil and gas market value, by product type from 2016 to 2026.

Figure 7.4
Global IoT Platform in Oil and Gas Market Value, by Product Type, 2016-2026

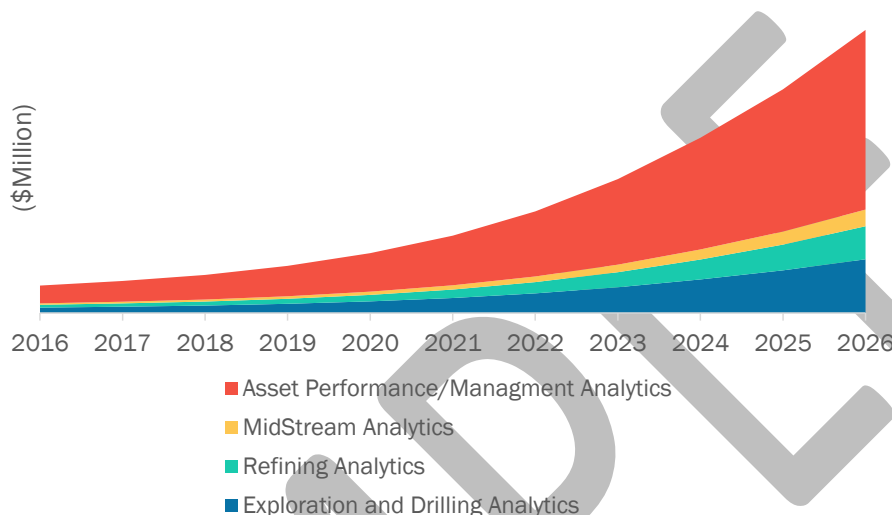


Source: BIS Research Analysis

Application enablement platform accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016 and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast

Figure 7.5

Global IoT Analytics in Oil and Gas Market Value, by Product Type, 2016-2026



Source: BIS Research Analysis

Asset performance/management analytics accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016 and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. This is mainly due to that fact that oil and gas industry is an asset intensive industry. Several expensive assets are used across the supply chain of oil and gas industry. Thus, maintenance of the infrastructure is thus necessary. Aging infrastructure and pressure to improve operational efficiency will drive the need for asset performance analytics across all the phases of oil and gas industry. Moreover, increasing use of sensors will also drive the need to maintain and monitor the assets, which in turn will drive the asset performance/management analytics.

Exploration and drilling analytics is expected to grow owing to the need to reduce production cost of oil, new projects for oil and gas exploration, use of advanced technologies for exploration, and to comply with the regulations among others. Refining analytics is expected to grow owing on account of the growing demand of petroleum products in developing countries. Midstream analytics will mainly grow because of the need to monitor fleet, and pipeline which will drive the use of sensors and tracking devices.

6.1.1 IoT Analytics by Application Type

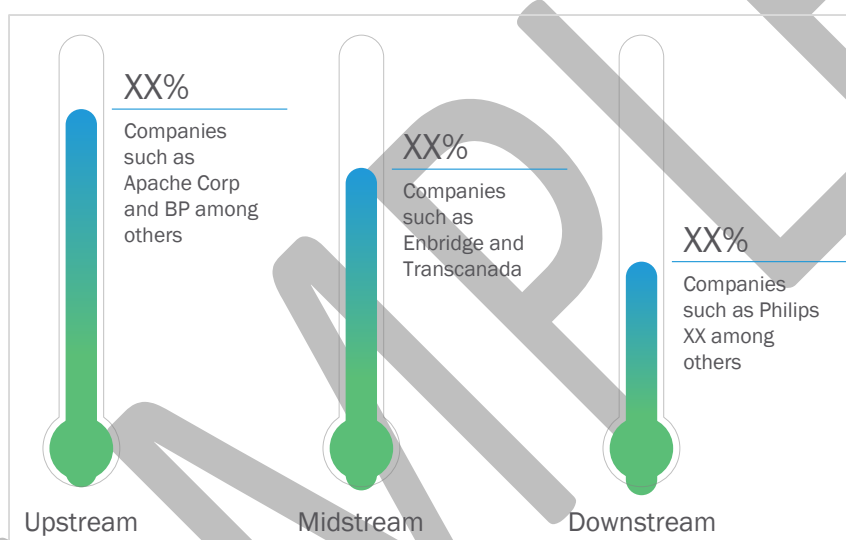
The following table depicts the global IoT analytics in oil and gas market value, by application type from 2016 to 2026.

7 Global IoT in oil and gas Industry by Application

Oil and Gas industry has 3 major phases in its value chain namely upstream, midstream and downstream. Upstream phase mainly includes exploration, drilling and production of oil. Midstream phase mainly includes the transportation of oil and gas through various mediums such as containers, pipelines and trucks among others. Downstream is mainly associated with refining, distribution and marketing of oil and gas. Following figure depicts estimated IoT solutions usage across the 3 major applications of oil and gas industry.

Figure 7.1

IoT Solutions Across Applications of Oil and Gas Industry, by Percentage Share, 2016



Source: BIS Research Analysis

Following table represents the global IoT in oil and gas market value in \$Million by application, 2016-2026

Table 7.1

Global IoT in Oil and Gas Market by Application, 2016-2026

Application Type												\$Million
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
Upstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Midstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Downstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

7.1.1 IoT in Upstream by Region

The following table depicts the global IoT in oil and gas market value by region from 2016 to 2026.

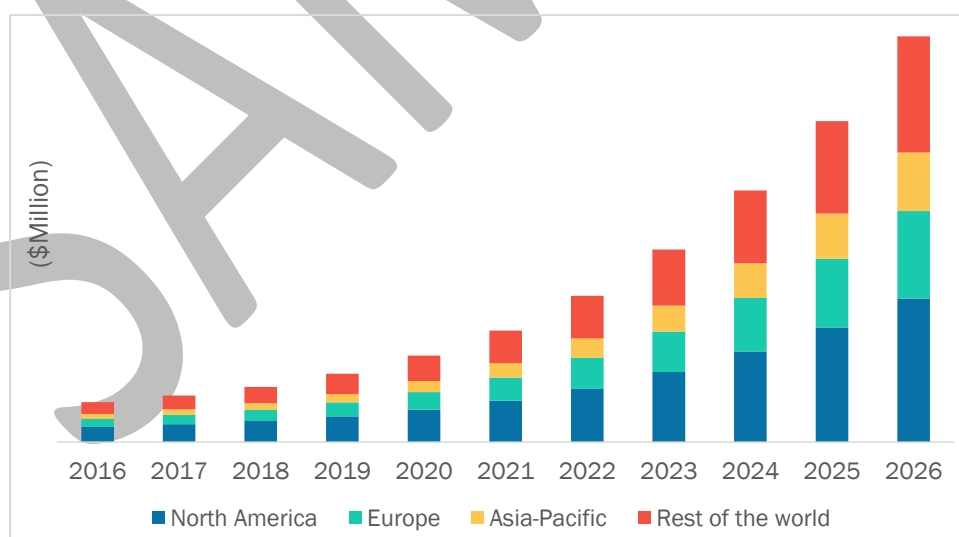
Table 7.5
Global IoT in Upstream Oil and Gas Market Value, by Region, 2016-2026

Region												\$Million
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
North America	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Europe	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Asia-Pacific	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Rest of the world	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

The following figure depicts the global IoT in oil and gas market value by region from 2016 to 2026.

Figure 7.5
Global IoT in Upstream Oil and Gas Market Value, by Region, 2016-2026



Source: BIS Research Analysis

Table 7.11
Global IoT in Downstream Oil and Gas Market Value, by Platform, 2016-2026

Platforms	\$Million											CAGR% (2017-2026)
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Application Enablement Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Device Management Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Connectivity Platform	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

Application enablement platform accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016, and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. Major factors contributing to the growth of AEP are the need to manage data by developing applications, and the need to increase the operational efficiency among others. These applications can help the downstream companies to store data with no security threats, and empower the communication and collaboration among the oil and gas industry workers.

Connectivity platforms and device management platform are also expected to grow at a faster the CAGRs of XX% and XX% respectively owing to the increased use of sensors, standard and modules to transmit data, and the need to store, manage and analyze the data in a secure zone among others.

7.1.2 IoT in Downstream by Analytics Type

The following table depicts the global IoT in downstream oil and gas market value, by analytics type from 2016 to 2026.

Table 7.12
Global IoT in Downstream Oil and Gas Market Value, by Analytics, 2016-2026

\$Million

Analytics	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
Refining Analytics	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Asset Performance/Management Analytics	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

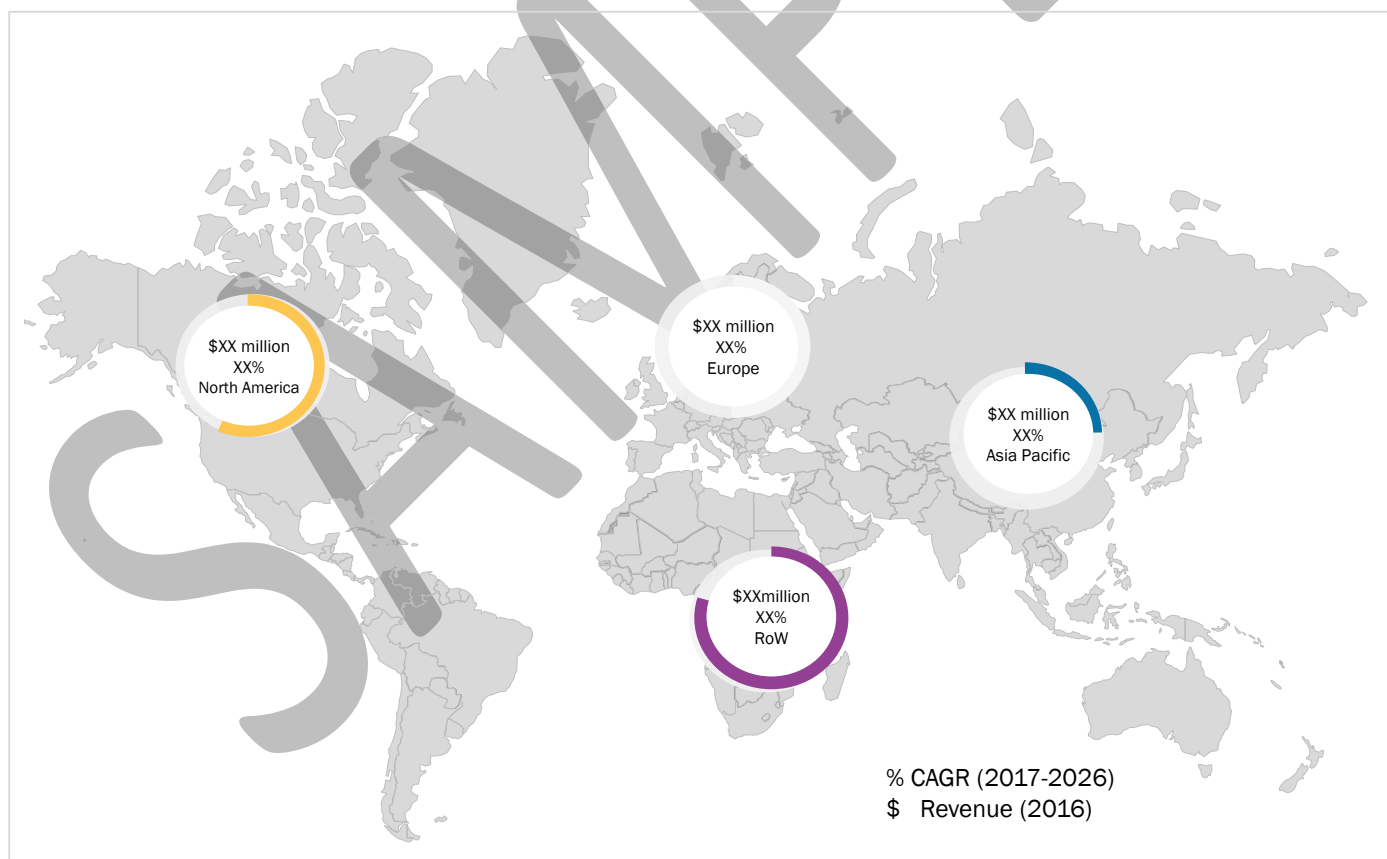
8 Global IoT in oil and gas Industry by Region

The chapter spans four major regions - North America, Europe, Asia Pacific and RoW with respect to IoT solutions in oil and gas industry. The RoW region includes the Middle East, Russia, Latin America and Africa. It is believed that majority of the upstream companies are located in North America and RoW region. Midstream and downstream companies are focused mainly in the Asia Pacific and European region.

Analytics has mainly dominated the IoT solutions in oil and gas industry globally. However, it has been witnessed that the use of platforms has increased from the past few years. Factors such as the need to increase operational efficiency, shortage of skilled labor, low demand of oil globally and rising cyber threats among others has have triggered the demand of integrated IoT solutions globally.

The following figure depicts the IoT in oil and gas industry and its growth across the various regions.

Figure 8.1
Global IoT in Oil and Gas Market and Growth Snapshot



Source: BIS Research Analysis

Platforms accounted for a share of approximately XX% in 2016. It was valued at \$XX million in 2016, and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. Major factors contributing to this growth are the usage of advanced technologies such as integrated platforms which provide application and device management coupled with analytics to make instant decisions. Moreover, challenges such as need for data storage and its security can be solved with the use of IoT platforms. Thus, the market for platforms will grow at a faster pace in oil and gas industry as they provide all in one solution.

8.1.1 IoT in North America by Application Type

The following table depicts the growth of North America IoT in oil and gas industry value by application type from 2016 to 2026.

Table 8.3
North America IoT in Oil and Gas Industry Value, by Application Type: 2016-2026

Application Types	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
Upstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Midstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Downstream	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

Use of IoT solution in upstream phase accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016, and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. This is mainly due to the fact that the North America is a home to many a number of upstream companies and there is a high demand for IoT solutions in upstream phase as compared to midstream and downstream. Moreover, other factors such as pressure to reduce greenhouse gas emissions and increasing use of sensors in oil well rigs among others will contribute to the growth of IoT solutions in oil and gas industry. Certain contracts have been witnessed for platforms and analytics in the North American region such as GE digital and BP for predix platform and Apache Corp for analytics among others.

In addition to that, rise of unconventional oil such as shale oil and tight oil among others in the U.S. will drive the adoption of IoT solutions in oil and gas industry.

increase their fleet and infrastructure capacity in order to meet the increasing supply and demand in the gulf region. These factors will be primarily attributable to drive the use of IoT solutions and services in the region.

8.1.2 IoT in RoW by Product Type

The following table depicts the growth of Asia Pacific IoT in oil and gas industry value by product type from 2016 to 2026.

Table 8.8
RoW IoT in Oil and Gas Industry Value, by Product Type: 2016-2026

	\$Million											
Platforms and Analytics	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	CAGR% (2017-2026)
Platforms	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Analytics	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

Source: BIS Research Analysis

Analytics accounted for a major share of approximately XX% in 2016. It was valued at \$XX million in 2016, and is expected to reach \$XX million in 2026 at a CAGR of XX% during the forecast period 2017-2026. Major factors contributing to the growth of analytics in RoW are high production rate of oil and gas, extensive use of advanced exploration and drilling tools, which will drive the need for analytics to achieve operational efficiency. Moreover, low prices of crude oil will drive the need for analytics to take instant decisions.

Platform use will increase owing to analytics, data security and several other features being incorporated within a single solution. It has been witnessed that oil and gas companies are collaborating with IoT solution providers for platforms to make their operations more profitable. One such instance is of Saudi Aramco, which has recently collaborated with GE digital for its predix platform.

9 Company Profiles

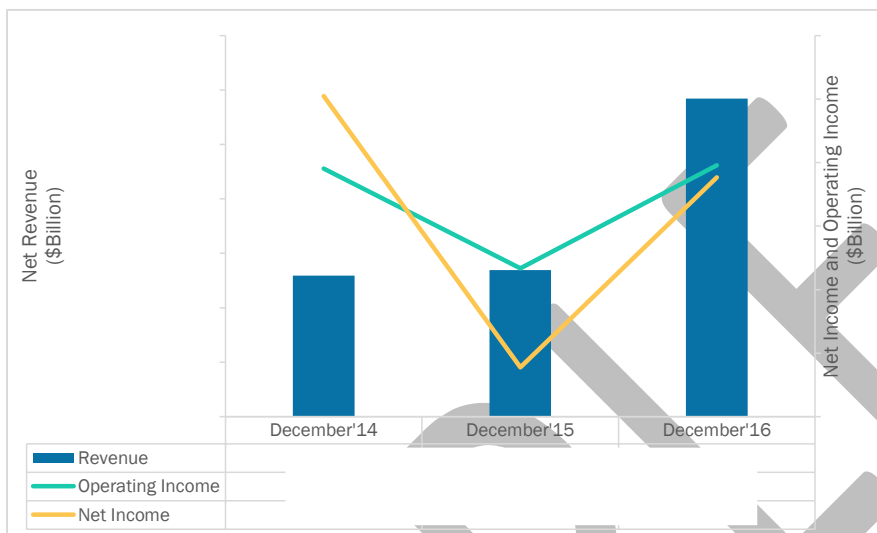
9.1 ABB Ltd.

9.1.1 Overview

Particular	Specifications (as of 2016)
Website	www.abb.com
Contact Details	Affolternstrasse 44 CH-8050 Zurich Switzerland Tel: +41 43 317 7111
Year of Establishment	1988
Ownership Type	Public
Company Type	Manufacturer, Developer, Seller and Service Provider
Number of Employees	132,000 (as of December 2016)
Net Revenue	\$XX Billion (as of FY2016)
Competitors	Siemens AG, Schneider Electric and Eaton Corporation among others
Subsidiaries	ABB Holding Ltd. (Hong Kong), ABB India Limited, ABB Limited, Warrington (U.K.), and ABB Inc., Cary, NC (U.S.), among others
Related Products & Services	Analytics such as asset management among others and IoT platform
Other Products & Services	Semiconductors, Robotics, Power conditioning, motors and generators among others

Source: ABB Ltd. Website, BIS Research Analysis

Figure 10.14
General Electric Company: Overall Financials (2014-2016)

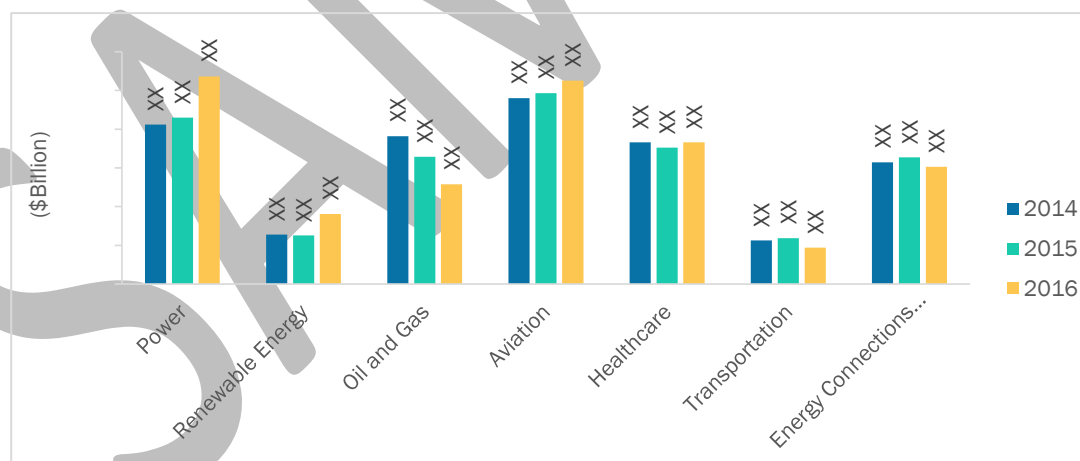


Source: GE Website, BIS Research Analysis

Net Revenue by Business Segment

The following graph shows net revenue earned by different business segments from December (2014-2016):

Figure 10.15
General Electric Company: Net Revenue by Business Segment, 2014-2016



Source: GE Website, BIS Research Analysis

9.1.1.2 SWOT Analysis

Figure 10.41
PTC: SWOT Analysis



Source: BIS Research Analysis

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

Tel: +1 650 228 0182