MARKETSANDMARKETS™

DATA HISTORIAN MARKET

GLOBAL FORECAST TO 2023

BY APPLICATION (PRODUCTION TRACKING, ENVIRONMENTAL AUDITING, ASSET PERFORMANCE MANAGEMENT, AND GRC MANAGEMENT), COMPONENT (SOFTWARE/TOOLS, SERVICE), DEPLOYMENT MODE, ORGANIZATION SIZE, END-USER, AND REGION

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATION	FULL FORM
AI	Artificial Intelligence
ANZ	Australia and New Zealand
APM	Asset Performance Management
BACnet	Building Automation and Control Networks
CAGR	Compound Annual Growth Rate
CEO	Chief Executive Officer
CSCC	Cloud Standard Customer Council
DaaS	Database-as-a-Service
DCB	Disconnecting Circuit Breaker
EIA	Energy Information Administration
FOCS	Fiber Optic Current Sensor
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GRC	Governance, Risk, and Compliance
HART-IP	Highway Addressable Remote Transducer Internet Protocol
HMI	Human Machine Interface
ICT	Information and Communications Technology
IED	Intelligent Electronic Device
IIoT	Industrial Internet of Things
IoT	Internet of Things
IoTSP	Internet of Things, Services, and People
ISV	Software Vendor
IT/OT	Information Technology/Operational Technology
KSA	Kingdom of Saudi Arabia
ME	Machine Edition
MES	Manufacturing Execution System
MoU	Memorandum of Understanding
OAS	Open Automation Software
OPC	Open Platform Communications
PIMS	Plant Information Management System
PLC	Programmable Logic Controller
RoI	Return on Investment
RT	Revenue Tree
SaaS	Software-as-a-Service
SDK	Software Development Kit
SME	Small and Medium-sized Enterprise

SQL	Structured Query Language
TnT	Track and Trace
UA	Unified Architecture
UAE	United Arab Emirates
USD	United States Dollar
VAR	Value-Added Reseller
VP	Vice President

1 INTRODUCTION

1.1 OBJECTIVES OF THE STUDY

- To describe, segment, and forecast the global data historian market based on components, applications, deployment modes, organization size, end-user, and regions
- To forecast the market size of 5 main regions, namely, North America, Europe, Asia Pacific (APAC), Middle East and Africa (MEA), and Latin America
- To analyze the market's subsegments with respect to individual growth trends, prospects, and contributions to the total market
- To provide detailed information regarding the major factors (drivers, restraints, opportunities, and challenges) influencing the growth of the market
- To analyze opportunities in the market for stakeholders and provide details of the competitive landscape of the major players
- To comprehensively analyze the core competencies* of the key players in the market
- To track and analyze the competitive developments, such as mergers and acquisitions, new product developments, and partnerships and collaborations in the market

1.2 MARKET DEFINITION

Data historian is a high-performance time series database that is capable of storing huge volumes of processed data from industrial facilities. It is also a software program used for recording and retrieving processed and production data from an electronic storage. Additionally, it combines advanced data storage and compression techniques with an industry standard query interface to ensure easy access to process, alarm, and real-time data.

*Core competencies of the companies are captured in terms of the key developments, observations, and strategies adopted by them to sustain their position in the market.

1.3 MARKET SCOPE

The study provides an analysis of the global data historian solutions offered by different software vendors.

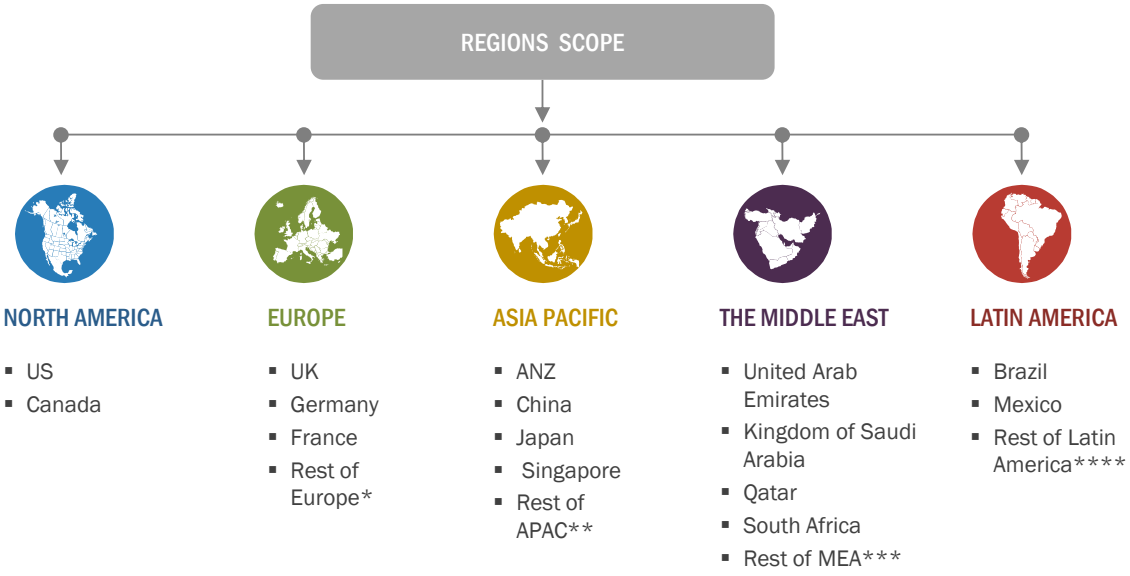
FIGURE 1 DATA HISTORIAN MARKET: MARKET SEGMENTATION

Others includes security and quality control management

**Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: MarketsandMarkets Analysis

FIGURE 2 DATA HISTORIAN MARKET: REGIONAL SCOPE



Source: MarketsandMarkets Analysis

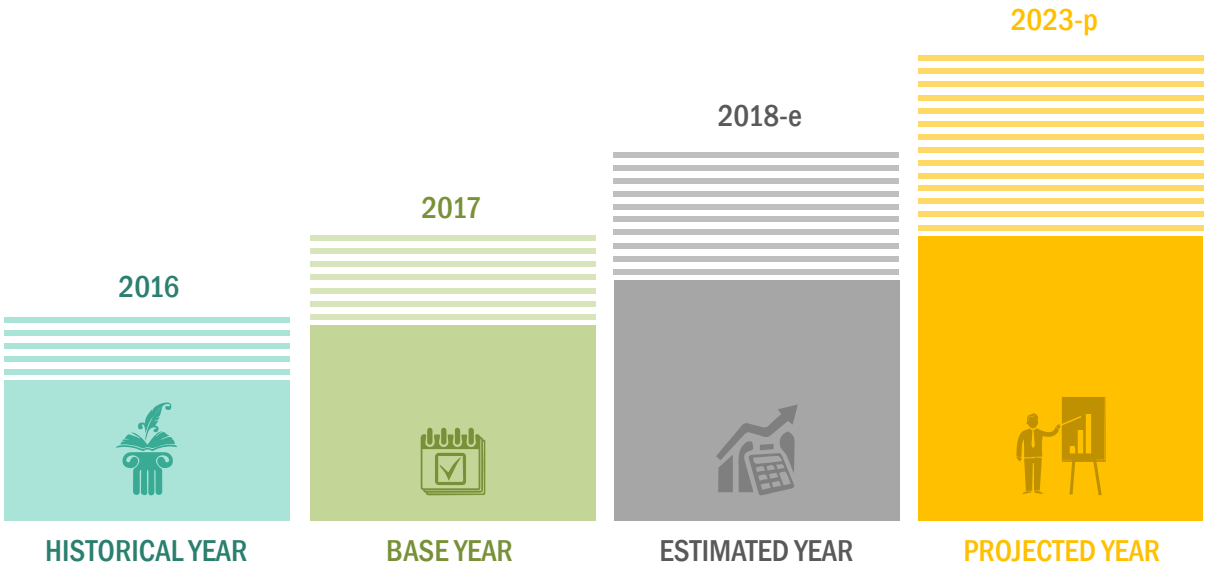
**Rest of Europe includes Spain, Sweden, Italy, and Switzerland*

***Rest of APAC includes India, Malaysia, and South Korea*

****Rest of MEA includes Israel and Kuwait*

*****Rest of Latin America includes Argentina, Costa Rica, Panama, and Chile*

1.4 YEARS CONSIDERED FOR THE STUDY



e: estimated; p: projected

Note: The forecast period under consideration is 2018–2023

Source: MarketsandMarkets Analysis

1.5 CURRENCY

The currency used in the report is the United States Dollar (USD), with the market size indicated in USD billion/million.

- For companies reporting their revenues in the USD, their revenue figures were sourced from their annual reports.
- For companies reporting their revenues in other currencies, the average annual currency conversion rate was used for that particular year to convert the value to USD.

1.6 STAKEHOLDERS

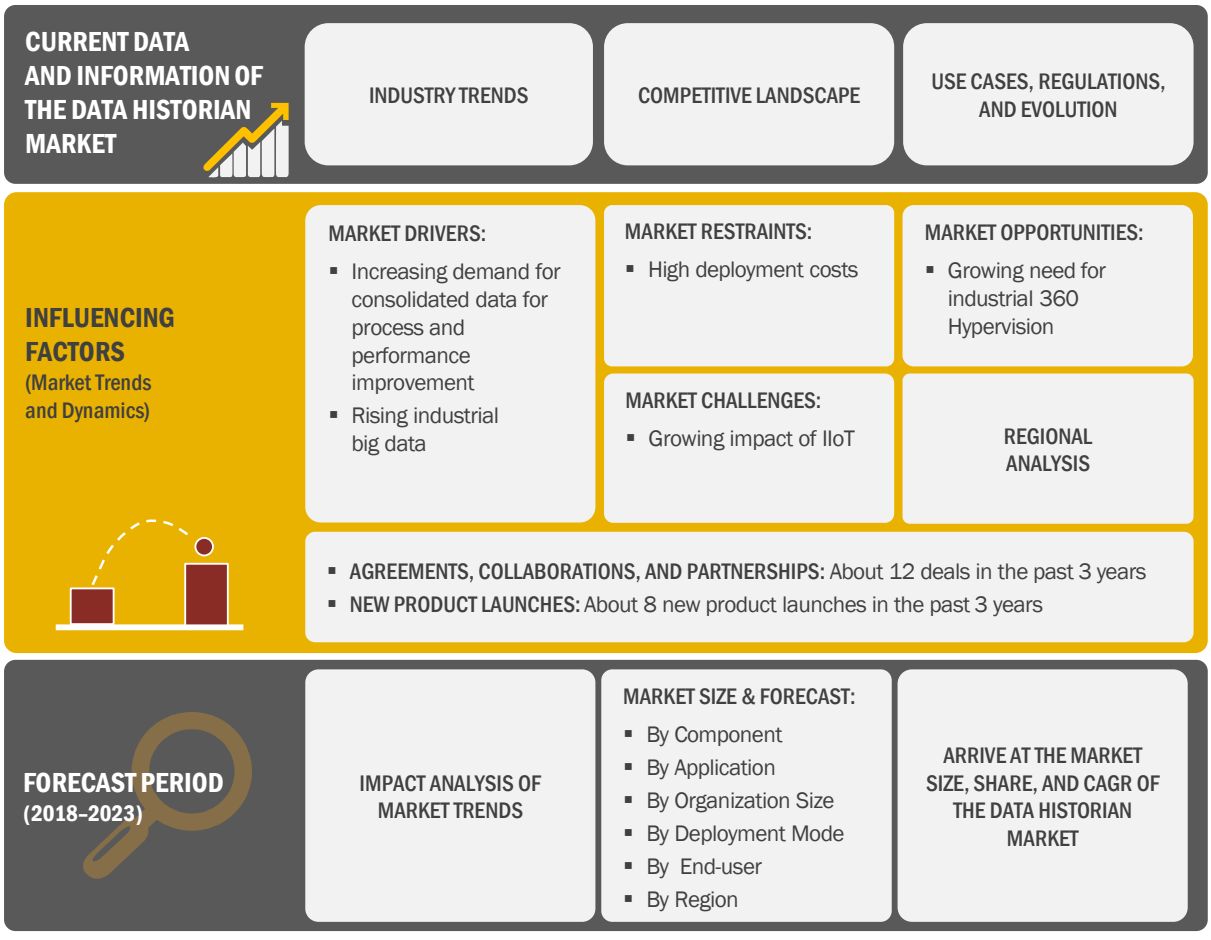
- Value-Added Reseller (VAR)
- Small and Medium-sized Enterprises (SMEs)
- Large enterprises
- Third-party providers
- Consultants/consultancies/advisory firms
- Professional service providers
- Software and application developers
- Government agencies

2 RESEARCH METHODOLOGY

2.1 RESEARCH DATA

The research study about the data historian market report involved the use of extensive secondary sources, directories, and several journals and magazines to identify and collect information useful for this technical and market-oriented study. During the production cycle of the report, in-depth interviews were conducted with various primary respondents, including key opinion leaders, subject matter experts, high-level executives of various companies offering data historian services, and industry consultants, to obtain and verify critical qualitative and quantitative information, and assess the market's prospects and industry trends.

FIGURE 3 DATA HISTORIAN MARKET: RESEARCH DESIGN



Source: MarketsandMarkets Analysis

2.1.1 SECONDARY DATA

In the secondary research process, various secondary sources were referred to for identifying and collecting information regarding this study. The secondary sources included annual reports, press releases, investor presentations of data historian tool vendors, white papers, certified publications, and articles from recognized industry associations, statistics bureaus, and government publishing sources. The secondary research was mainly used to obtain key information about the industry's value chain, total pool of key players, market classification, and segmentation from both the market and technology-oriented perspectives.

The factors considered for estimating the regional-level market size are as follows:

- Gross Domestic Product (GDP) growth
- Information and Communications Technology (ICT) spending
- Recent market developments
- Technology adoption rates for advanced security
- Market ranking analysis of major data historian providers

2.1.2 PRIMARY DATA

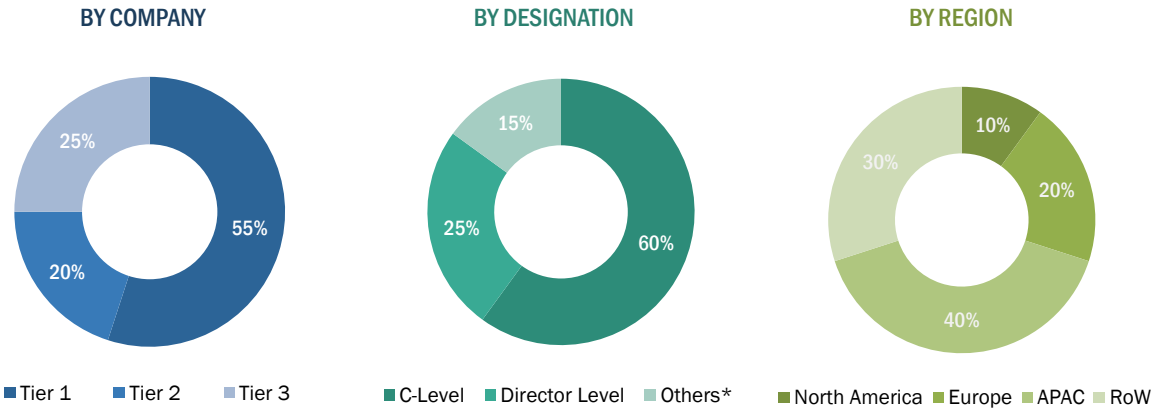
In the primary research process, various primary sources from both supply and demand-sides of the data historian market ecosystem were interviewed to obtain qualitative and quantitative information for this study. The primary sources from the supply-side included industry experts, such as Chief Executive Officer (CEO), Vice President (VP), marketing directors, technology and innovation directors, and related key executives of various vendors providing data historian services, and system integrators operating in the targeted regions. All possible parameters that affect the market covered in this research study have been accounted for, viewed in extensive detail, verified through primary research, and analyzed to get the final quantitative and qualitative data.

After the complete market engineering process (including calculations for market statistics, market breakdown, market size estimations, market forecasting, and data triangulation), an extensive primary research was conducted to gather information, and verify and validate the critical numbers arrived at. The primary research also helped identify and validate the segmentation types; industry trends; key players; the competitive landscape of market players; and key market dynamics, such as drivers, restraints, opportunities, challenges, industry trends, and key strategies.

In the complete market engineering process, bottom-up approaches were extensively used, along with several data triangulation methods, to perform market estimation and market forecasting for the overall market segments and subsegments listed in this report. Extensive qualitative and quantitative analysis were performed on the complete market engineering process to list key information/insights throughout the report.

2.1.2.1 Breakdown of primaries

FIGURE 4 BREAKDOWN OF PRIMARY INTERVIEWS: BY COMPANY, DESIGNATION, AND REGION

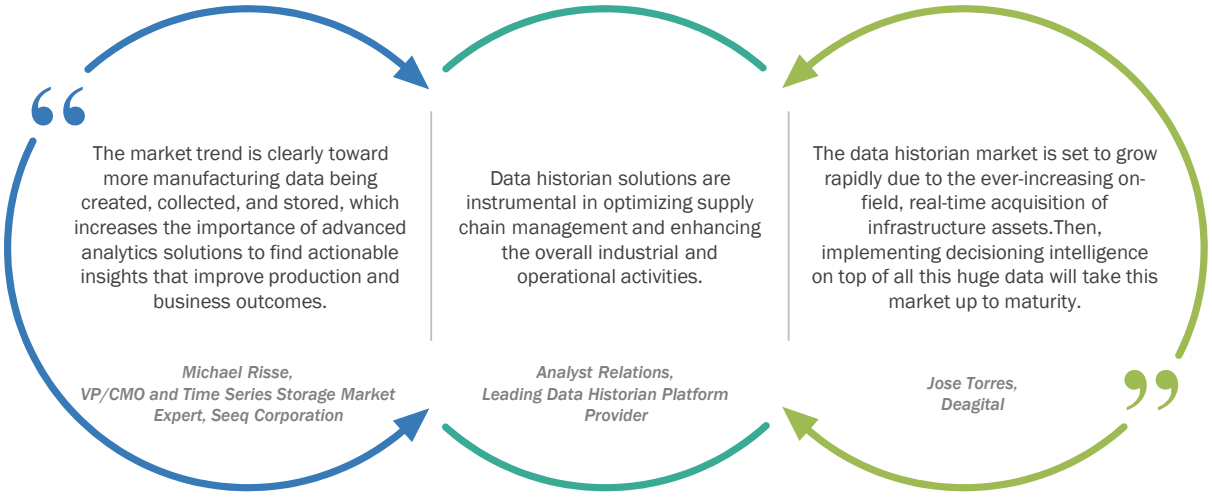


*Others include sales managers, marketing managers, and product managers

Note: Tier 1 companies have annual revenues of more than USD 10 billion, tier 2 companies' revenue ranges in between USD 1 and 10 billion of the overall revenues, and Tier 3 companies' revenue ranges in between USD 500 million and 1 billion of the overall revenues

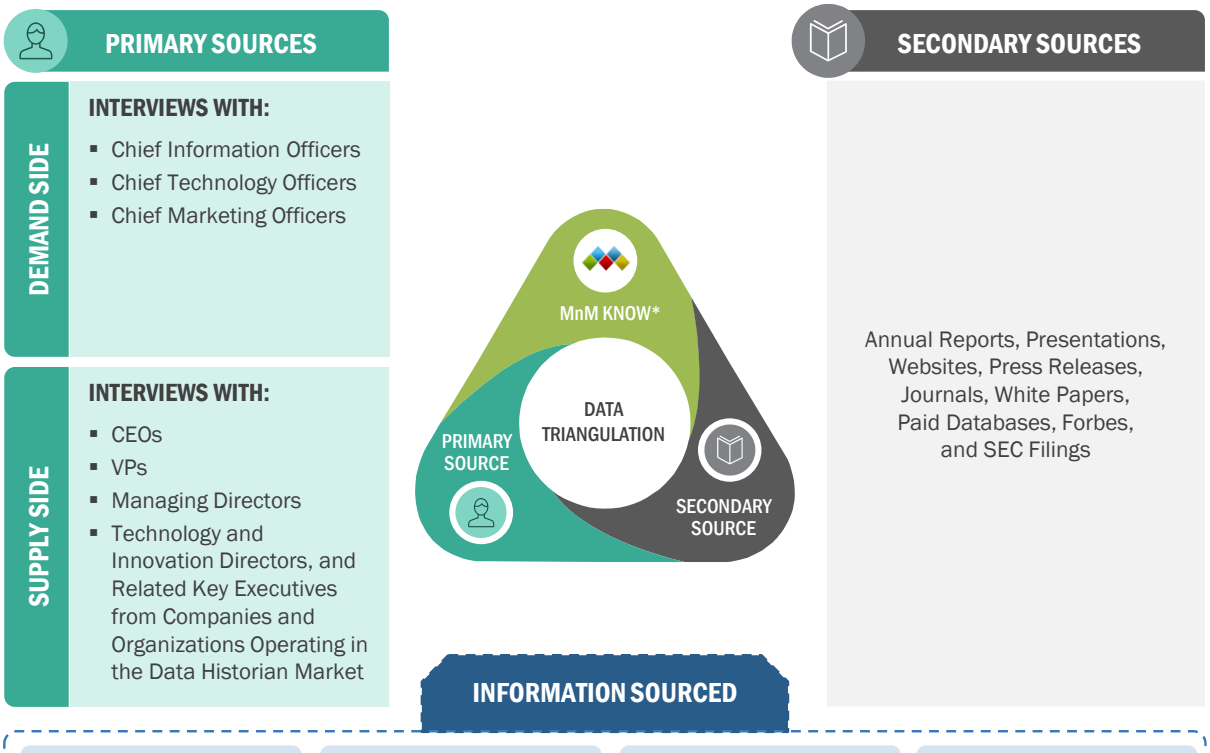
Source: Industry Experts

2.1.2.2 Key industry insights



Source: Industry Experts

FIGURE 5 DATA TRIANGULATION



MnM KNOW* stands for MarketsandMarkets' 'Knowledge Asset Management' framework. In this context, it stands for existing market research knowledge repository of over 5,000 granular markets, our flagship competitive intelligence and market research platform "Knowledge store", subject matter experts, and independent consultants. MnM KNOW acts as an independent source that helps us validate information gathered from primary and secondary sources.

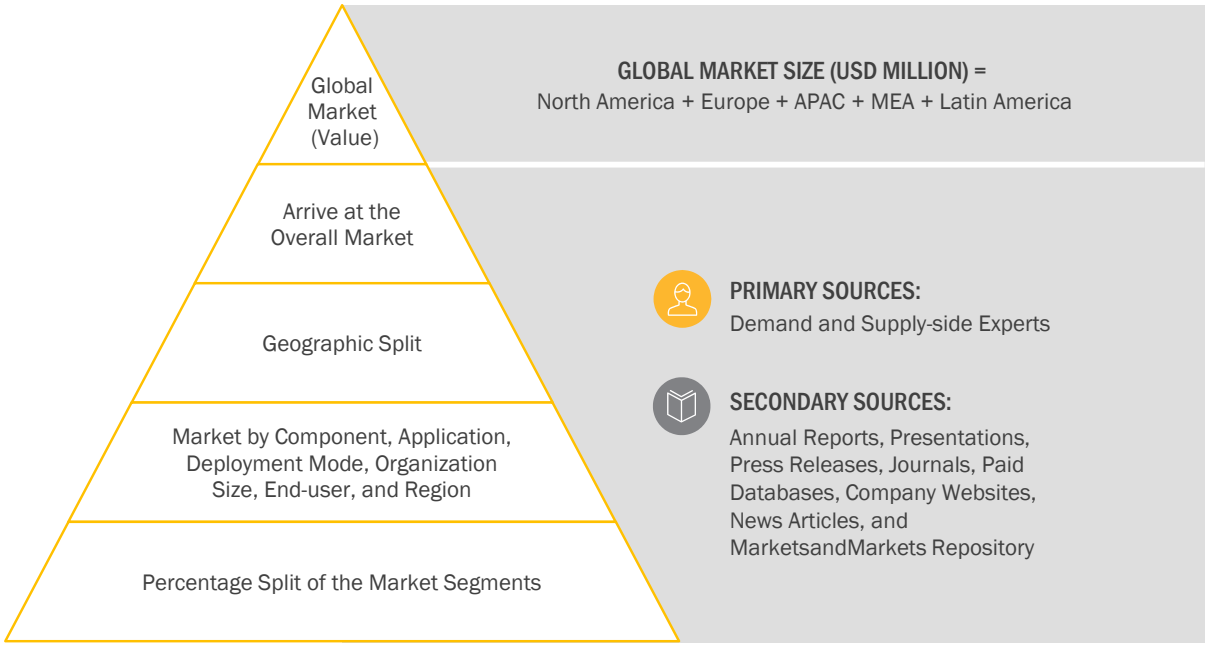
Source: MarketsandMarkets Analysis

2.2 MARKET SIZE ESTIMATION

For making market estimates and forecasting the data historian market, and the other dependent submarkets, both top-down and bottom-up approaches were used. The bottom-up procedure was deployed to arrive at the overall market size of the global data historian market using the revenues of the key companies and their offerings in the market. With data triangulation and validation through primary interviews, the exact value of the overall parent market size was determined and confirmed using this study. The overall market size was then used in the top-down procedure to estimate the size of other individual markets via percentage splits of the market segments.

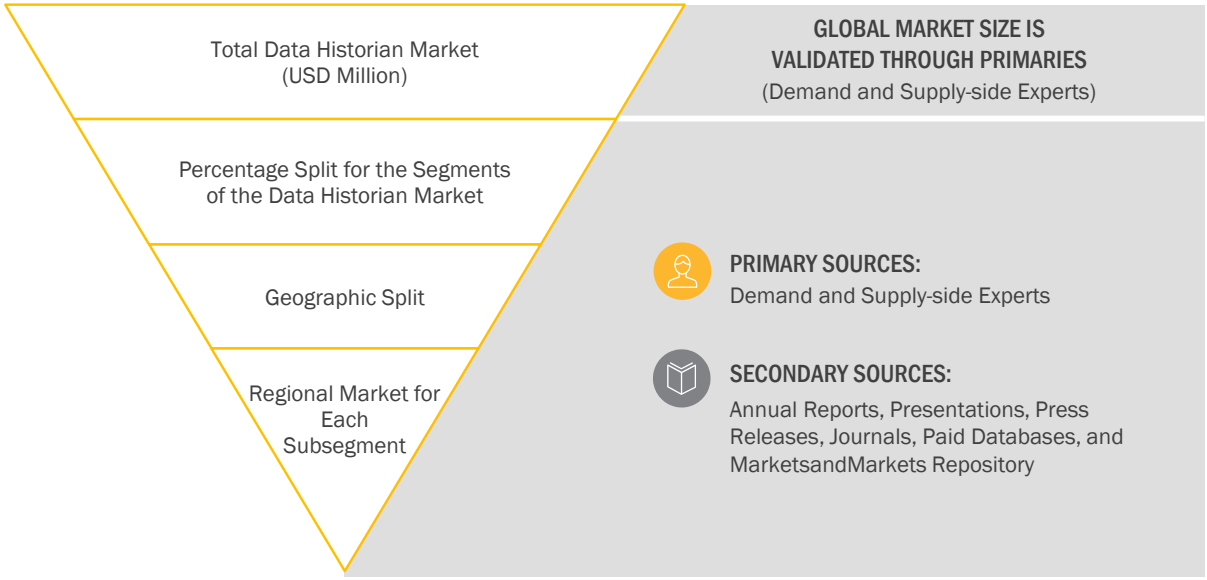
The following figures provide an illustrative representation of the overall market size estimation process employed for this study:

FIGURE 6 MARKET SIZE ESTIMATION METHODOLOGY: BOTTOM-UP APPROACH



Source: MarketsandMarkets Analysis

FIGURE 7 MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN APPROACH



Source: MarketsandMarkets Analysis

- The bottom-up procedure was employed to arrive at the overall market size of the data historian market.
- The overall market size was used in the top-down procedure to estimate the size of the individual markets via percentage splits.
- The individual markets include the subsegments of the main market, which consist of applications, components, deployment mode, organization size, end-users, and regions.
- For the calculation of each type of specific market segment, the most appropriate immediate parent market size was used for implementing the top-down procedure.
- The bottom-up procedure was also implemented for the data extracted from secondary research to validate the market segment revenues obtained.
- With the data triangulation procedure and validation of data through primaries, the exact values of the overall parent market size and each individual market size were determined and confirmed using this study.

2.3 RESEARCH ASSUMPTIONS

The following assumptions were taken into consideration for making the data historian market report:

FIGURE 8 DATA HISTORIAN MARKET: ASSUMPTIONS

PARAMETER	ASSUMPTION
EXCHANGE RATE	Dollar fluctuations are not expected to be serious enough to affect the forecasts to a significant extent. Fall in the value of dollar would enhance revenue growth opportunities for the US multinationals, whereas stability in the value of dollar would stabilize the price of imports and exports.
POLITICAL STABILITY	Most of the regions covered are politically stable. However, the political tension prevailing in some regions would not hamper their economic growth significantly.
GLOBAL ECONOMIC CONDITION	The world economy is assumed to be stable, exhibiting strong positive growth. This would also pertain among the economies of countries, which would increase the amount of IT spending across the globe.
FINANCIAL STATISTICS	All the revenue and financial insights were extracted from companies' website or annual report, which are true to the best of MarketsandMarkets' knowledge.

2.4 LIMITATIONS

- The scope of the market excludes all the data historian hardware.
- The internal staffing and related expenses were not considered while forecasting the market size.

3 EXECUTIVE SUMMARY

A data historian solution, also referred to as process historian or operational historian, is a software program that deals with time series data. A time series database stores data pieces in the order they were received. In other words, a time series database is optimal for retrieving a piece of data that changes over time. Process historians fall under the category of industrial software due to the critical role they play in the success of analysis and decision-making. Process historians are complex pieces of software that are used to store and analyze vital processes and industrial data. They record manufacturing data over a specific amount of time from different parts of the industry for the user to analyze. Moreover, data historian solutions help integrate confidential business data obtained from a wide range of external and internal sources under a controlled auditable environment. These solutions enable organizations to implement a uniform corporate solution for handling the internal review processes, incident reports, and audit findings. Additionally, they help the organizations come up with corrective measures to rectify the inconsistencies that occur.

Earlier, the data collection and storage method was based on manual entries, wherein all operational records, such as temperature, machine downtime, and machine pressure, were recorded manually on papers. This data was used to understand and analyze the production floor activities and make decisions accordingly. Subsequently, the use of computers enabled organizations to automate the data entries through computers. However, the generation of huge amounts of data from numerous sources was the critical issue among organizations. Therefore, the concept of data historian came into existence in 1970, which collects the data from numerous sources and records it on a time series basis. This evolution of data historian started around 1970, when companies started using computers in their daily operational activities and experienced many issues pertaining to unorganized data coming from diverse sources on the production floor.

Moreover, the beginning of the fourth industrial revolution, Industry 4.0; and advent of Industrial Internet of Things (IIoT) have transformed the data historian market space. The integration of IIoT with data historian has widened data historian applications. Additionally, the increasing volume and variety of industrial big data has created new opportunities for organizations to transform the way they manage their businesses. It results in enhanced operational efficiency, increased revenue, and reduced costs. Data historian software and services offer crucial benefits to enterprises; some of these benefits include cutting inevitable losses, creating new opportunities, saving costs by ensuring uninterrupted operations, and increasing efficiency by providing the time series data. By monitoring the historical and real-time machine performance, data historian provides data to reschedule the maintenance plan to act prior to any machine failure. Data historian provides decision-support systems for industrial processes by using data from operations to automate production scheduling as well as purchase order decisions.

The main factors driving the growth of the data historian market include rise in industrial big data and consolidating data for process and performance quality improvement. The data historian market also faces challenges, such as growing impact of IIoT. The data historian market is segmented on the basis of applications, components, deployment modes, organization size, end-users, and regions. APAC is estimated to have the largest market size in the data historian market in 2018, followed by North America, owing to the increasing number of manufacturing firms, proliferation of IoT devices, and emergence of Artificial Intelligence (AI). The adoption of data historian tools is increasing in APAC and Latin America, due to the rapid generation of data across end-users, and also due to the increasing investments in new technologies, such as machine learning and AI.

The major vendors in the data historian market include General Electric Company (GE), ABB Ltd (ABB), Emerson Electric Co. (Emerson), Siemens AG (Siemens), AVEVA Group plc (AVEVA Group), Honeywell International Inc. (Honeywell), Rockwell Automation, Inc. (Rockwell Automation), OSIsoft, ICONICS, Inc. (ICONICS), IBM Corporation (IBM), Yokogawa Electric Corporation (Yokogawa), PTC, Inc. (PTC), Inductive Automation, Canary Labs, Open Automation Software, InfluxData, Inc. (InfluxData), Progea, Kx Systems, Sorbotics, LLC (SORBA), Savigent Software, Inc. (Savigent Software), Automsoft, LiveData Utilities, Industrial Video & Control Co. (IV&C), Aspen Technology, Inc. (Aspen Technology), and COPA-DATA GmbH (COPA-DATA). These vendors have adopted various types of organic and inorganic growth strategies, such as new product launches, product upgradations, partnerships and collaborations, and mergers and acquisitions, to increase their offerings in the data historian market. Most of the vendors have opted for partnerships, collaborations, and agreements to enhance their business footprint. Some of the major developments that took place were: ICONICS upgraded its cloud-based IoT solution, GENESIS64 v10.95, by adding various new features, such as asset-enabled alarm counting and rollup, additional filter capabilities, and accurate visualization of event and historical data. This advanced version leverages data historian features, including hyperscalability performance calculation engine, asynchronous expressions engine, and hyper historian debugging. Similarly, AVEVA expanded its partnership with EOH, an IT services management company, to improve Sub-Saharan African sales and support for AVEVA's software portfolio.

TABLE 1 DATA HISTORIAN MARKET SIZE AND GROWTH RATE, 2016–2023 (USD MILLION, Y-O-Y%)

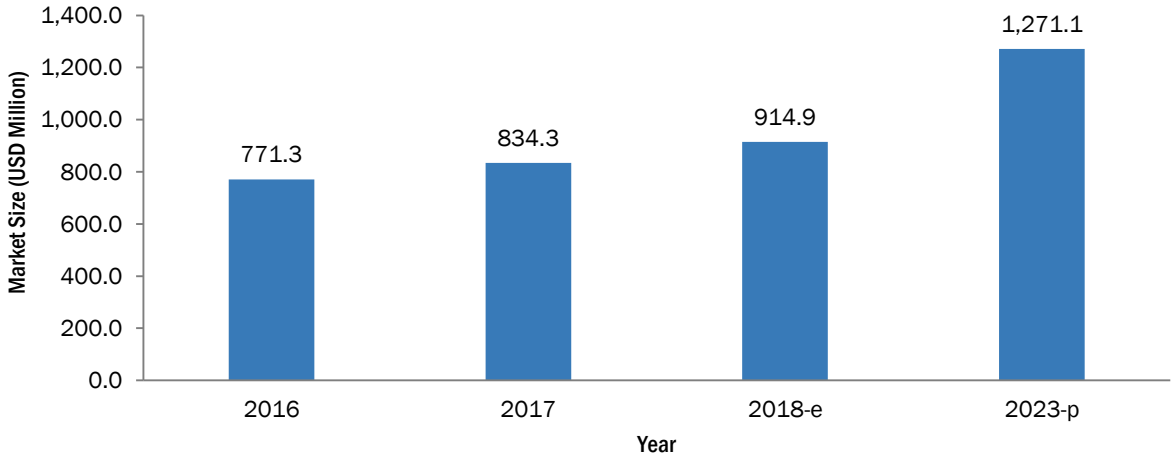
Data Historian Market	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Market Size	771.3	834.3	914.9	1,271.1	6.8%
Y-o-Y (%)	6.0%	8.2%	9.7%	6.0%	

e: estimated, p: projected

Note: Y-o-Y for the year 2023 has been calculated from 2022 to 2023

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

FIGURE 9 GLOBAL DATA HISTORIAN MARKET IS EXPECTED TO WITNESS SIGNIFICANT GROWTH DURING THE FORECAST PERIOD

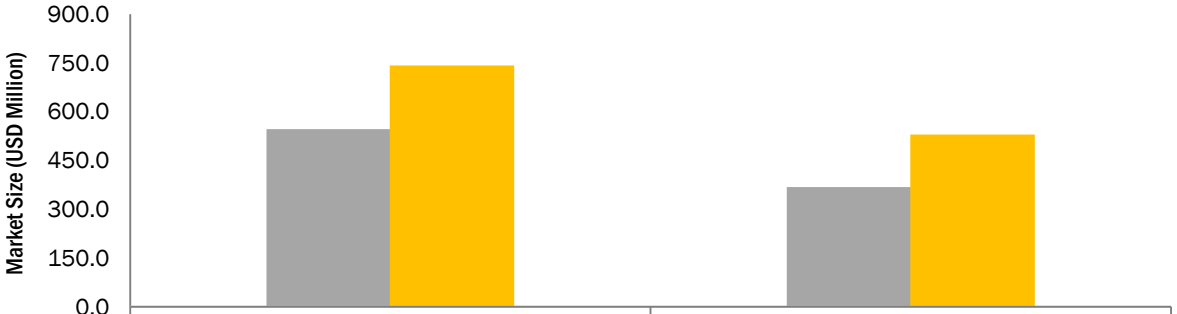


e: estimated; p: projected

Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

The table and figure given above highlight the data historian market size and growth rate from 2018 to 2023. The market size is expected to grow from USD 914.9 million in 2018 to USD 1,271.1 million by 2023, at a Compound Annual Growth Rate (CAGR) of 6.8% during the forecast period.

FIGURE 10 DATA HISTORIAN MARKET SNAPSHOT, BY COMPONENT, 2018 VS. 2023



	Software/Tool	Services
2018-e	546.6	368.3
2023-p	741.9	529.2
CAGR	6.3%	7.5%

e: estimated; p: projected

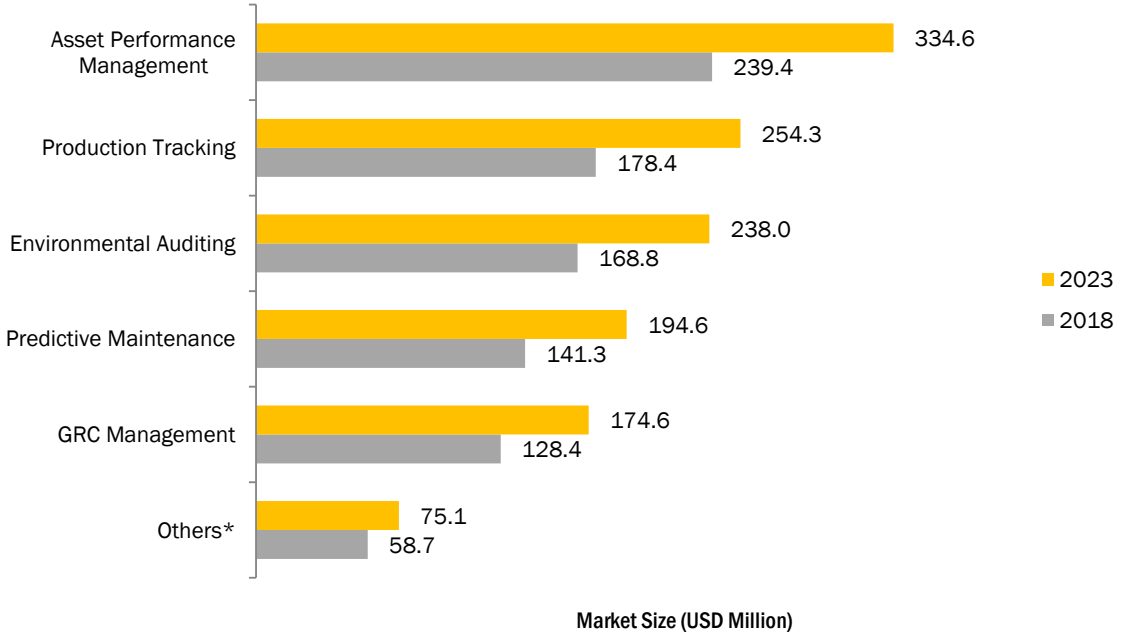
Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

FIGURE 11 DATA HISTORIAN MARKET SNAPSHOT, BY SERVICE, 2018 VS. 2023

Note: Percentage values indicate market shares of the services in 2018

Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

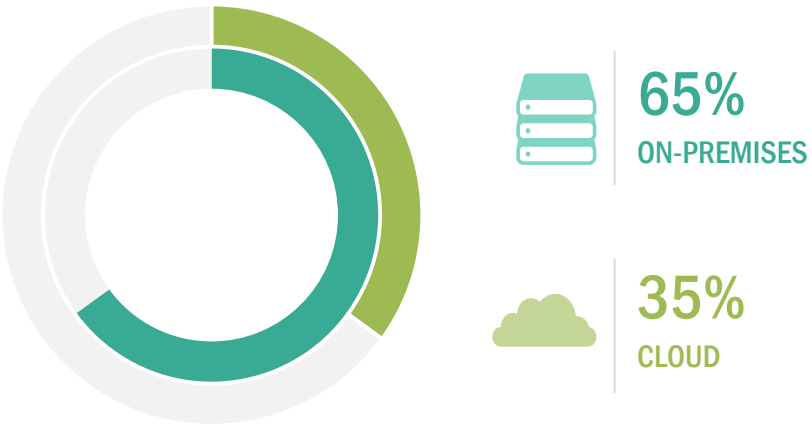
FIGURE 12 DATA HISTORIAN MARKET SNAPSHOT, BY APPLICATION, 2018 VS. 2023



*Others includes security and quality control management

Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

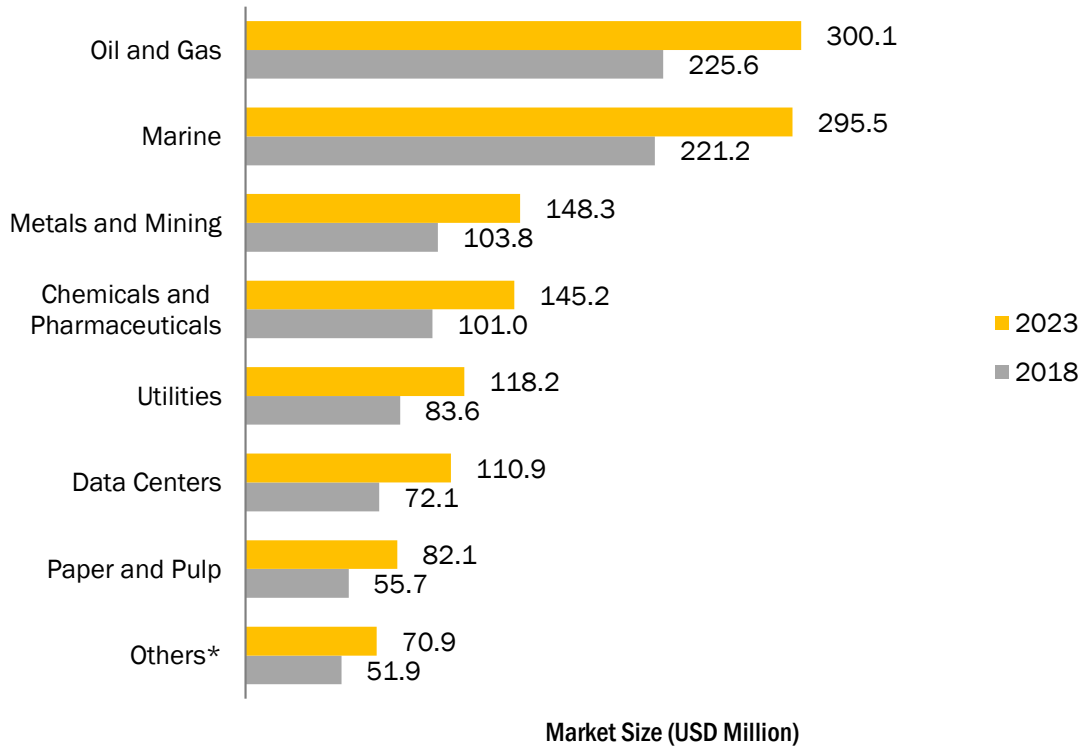
FIGURE 13 DATA HISTORIAN MARKET SNAPSHOT, BY DEPLOYMENT MODE, 2018 VS. 2023



Note: Percentage values indicate market shares of the deployment modes in 2018

Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

FIGURE 14 DATA HISTORIAN MARKET SNAPSHOT, BY END-USER, 2018–2023



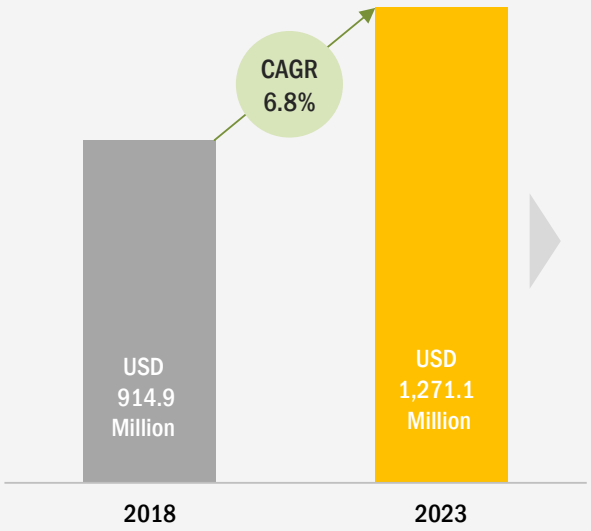
*Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways

Source: Press Releases, Investor Presentations, Expert Interviews, and MarketsandMarkets Analysis

4 PREMIUM INSIGHTS

4.1 ATTRACTIVE OPPORTUNITIES IN THE DATA HISTORIAN MARKET

FIGURE 15 RAPID GROWTH IN INDUSTRY DATA VOLUMES AND DATA CONSOLIDATION FOR PROCESS AND PERFORMANCE QUALITY IMPROVEMENT ARE EXPECTED TO DRIVE THE GROWTH OF THE DATA HISTORIAN MARKET

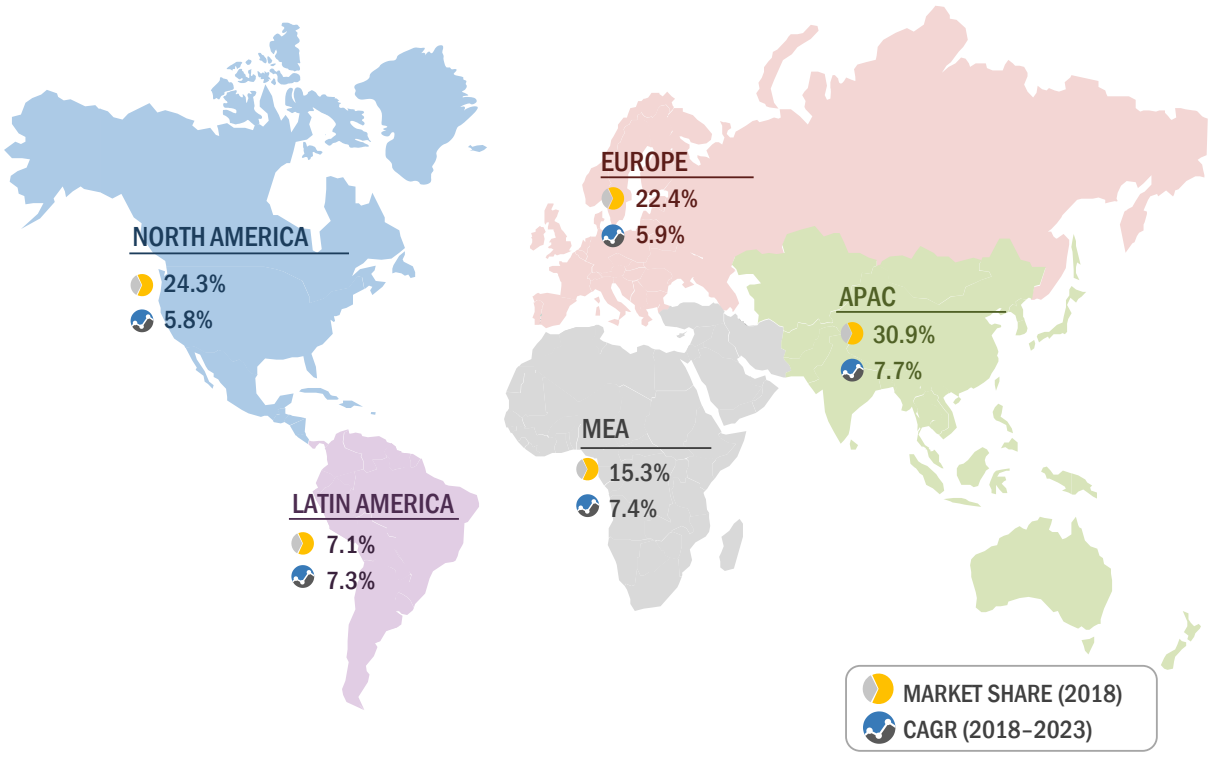


- The global data historian market is projected to reach USD 1,271.1 million by 2023, growing at an estimated CAGR of 6.8% from 2018 to 2023.
- Increasing volume of industry data and data consolidation for process and performance quality improvement are the major driving factors for the data historian market.
- Increasing projects based on SCADA are expected to further fuel the growth of the data historian market.
- Emerging economies in MEA and Latin America offer several untapped and unexplored opportunities.

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

4.2 DATA HISTORIAN MARKET: MARKET SHARE, BY REGION

FIGURE 16 ASIA PACIFIC IS ESTIMATED TO HAVE THE LARGEST MARKET SHARE IN 2018



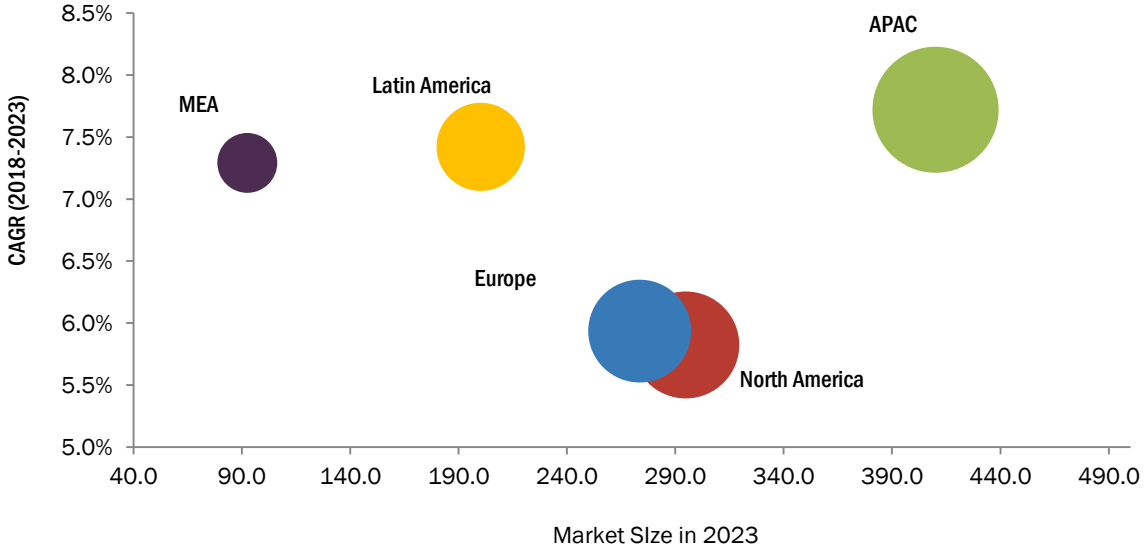
Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

4.3 INVESTMENT OPPORTUNITIES IN THE DATA HISTORIAN MARKET

The data historian market in this report is divided into 5 major regions, namely, North America, Europe, APAC, MEA, and Latin America. APAC is expected to be the overall leader in the adoption and implementation of data management and historian solutions and services, followed by North America. Rising volume of industrial big data, and data consolidation for process and performance quality improvement are expected to drive the market in both APAC and North America. The advent of AI and machine learning technologies in data management solutions and increasing investments across end-users are expected to bolster the data historian market growth in APAC.

4.4 DATA HISTORIAN MARKET: MARKET SHARE, BY REGION

FIGURE 17 ASIA PACIFIC IS ESTIMATED TO HAVE THE LARGEST MARKET SHARE IN 2018



Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

5 MARKET OVERVIEW

5.1 INTRODUCTION

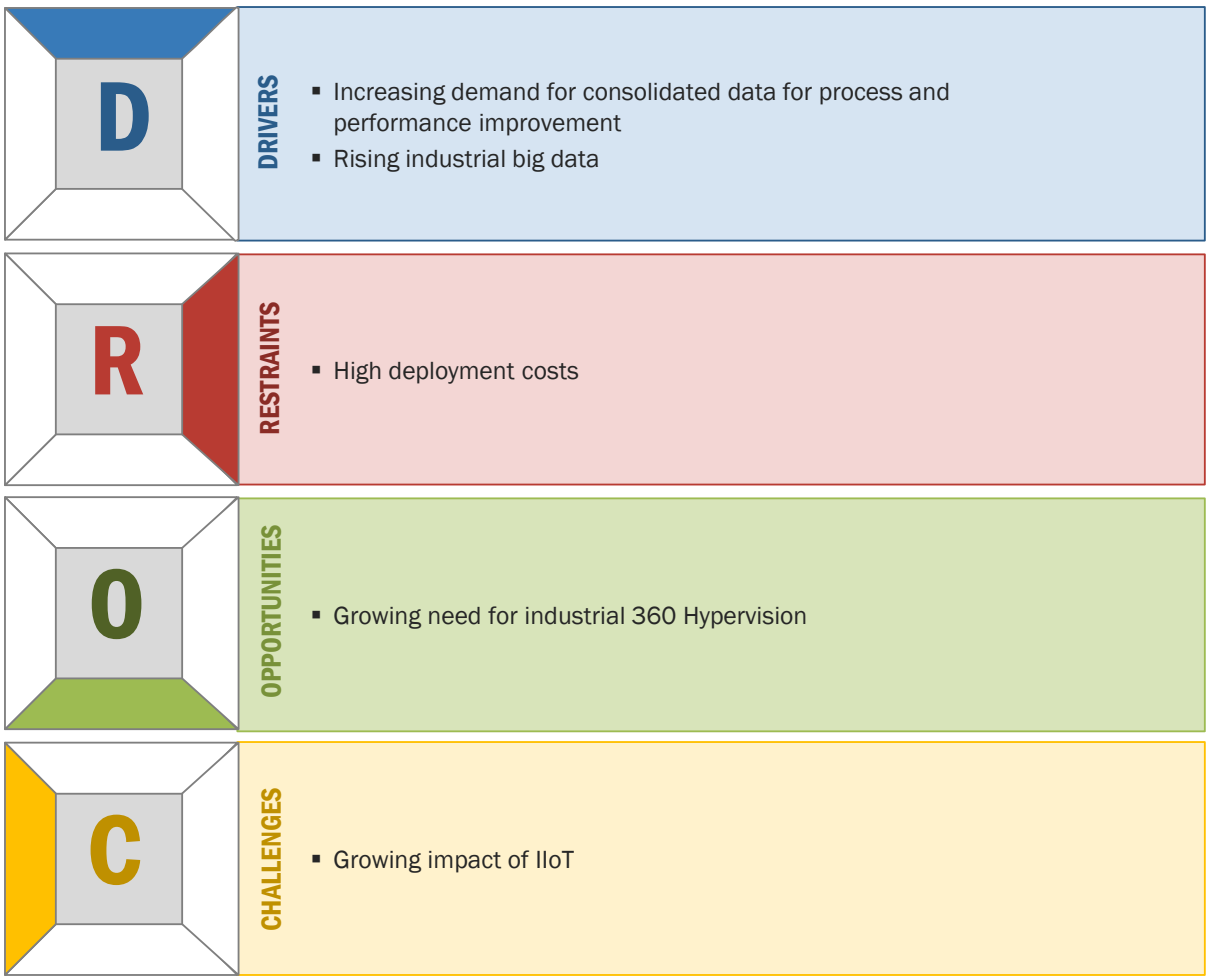
The market overview chapter consists of factors that are responsible for the growth of the market. It also includes various market dynamics, including drivers, restraints, opportunities, and challenges. Further, it explains case studies and architecture related to the data historian market. The total data historian market analysis comprises the evaluation of the market by component, application, deployment mode, organization size, end-user, and region. The data historian software gathers and stores asset-generated data and enables rapid retrieval whenever it is needed for analysis. Major companies such as IBM, ABB Corporation, Honeywell, Siemens, and Aveva Group offer comprehensive data historian solutions.

5.2 MARKET DYNAMICS

North America and Europe are expected to grow significantly, followed by APAC. Furthermore, Latin America and MEA, due to the lack of awareness of data historian solutions, are expected to witness slow but gradual growth. The major factors that are expected to drive the market include the growing need for consolidation of data for process and performance improvement. Whereas the high deployment cost of the data historian solutions might hinder the growth of the market to a certain extent.

Apart from drivers and restraints, the market is expected to provide a few lucrative opportunities for data historian solution providers. These opportunities include the increasing need for industrial 360 Hypervision for gaining a holistic view of processes to identify and rectify technical and operational glitches. However, the growing impact of the IIoT is expected to challenge the growth of the market.

FIGURE 18 DATA HISTORIAN MARKET: DRIVERS, RESTRAINTS, OPPORTUNITIES, AND CHALLENGES



Source: Secondary Literature, Press Releases, Expert Interviews, and MarketsandMarkets Analysis

5.2.1 DRIVERS

5.2.1.1 Increasing demand for consolidated data for process and performance improvement

With rapid business expansions, it has become necessary for businesses to deliver the right information to the right person at the right time. Despite complications, consolidating data has become necessary for prioritizing business activities, which include enhancement in customer experience, operational process, and overall business performance. Data historian solutions play an important role in collecting, storing, and making the stored data available to users across enterprises. The data historian solutions synchronize the data, and thus eliminate the complexity of maintaining multiple connections across distant site locations. Due to reduced complexities plant managers and engineers can analyze and tune control loops, investigate incidents, and detect changes in equipment behavior. Real-time decisions and advanced analytics are expected to drive the adoption of data historian solutions. Hence, the data historian solutions have become important for integrating data from various sources. These solutions provide better operational decisions for process and performance improvement.

5.2.1.2 Rising industrial big data

As organizations are becoming scattered and sensors affordable, data volumes are also rising at an exponential rate. Industrial big data is the explosion of data, which is difficult to manage as it is collected from multiple systems, devices, and applications. Thus, it has become necessary for engineering industries to replace their outdated software solutions with data historian solutions. The size of big data can vary from a few dozen terabytes to many petabytes of statistics in a single data set. With the increasing availability of advanced devices and technologies, numerous agencies are leveraging the benefits of statistics for operational excellence and predictive analysis, which accelerate businesses' growth. To leverage the benefits of big data, industries are deploying data historian solutions to retrieve the collected data from different sources and permit the historical analysis of critical business trends for enabling real-time predictive analysis.

5.2.2 RESTRAINTS

5.2.2.1 High deployment costs

With the ongoing innovations, manufacturing excellence can be achieved by leveraging the advantages of companies' ecosystem which consists of customers, partners, and various outside participants. It requires extensive implementation of advanced analytical tools and automation processes. As the deployment cost of data historian solutions is high, a long-term investment is required for digitizing and improving business operations. With the growing impact of IoT and IIoT, the adoption of data historian software is expected to be slow in the manufacturing industry. Additionally, IoT sensors are comparatively cheaper as compared to that of data historian servers. This factor is expected to restrain the adoption of data historian servers in the market.

5.2.3 OPPORTUNITIES

5.2.3.1 Growing need for industrial 360 Hypervision

With data being the major factor for making the right decisions, it has become important to have a closer look at the process control industry. 360 Hypervision helps maintain accuracy, mitigate production costs, and enhance productivity and quality during the production life cycle., Additionally, with the increasing digitalization and falling cost of sensors, industrial data would provide a holistic view of operational performance throughout the entire production life cycle. This data can be utilized to identify and rectify bottlenecks and barriers for carrying out effective production on a real-time basis.

5.2.4 CHALLENGES

5.2.4.1 Growing impact of IIoT

IIoT consists of connected industrial systems, which coordinate their information analytics to enhance overall industrial performance. A key function of IIoT and Big Data technologies is to deliver insights for enhancing operational processes and assisting decision makers in making actionable decisions across enterprises. Both data historian and IIoT solutions are capable of gathering actionable insights through sensors and actuators, which are used to obtain and gain deeper perception via records and analytics. Despite data historian represents meaningful data, it requires more time to extract the same value as compared to an IIoT solution. IIoT solutions deliver improved scalability, gather meaningful business insights, and present operational data to provide organizations with more visibility into their processes on a real-time basis.

5.3 INDUSTRY TRENDS

Organizations across the globe are rapidly deploying data historian solutions to improve their operations and minimize losses, so that they can obtain a competitive edge in the market. The major market players such as IBM, Aveva, and Honeywell have adopted numerous organic growth strategies, such as mergers and acquisitions, new product launches, and business expansions, to enhance their market shares.

This chapter provides detailed information about use cases and architecture related to the data historian market.

5.4 DATA HISTORIAN: USE CASES

This section includes case studies of various vendors and provides live use cases of the data historian market. These case studies include various deployment scenarios, wherein data historian applications are being used by organizations to deliver comprehensive solutions.

5.4.1 USE CASE #1: ENHANCED VISIBILITY OF DATA RESULTED IN GREATER PRODUCTIVITY

Description	In the manufacturing industry, the production floor data can be gathered from numerous sources. This data can be in structured and semi-structured or unstructured formats. Thus, visualizing this data on the basis of time series is a complex and time-consuming task for any manufacturer. Due to which manufacturers are unable to turn their data into actions. Uponor North America, one of the leading manufacturers of crosslinked polyethylene (PEX) pipes, was facing similar issues pertaining to its data. To resolve its data issues, the company used Savigent Software's data historian solution.
Savigent Software's Data Historian Solution	Savigent Software, a data historian solution provider, helps numerous organizations see their production data in a single view through its context-aware process data historian capability. This software helped Uponor North America create a series of protocols that can visualize its data on the basis of time series and help the organizations make decisions in real time. Moreover, the solution notifies operations officials in case of machine breakdowns.
Benefits	With the help of Savigent Software's data historian solution, manufacturers can visualize all operational activities that take place on the production floor in real-time and streamline workflow processes in case of issues.

Source: Company Website

5.4.2 USE CASE #2: MOVING DATA FROM PROGRAMMABLE LOGIC CONTROLLER (PLC) TO OPEN DATABASES FOR HISTORICAL LOGGING AND ANALYSIS

Description	Allen Bradley, a factory line of a Rockwell Automation company, needed to move its data from Allen Bradley PLCs to open databases for analyzing and logging the historical data. The company used Open Automation Software's (OAS) Data Historian software to perform this activity.
Open Automation Software's Solution	The OAS Data Historian software enables organizations to log data to SQL Server, Oracle, Access, MySQL, Azure SQL, and CSV files in both wide and narrow table formats. The solution records the data generated through IIoT devices from multiple locations using its store and forward functionality. This can achieve faster data movement and arrange the data according to time series in the targeted database.
Benefits	Allen Bradley could access multiple physical locations to capture all data points and transfer data to the targeted database during network downtime.

Source: Company Website

5.4.3 USE CASE #3: DATA MINING AND DATA AGGREGATION NEEDS

Description	Metal Trade Comax, a provider of non-ferrous casting alloys, and surface treated metal sheets and bands, needed to track and visualize its coating line data to avoid the defective production of sheets.
ICONICS Solution	The company used ICONICS GENESIS32 and GraphWorX32 to perform activities, such as data visualizing logging, reporting, and charting the data related to coating line. Moreover, the ICONICS Software uses Microsoft Dynamics NAV, an enterprise resource planning software, to exchange the production data for achieving higher integration of data and processes.
Benefits	ICONICS Software helped Metal Trade Comax to monitor and control its entire production process, and gain interoperability with its devices from diverse vendors.

Source: Company Website

5.5 DATA HISTORIAN: EVOLUTION

Earlier, data collection and storage methods were based on manual entries, wherein all the operational records, such as temperature, machine downtime, and pressure of machines, were recorded manually on papers. This data was used to understand and analyze production activities, and make decisions accordingly. Subsequently, the use of computers enabled organizations to automate their data entries. However, generation of a huge amount of data from numerous sources was the critical issue among the organizations. Thus, around 1970, the concept of data historian came into existence which collects data from numerous sources and records it on the basis of time series. The concept evolved when companies started using computers in their daily operational activities and experienced many issues pertaining to unorganized data coming from diverse sources on the production floor.

Moreover, the beginning of the 4th industrial revolution, Industry 4.0 and advent of IIoT have transformed data historian. The integration of IIoT with data historian solutions has widened the applicability of the data historian solutions. Data historian solutions help organizations enhance their operational efficiency, increase revenue, and reduce costs. Additionally, the increasing volume and variety of industrial big data has transformed the way organizations manage their businesses. Data historian software and services offer crucial benefits, such as cutting inevitable losses, creating new opportunities, saving costs by ensuring uninterrupted operations, and increasing efficiency by providing time series data, to enterprises. Through monitoring the historical and real-time machine performance, data historian solutions provide data to reschedule the maintenance plan for avoiding machine failures. Additionally, the data historian solutions offer decision support systems for industrial processes by using the data from operations to automate production scheduling as well as purchase order decisions.

5.6 REGULATIONS

5.6.1 EU GENERAL DATA PROTECTION REGULATION (GDPR)

This regulation came into force in May 2018 across the European Union. This would replace the Data Protection Directive 95/46/ec and safeguard the EU citizens' personal data. The GDPR regulations are applicable to every citizen of the EU. These regulations are drafted to protect personal and consumers' data, across the EU nations. Key privacy and data protection requirements of the GDPR include:

- Confidentiality of collected data to ensure data protection
- Safe transfer of data across borders
- Prior consent of subjects for data processing
- Data breach notifications

The GDPR would impose consistent data security for all EU member countries, which are marketing goods and services to EU residents.

5.6.2 CLOUD STANDARD CUSTOMER COUNCIL (CSCC)

CSCC is an end-user advocacy group. The core responsibilities of this group include increasing the adoption of cloud, resolving security and interoperability issues, and providing facilities for the effective implementation of cloud with few standards.

Additionally, CSCC has the following responsibilities:

- Deliver customer-focused content in the form of best practices, patterns, case studies, use cases, and standard roadmaps
- Simplify the standard development process for new standards
- Facilitate the exchange of real-world stories, practices, lessons, and insights

6 DATA HISTORIAN MARKET, BY APPLICATION

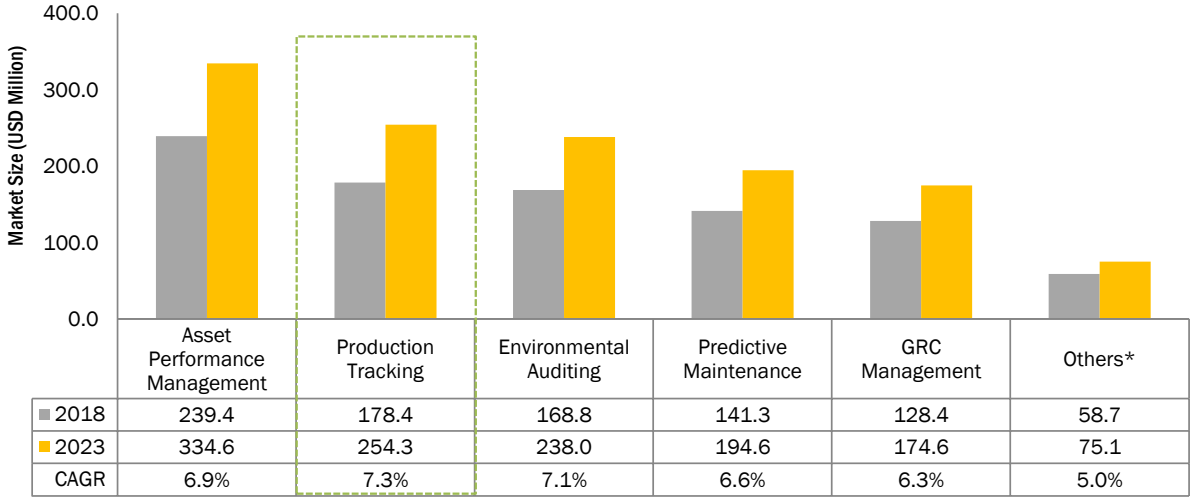
KEY FINDINGS

- Data historian software solutions have automated various data-driven tasks that are performed at the operational floor. These tasks include performance monitoring, quality control, and cost controlling, and they are expected to drive the market growth.
- The asset performance management application is estimated to contribute the highest revenue to the data historian market and hold the market size of USD 239.4 million in 2018, which is projected to reach USD 334.6 million by 2023, growing at a CAGR of 6.9% during the forecast period.
- The production tracking application is expected to follow the asset performance management in terms of growth and expected to grow at the highest CAGR of 7.3% during the forecast period.
- The Governance, Risk, and Compliance (GRC) management application assists enterprises in automating and improvising their production processes to save resources, costs, and the time spent on managing the current compliance mandates.
- The need to minimize unexpected downtimes has created a demand for predictive maintenance solutions lately. Reducing the production time is a major factor in accelerating the adoption of data historian software and services across engineering industries.

6.1 INTRODUCTION

An enterprise solution has numerous applications that manage different business processes and operations. The data generated from disparate sources across a production site needs to be captured, stored, monitored, and managed in a consolidated data repository. Hence, data historian applications enable consolidation of the plant and process data to make the optimum use of this data and enhance the entire production cycle. Various applications of the data historian market include production tracking, environmental auditing, asset performance management, GRC management, predictive maintenance, and others (security and quality control management)

FIGURE 19 PRODUCTION TRACKING APPLICATION IS EXPECTED TO GROW AT THE HIGHEST CAGR DURING THE FORECAST PERIOD



	Asset Performance Management	Production Tracking	Environmental Auditing	Predictive Maintenance	GRC Management	Others*
2018	239.4	178.4	168.8	141.3	128.4	58.7
2023	334.6	254.3	238.0	194.6	174.6	75.1
CAGR	6.9%	7.3%	7.1%	6.6%	6.3%	5.0%

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

TABLE 2 DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	147.8	161.2	178.4	254.3	7.3%
Environmental Auditing	140.8	153.1	168.8	238.0	7.1%
Asset Performance Management	201.0	217.9	239.4	334.6	6.9%
GRC Management	109.8	117.9	128.4	174.6	6.3%
Predictive Maintenance	119.8	129.2	141.3	194.6	6.6%
Others*	52.1	55.0	58.7	75.1	5.0%
Total	**771.3**	**834.3**	**914.9**	**1,271.1**	**6.8%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application. The asset performance management application is expected to grow from USD 239.4 million in 2018 to USD 334.6 million by 2023, at a CAGR of 6.9%. The production tracking application is expected to grow from USD 178.4 million to USD 254.3 million, at the highest CAGR of 7.3% during the forecast period.

6.2 PRODUCTION TRACKING

Production tracking is the most critical process in any manufacturing plant. Efficient production tracking enables quality improvement using root cause analysis, better monitoring and reporting, and improved supervision over raw material to avoid wastage. Data historian solutions collect, store, analyze, and represent information from over a diversified production floor and data source to enable users to get real-time manufacturing intelligence outcomes. For example, OSIsoft, through its PI historian platform, delivers robust manufacturing intelligence solutions, which include Overall Equipment Effective (OEE), product tracking and genealogy, electronic batch record reports, and asset utilization monitoring for better production tracking throughout the production life cycle.

TABLE 3 PRODUCTION TRACKING: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	38.6	41.0	44.2	58.1	5.6%
Europe	31.9	34.6	38.1	53.4	7.0%
APAC	48.6	54.5	61.9	94.9	8.9%
MEA	17.4	18.8	20.6	28.8	6.9%
Latin America	11.3	12.3	13.6	19.2	7.1%
Total	**147.8**	**161.2**	**178.4**	**254.3**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the production tracking application by region. APAC is expected to grow from USD 61.9 million in 2018 to USD 94.9 million by 2023, at the highest CAGR of 8.9% during the forecast period.

6.3 ENVIRONMENTAL AUDITING

Pollution is an unavoidable consequence of modern industrial technologies, which are impacting humans' health and the economic well-being. Environmental auditing can be referred to as the process of analyzing the impact of industries on the environment. It has become necessary to perform environmental audits to make industries aware of the use of better and cleaner technologies. Data historian solutions help in understanding the previous use of the industrial site through the collected historical plant data, which can be further analyzed to identify the glitches and rectify them to build cleaner manufacturing environment. Moreover, these solutions can be used to identify potential cost-savings from waste minimization and other activities.

TABLE 4 ENVIRONMENTAL AUDITING: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	30.9	33.3	36.5	50.6	6.7%
Europe	35.5	38.7	42.8	61.0	7.3%
APAC	41.6	44.8	48.9	66.7	6.4%
MEA	23.1	25.8	29.2	44.3	8.7%
Latin America	9.7	10.4	11.4	15.4	6.3%
Total	**140.8**	**153.1**	**168.8**	**238.0**	**7.1%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the environmental auditing application by region. APAC is expected to grow from USD 48.9 million in 2018 to USD 66.7 million by 2023, at a CAGR of 6.4% during the forecast period. The market size in MEA is expected to grow from USD 29.2 million to USD 44.3 million, at the highest CAGR of 8.7% during the forecast period.

6.4 ASSET PERFORMANCE MANAGEMENT

Industrial organizations, particularly the upstream oil and gas, and power and utilities sectors, are investing in solutions to reduce the unplanned interruption in production, optimize asset utilization, mitigate maintenance costs, and cut the risk of failures of both critical and non-critical assets. Through the real-time process data from the data historian's systems, near-time abnormalities and the future performance of machineries can be predicted. The collected data is essential for developing and designing new inspections routines, maintenance schedules, safety measures, and other necessary initiatives to extend the life of an asset. Furthermore, with automation gaining traction, the data historian solutions are in demand lately. Companies such as Schneider Electric and iSolutions Inc. are offering asset performance management solutions.

TABLE 5 ASSET PERFORMANCE MANAGEMENT: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	48.2	50.8	54.3	69.4	5.0%
Europe	42.6	44.5	47.2	58.6	4.4%
APAC	67.1	75.7	86.4	134.4	9.2%
MEA	31.2	33.7	36.9	50.8	6.6%
Latin America	11.9	13.1	14.6	21.4	7.9%
Total	**201.0**	**217.9**	**239.4**	**334.6**	**6.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the asset performance management application by region. APAC is expected to grow from USD 86.4 million in 2018 to USD 134.4 million by 2023, at the highest CAGR of 9.2% during the forecast period.

6.5 GOVERNANCE, RISK, AND COMPLIANCE MANAGEMENT

The GRC management application assists enterprises in automating and reorganizing the production process to save resources, costs, and the time spent on managing the current compliance mandates. Organizations collect, store, process, and exchange large volumes of information and face several data security and data privacy-related challenges. GRC management refers to data strategies for managing several corporate governances and corporate compliance issues to meet the regulatory requirements. Data historian helps organizations test, remediate, attest, and manage their corporate structure, and also spot compliance gaps, prioritize remediation, and adapt to the evolving regulations rapidly. Compliance management applications enable organizations to implement, manage, monitor, and measure the effectiveness of their governance and compliance strategies. In addition, cloud-based compliance management applications provide organizations with all the necessary tools for creating an effective internal management system. The collaborative workspace helps process managers in determining an organization's compliance level.

TABLE 6 GOVERNANCE, RISK, AND COMPLIANCE MANAGEMENT: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	27.0	29.0	31.6	42.9	6.3%
Europe	26.6	28.0	29.9	38.0	4.9%
APAC	27.8	29.4	31.6	41.2	5.4%
MEA	20.8	23.1	26.1	39.1	8.4%
Latin America	7.6	8.3	9.2	13.4	7.8%
Total	**109.8**	**117.9**	**128.4**	**174.6**	**6.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the GRC management application by region. North America is expected to grow from USD 31.6 million in 2018 to USD 42.9 million by 2023, at a CAGR of 6.3% during the forecast period. The market size in MEA is expected to grow from USD 26.1 million in 2018 to USD 39.1 million by 2023, at the highest CAGR of 8.4% during the forecast period.

6.6 PREDICTIVE MAINTENANCE

Managing large fleet of assets has become difficult. Additionally, collaborating data from multiple systems across numerous industrial sites is tedious. To simplify the consolidation of data, many industrial businesses are using data historian solutions to gain a comprehensive view of the plant and its asset performance. The data from the data historian systems can be leveraged for early detection of equipment issues before it leads to failures, thereby avoiding heavy losses and time. Data historian solutions help in building robust data archival and creating a retrieval architecture design for consistent access to both real-time and historical data. These solutions also generate accurate and standardized reports in a lesser time, which enhances all the predictive maintenance procedures.

TABLE 7 PREDICTIVE MAINTENANCE: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	34.7	37.2	40.5	54.9	6.3%
Europe	30.2	32.5	35.4	48.5	6.5%
APAC	32.4	35.0	38.2	52.7	6.6%
MEA	13.9	15.0	16.5	23.0	6.8%
Latin America	8.6	9.5	10.6	15.5	7.9%
Total	**119.8**	**129.2**	**141.3**	**194.6**	**6.6%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the predictive maintenance application market by region. North America region is expected to grow from USD 40.5 million in 2018 to USD 54.9 million by 2023, at CAGR of 6.3%. The market size in Latin America is expected to grow from USD 10.6 million in 2018 to USD 15.5 million by 2023, at the highest CAGR of 7.9% during the forecast period.

6.7 OTHERS

The other applications comprise security and quality control management, which support business continuity and provide enhanced data security and productivity. These functions do not have a major share in the market; however; they contribute a noticeable amount of data, which is sensitive and needs to be safeguarded. Security and vulnerability management is a proactive approach to secure the sensitive data by eliminating the weaknesses of network security. The weaknesses include contingent cyber threats, such as dormant malware attacks and other advanced invasion techniques. The process includes the checking and identification of risks, along with mitigation and patching of unwanted software programs. Data historian solutions help in identifying risk factors by analyzing the past behavior of the connected machinery and other critical assets at the production site.

On the other hand, the quality control management application is undergoing a rapid revolution. Having said that, the introduction of AI has led to numerous modifications in quality management processes.

TABLE 8 OTHERS: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	13.5	14.2	15.1	18.9	4.7%
Europe	10.6	11.1	11.6	14.1	3.9%
APAC	13.9	14.7	15.7	20.2	5.1%
MEA	9.3	9.9	10.7	14.3	6.0%
Latin America	4.9	5.2	5.6	7.5	6.0%
Total	**52.1**	**55.0**	**58.7**	**75.1**	**5.0%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the other applications by region. APAC is expected to grow from USD 15.7 million in 2018 to USD 20.2 million by 2023, at a CAGR of 5.1% during the forecast period.

7 DATA HISTORIAN MARKET, BY COMPONENT

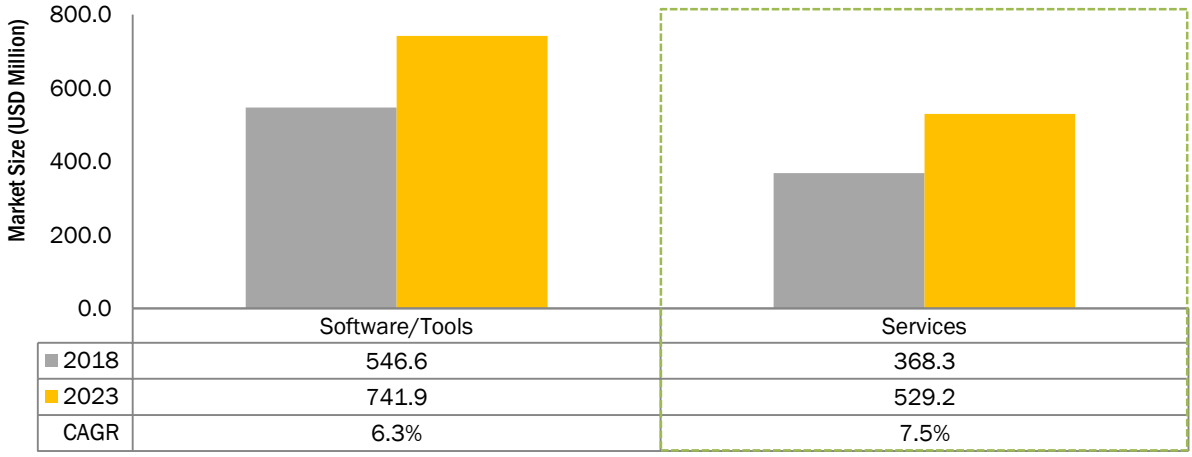
KEY FINDINGS

- The software/tools segment is projected to hold the larger market size of USD 546.6 million in 2018 and expected to reach USD 741.9 million by 2023, at a CAGR of 6.3%.
- The services segment in the data historian market is expected to witness a higher CAGR of 7.5% during the forecast period.
- Among services, the professional services segment is projected to have the largest market share and expected to grow from USD 245.5 million in 2018 to USD 346.8 million by 2023, at a CAGR of 7.2%.
- The increasing use of data historian solutions across numerous end-user segments, from metals and mining, chemicals and pharmaceuticals, to paper and pulp is expected to drive the demand for data historian software solutions and the associated services.
- In the software/tools segment, APAC is expected to grow at the highest CAGR of 7.4% during the forecast period, because of the increasing demand for data historian software and services.

7.1 INTRODUCTION

Data historian software solutions are used by industrial organizations to collect, store, and retrieve real-time and historic data whenever required. Various companies are contributing to the market's growth by offering their own software and services. These companies include IBM, Aveva, ABB, and Siemens. Data historian solutions enable organizations to identify and rectify production issues based on the collected data. These solutions also enable the prediction of potential breakdowns and reduce the losses, thus improving organizations' decision-making capabilities. The global data historian market has been segmented on the basis of components into software/tools and services.

FIGURE 20 SERVICES SEGMENT IS EXPECTED TO GROW AT A HIGHER CAGR DURING THE FORECAST PERIOD



Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

TABLE 9 DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	467.9	502.3	546.6	741.9	6.3%
Services	303.4	332.0	368.3	529.2	7.5%
Total	**771.3**	**834.3**	**914.9**	**1,271.1**	**6.8%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component. The software/tools segment is estimated to garner a higher revenue during the forecast period and expected to grow from USD 546.6 million in 2018 to reach USD 741.9 million by, at a CAGR of 6.3% during the forecast period. These days, organizations are more focused on asset performance management, for which they have started enhancing their products and services. This move is expected to fuel the demand for data historian software and the associated services across the world. The services segment is expected to grow from USD 368.3 million in 2018 to USD 529.2 million by 2023, at a higher CAGR of 7.5%. The higher growth rate of the services segment can be attributed to the need for technical expertise for product upgradation, maintenance, training, and consulting, all of which play a very important role during and after the implementation of the data historian software.

7.2 SOFTWARE/TOOLS

Data historian software/tools are prevalent among data-sensitive organizations, due to the ever-increasing volume of data. These organizations need to manage such huge volumes of data efficiently and effectively to enhance the productivity and maintain business continuity. The proliferation of data amounting to industrial big data has forced companies such as IBM to design and build advanced data historian software/tools to help IT team simplify and manage the processes. With various data historian techniques in the market, organizations need to understand their requirement, choose the solution that will meet their requirements, and then deploy the software.

TABLE 10 SOFTWARE/TOOLS: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	111.8	117.9	126.1	161.3	5.1%
Europe	106.4	112.3	120.0	153.8	5.1%
APAC	141.1	154.1	170.6	243.5	7.4%
MEA	71.7	78.1	86.2	122.1	7.2%
LA	36.7	39.8	43.7	61.2	6.9%
Total	**467.9**	**502.3**	**546.6**	**741.9**	**6.3%**

e: estimated; p: projected

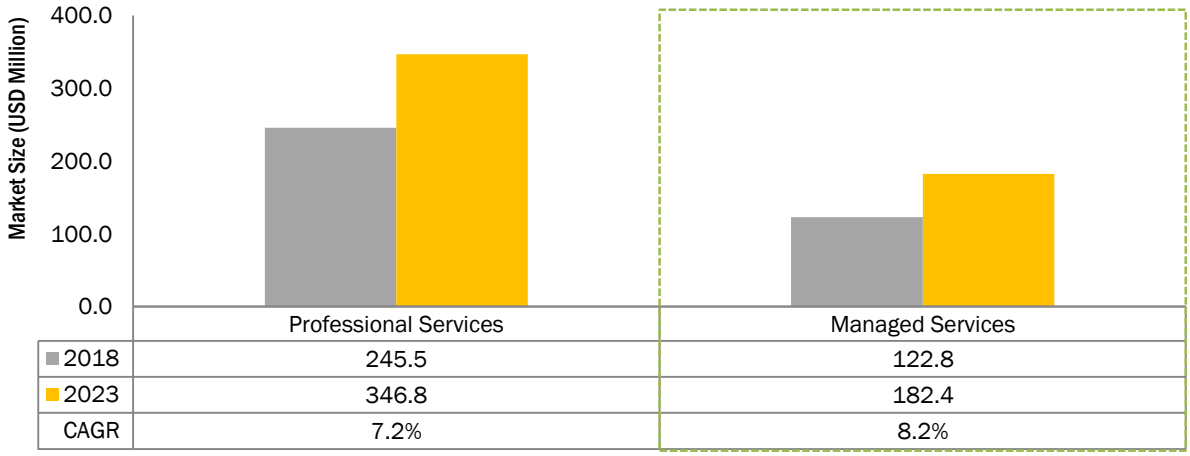
Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the software/tools segment by region. The APAC region is estimated to maintain its dominance during the forecast period and expected to grow from USD 170.6 million from 2018 to reach USD 243.5 million by 2023, at the highest CAGR of 7.4% during the forecast period.

7.3 SERVICES

The data historian services segment has been segmented into 2 types, namely, managed services and professional services. The professional services segment has been further classified into consulting services, and support and maintenance services. These services form an integral part of the software life cycle, which mainly comprises product upgradation, maintenance, training, and consulting. In this digital economic era, enterprises are evolving and demanding new ways to improve their Return on Investment (RoI) and optimize their business. Services boost the growth of organizations and assist them in generating higher revenues. Enterprises are becoming service-oriented to streamline their operations and optimize the business resources. Support, which is also a part of the post-sales services, is a major contributor to the data historian market size. Organizations have realized the importance of data historian services and also look for additional services to maintain and improve their production.

FIGURE 21 MANAGED SERVICES SEGMENT IS EXPECTED TO GROW AT A HIGHER CAGR DURING THE FORECAST PERIOD



Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

TABLE 11 SERVICES: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	98.7	109.4	122.8	182.4	8.2%
Professional Services	204.7	222.7	245.5	346.8	7.2%
Total	**303.4**	**332.0**	**368.3**	**529.2**	**7.5%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the services segment by type. The professional services segment is estimated to garner a higher revenue during the forecast period and expected to grow from USD 245.5 million in 2018 to reach USD 346.8 million by 2023, at a CAGR of 7.2%.

TABLE 12 SERVICES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	81.0	87.6	96.1	133.5	6.8%
Europe	71.0	77.1	85.0	119.8	7.1%
APAC	90.2	99.9	112.2	166.5	8.2%
MEA	44.0	48.3	53.8	78.1	7.7%
LA	17.3	19.1	21.3	31.3	8.0%
Total	**303.4**	**332.0**	**368.3**	**529.2**	**7.5%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the services segment by region. APAC is expected to continue to contribute the highest revenue to the data historian market size during the forecast period and expected to grow from USD 112.2 million in 2018 to reach USD 166.5 million by 2023, at the highest CAGR of 8.2%.

7.3.1 MANAGED SERVICES

With the help of managed services, organizations can increase the efficiency, reduce the deployment time, and drive better outcomes. The managed service providers support and manage third-party infrastructures that help organizations manage their products or services. Managed services are focused on the service quality and end-user experience, while also delivering speed, cost optimization, and quality of service. In addition, managed service providers handle all the hardware and software-related functions, while organizations are supposed to install business applications, provide business data, and configure company policies.

TABLE 13 MANAGED SERVICES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	24.3	26.6	29.5	42.5	7.5%
Europe	22.7	25.0	27.9	40.8	7.9%
APAC	29.8	33.4	37.9	58.2	8.9%
MEA	15.4	17.0	19.0	28.1	8.1%
LA	6.6	7.4	8.4	13.0	9.1%
Total	**98.7**	**109.4**	**122.8**	**182.4**	**8.2%**

e: estimated; p: projected

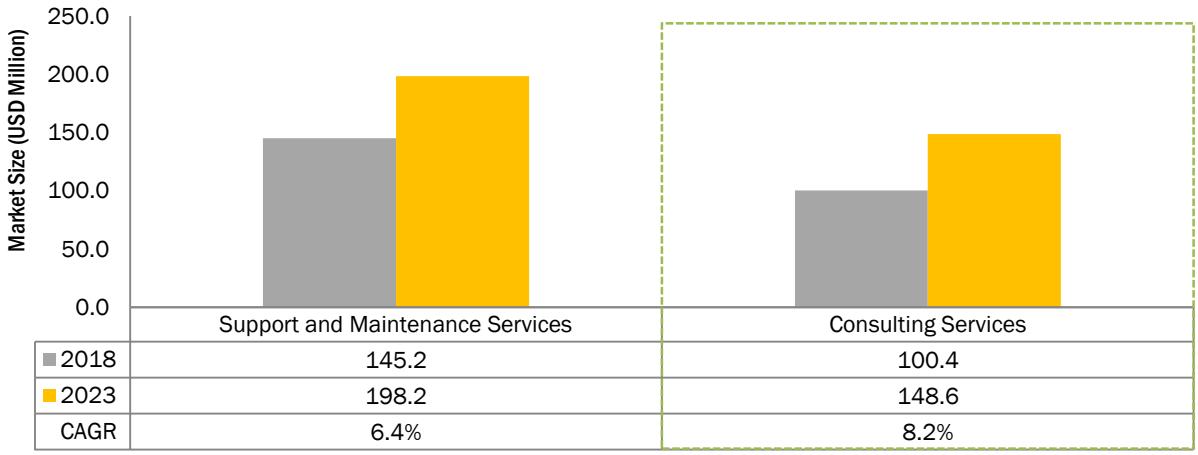
Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the managed services segment by region. APAC is estimated to hold the largest market share and expected to grow from USD 37.9 million in 2018 to USD 58.2 million by 2023, at a CAGR of 8.9%.

7.3.2 PROFESSIONAL SERVICES

Professional services is all about customized, knowledge-based services. This segment includes support and maintenance services and consulting services. Professional services are normally given as an add-ons, after the purchase of a software. Some of the companies do not have the expertise to manage their infrastructure successfully. Hence, they outsource it to third parties. These services constitute an integral part of deploying a solution, and this includes support, handling, and maintenance. Professional services also include modeling, planning, upgrading, and various other consulting services provided to the clients. Companies offering these services encompass consultants, big data experts, and dedicated project management teams that specialize in the design and delivery of critical decisions, support software, tools, services, and expertise.

FIGURE 22 CONSULTING SERVICES SEGMENT IS EXPECTED TO GROW AT A HIGHER CAGR DURING THE FORECAST PERIOD



Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

TABLE 14 PROFESSIONAL SERVICES: DATA HISTORIAN MARKET SIZE, BY TYPE, 2016–2023 (USD MILLION)

Type	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	81.8	90.0	100.4	148.6	8.2%
Support and Maintenance Services	122.9	132.7	145.2	198.2	6.4%
Total	**204.69**	**222.66**	**245.52**	**346.78**	**7.2%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the professional services segment by type. The support and maintenance services segment is expected to garner a higher revenue during the forecast period and expected to grow from USD 145.2 million in 2018 to reach USD 198.2 million by 2023, at a CAGR of 6.4%.

TABLE 15 PROFESSIONAL SERVICES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	56.7	61.0	66.6	91.0	6.5%
Europe	48.3	52.1	57.1	79.0	6.7%
APAC	60.5	66.6	74.2	108.4	7.9%
MEA	28.6	31.3	34.7	50.0	7.6%
LA	10.7	11.7	12.9	18.4	7.3%
Total	**204.7**	**222.7**	**245.5**	**346.8**	**7.2%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the professional services segment by region. APAC is estimated to hold the largest market share and expected to grow from USD 74.2 million in 2018 to USD 108.4 million by 2023, at the highest CAGR of 7.9%.

7.3.2.1 Consulting services

Organizations often come across numerous technological challenges in handling corporate and departmental data sources. Consulting services help enterprises select the best solutions and services for the migration of their data, post analysis of their business requirements. Migration consultants identify whether the workloads are fit for the data's migration to the cloud environment, thereby saving on resources and costs before migrating the entire workload.

TABLE 16 CONSULTING SERVICES MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	23.8	25.9	28.6	42.5	8.2%
Europe	19.3	21.1	23.4	33.7	7.5%
APAC	23.6	26.3	29.8	45.3	8.7%
MEA	10.6	11.6	13.0	18.8	7.8%
Latin America	4.5	5.0	5.6	8.2	8.0%
Total	**81.8**	**90.0**	**100.4**	**148.6**	**8.2%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the consulting services segment by region. APAC is estimated to hold the largest market share and expected to grow from USD 29.8 million in 2018 to USD 45.3 million by 2023, at the highest CAGR of 8.7% during the forecast period.

7.3.2.2 Support and maintenance services

Organizations that seek the support and maintenance services from third-party vendors expect to deliver high-level customer satisfaction, along with improved and rapid support, thereby contributing to the organization's healthier margins and helping it become more efficient by optimizing the workforce and bringing about low attrition rates. By seeking these services, organizations can deliver cost-effective migration support with an aim to prevent any downtime caused during the migration process. These services with their technical support, repair and exchange services, field maintenance, and proactive services, deliver improved performance while also being able to reduce the overall capital expenditure and operational expenditure of the organization.

TABLE 17 SUPPORT AND MAINTENANCE SERVICES MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	32.9	35.1	38.0	48.6	5.0%
Europe	29.0	31.0	33.6	45.3	6.1%
APAC	36.9	40.2	44.4	63.0	7.3%
MEA	18.0	19.7	21.8	31.1	7.4%
LA	6.2	6.7	7.4	10.2	6.7%
Total	**122.9**	**132.7**	**145.2**	**198.2**	**6.4%**

e: estimated; p: projected

Source: Secondary Research, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the support and maintenance services segment by region. APAC is estimated to hold the largest market share and expected to grow from USD 44.4 million in 2018 to USD 63.0 million by 2023, at a CAGR of 7.3% during the forecast period.

8 DATA HISTORIAN MARKET, BY DEPLOYMENT MODE

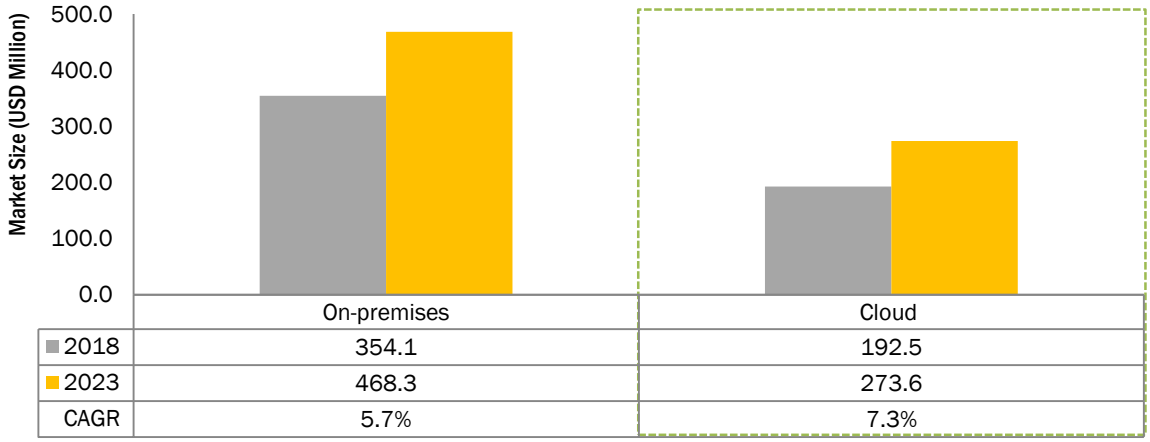
KEY FINDINGS

- The market size of the cloud deployment mode is projected to have a higher growth rate and expected to grow from USD 192.5 million in 2018 to USD 273.6 million by 2023, at a CAGR of 7.3% during the forecast period.
- The low cost and ease of implementation of the cloud deployment mode have made it highly desirable among organizations, contributing to a higher growth rate during the forecast period.
- The on-premises deployment mode in Europe is projected to hold significant market share during the forecast period and expected to grow from USD 71.9 million in 2018 to USD 89.2 million by 2023, at a CAGR of 4.4%.
- The cloud deployment mode in APAC is expected to grow from USD 50.0 million in 2018 to USD 76.0 million by 2023, at a CAGR of 8.7% during the forecast period.
- APAC is expected to witness the highest growth rate in the deployment mode segment, due to the increasing penetration of IIoT and the growing adoption of data historian software and services among SMEs.

8.1 INTRODUCTION

The data historian market by deployment mode has been segmented into on-premises and cloud. The cloud deployment mode is expected to hold a higher growth rate as compared to the on-premises deployment mode, owing to its higher scalability, mobility, and security features. Key vendors, including General Electric, Emerson, Aveva Group, OSIsoft, and Honeywell have started providing cloud-based solutions, which is expected to be driving the growth of the data historian market.

FIGURE 23 THE CLOUD DEPLOYMENT MODE IS EXPECTED TO GROW AT A HIGHER CAGR DURING THE FORECAST PERIOD.



Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

TABLE 18 DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	308.0	328.0	354.1	468.3	5.7%
Cloud	159.8	174.3	192.5	273.6	7.3%
Total	**467.9**	**502.3**	**546.6**	**741.9**	**6.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode. The on-premise deployment mode is projected to hold the larger market share and expected to grow from USD 354.1 million in 2018 to USD 468.3 billion by 2023, at a CAGR of 5.7%. Increased need for security of data has made deployment of data historian software and services on-premises highly desirable among organizations, thereby contributing to the overall data historian market size. The market size of the cloud deployment mode is expected to grow from USD 192.5 million in 2018 to USD 273.6 million by 2023, at a CAGR of 7.3% during the forecast period.

8.2 ON-PREMISES

The on-premises deployment mode is a traditional approach to storing and managing data in customers' premises. Enterprises need an established team of skilled and technically trained people, hardware infrastructure, software license, and annual support and maintenance fees. In the data historian marketplace, organizations are more concerned about security issues and want to find the expected value from their on-premises solutions. Therefore, irrespective of the high costs involved in managing and maintaining the internal IT infrastructure, organizations are deploying the on-premises business model. Using an on-premises data historian solution, different enterprises can acquire and store huge amounts of data generated from process applications.

TABLE 19 ON-PREMISES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	64.9	67.7	71.5	88.1	4.2%
Europe	64.9	67.9	71.9	89.2	4.4%
APAC	101.6	110.0	120.6	167.5	6.8%
MEA	51.6	55.7	60.9	84.0	6.6%
Latin America	25.0	26.8	29.2	39.6	6.3%
Total	**308.0**	**328.0**	**354.1**	**468.3**	**5.7%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the on-premises deployment mode by region. The on-premises deployment mode in Europe is estimated to hold the second largest share during the forecast period and expected to grow from USD 71.9 million in 2018 to USD 89.2 million by 2023, at a CAGR of 4.4%. The market size in APAC is expected to grow from USD 120.6 million in 2018 to USD 167.5 million by 2023, at the highest CAGR of 6.8%.

8.3 CLOUD

Cloud-based data historian solutions facilitate various advantages, such as scalability, adaptability, easy deployment, and cost-effectiveness, and these advantages promote the adoption of the cloud deployment mode among organizations. Low costs and the ease of implementation have made cloud a highly desirable deployment mode among organizations. SMEs tend to adopt cloud-based data historian solutions as compared to the on-premises solutions, owing cloud solutions' low costs and the 24x7 support and maintenance provided by the software vendors. A majority of the vendors offer cloud-based data historian solutions to lure customers. For example, enterprises such as Open Automation Software, Honeywell, and OSIsoft offer cost-effective, cloud-based data historian software solutions and services to their clients.

TABLE 20 CLOUD: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	47.0	50.3	54.5	73.2	6.1%
Europe	41.5	44.4	48.1	64.6	6.1%
APAC	39.5	44.2	50.0	76.0	8.7%
MEA	20.1	22.4	25.3	38.1	8.6%
Latin America	11.7	13.0	14.6	21.6	8.2%
Total	**159.8**	**174.3**	**192.5**	**273.6**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the cloud deployment mode by region. The cloud deployment mode in North America is projected to hold the largest share during the forecast period and expected to grow from USD 54.5 million in 2018 to USD 73.2 million by 2023, a CAGR of 6.1%. The market size in APAC is expected to grow from USD 50.0 million in 2018 to USD 76.0 million by 2023, at the highest CAGR of 8.7%.

9 DATA HISTORIAN MARKET, BY ORGANIZATION SIZE

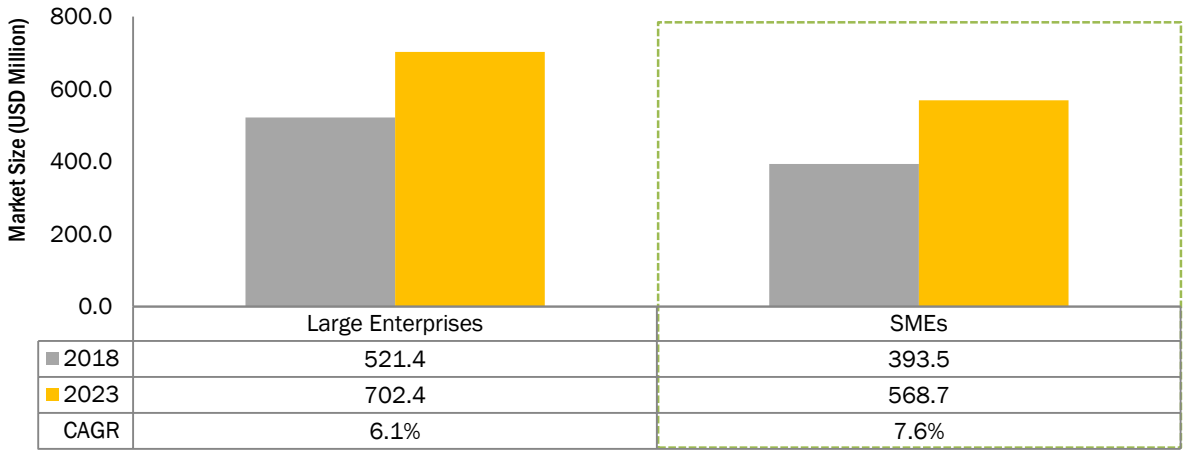
KEY FINDINGS

- The SMEs segment is expected to grow from USD 393.5 million in 2018 to USD 568.7 million by 2023, at a CAGR of 7.6% during the forecast period.
- The growing number of SMEs across regions, including APAC and MEA, and the increasing adoption of smart manufacturing solutions among SMEs are expected to be driving the adoption of data historian software and solutions.
- The large enterprises segment is estimated to have the larger market size of USD 521.4 million in 2018 and expected to reach USD 702.4 million by 2023, at a CAGR of 6.1% during the forecast period.
- Due to the increasing use of various electronic devices across APAC and the ease of use of cloud solutions, the data historian market in APAC is expected to witness a prominent growth rate, especially among the SMEs, during the forecast period.
- The market size of the data historian solutions and services among large enterprises in North America is expected to grow from USD 131.1 million in 2018 to USD 169.3 million by 2023, at a CAGR of 5.2% during the forecast period.

9.1 INTRODUCTION

The data historian market is booming, and its solutions and services are being adopted by various end-users for numerous applications. In fact, it is witnessing massive adoption trends among both large enterprises and SMEs. The data historian market has been segmented by organization size into large enterprises and SMEs. This segment has been arrived at on the basis of the total number of employees in an organization. It encompasses various vendors who fall under the large-scale enterprises and SMEs. These organizations are adopting data historian solutions across the globe, owing to the growth of big data across all the industries.

FIGURE 24 SMALL AND MEDIUM-SIZED ENTERPRISES SEGMENT IS EXPECTED TO GROW AT A HIGHER CAGR DURING THE FORECAST PERIOD



Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

TABLE 21 DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	448.4	480.3	521.4	702.4	6.1%
SMEs	322.9	354.0	393.5	568.7	7.6%
Total	**771.3**	**834.3**	**914.9**	**1,271.1**	**6.8%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size. The large enterprises segment is estimated to have the larger market size of USD 521.4 million in 2018 and expected to reach USD 702.4 million by 2023, at a CAGR of 6.1%. The SMEs segment is expected to grow from USD 393.5 million in 2018 to USD 568.7 million by 2023, at a CAGR of 7.6% during the forecast period.

9.2 SMALL AND MEDIUM-SIZED ENTERPRISES

SMEs are defined as business organizations with less than 1,000 employees. They are swiftly advancing in the adoption of cloud-based data historian solutions, which helps them improve their operational efficiency, streamline their operations, and enhance the existing customers' experience. With technological advancements, software solutions can be offered as per the needs of the customers. This would enable SMEs to pay only for what they need, and not end up paying for a huge product suite or platform that is made for large corporate clients. Companies, nowadays, need to react quickly to any situation that comes up in real-time for getting better results and taking instant remedial actions.

TABLE 22 SMALL AND MEDIUM-SIZED ENTERPRISES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	77.1	83.2	91.0	125.5	6.6%
Europe	72.7	79.0	87.0	122.6	7.1%
APAC	97.2	108.3	122.3	184.7	8.6%
MEA	52.1	57.4	64.2	94.5	8.0%
Latin America	23.8	26.0	28.9	41.5	7.5%
Total	**322.9**	**354.0**	**393.5**	**568.7**	**7.6%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the SMEs segment by region. North America is expected to grow from USD 91.0 million in 2018 to USD 125.5 million by 2023, at a CAGR of 6.6% during the forecast period. The APAC region is expected to grow from USD 122.3 million in 2018 to USD 184.7 million by 2023, at the highest CAGR of 8.6% during the forecast period.

9.3 LARGE ENTERPRISES

Large enterprises are defined as business entities with more than 1,000 employees. Large enterprises invest in enhancing the customer experience to have a leading edge in the market. In comparison to the SMEs, the large enterprises, which are mostly publicly traded companies, are compelled to adopt data historian solutions, due to the vast amounts of data the enterprises generate. These enterprises comprise of various end users such as oil and gas, marine, chemical and pharmaceuticals, paper and pulp, metal and mining, utilities, and data centers, which are keenly looking for automated solutions to complete data-driven tasks. They are incorporating data historian solutions to improve the customer experience, reduce the time spent, and save on costs.

TABLE 23 LARGE ENTERPRISES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	115.7	122.3	131.1	169.3	5.2%
Europe	104.7	110.4	118.0	151.0	5.1%
APAC	134.2	145.8	160.4	225.4	7.0%
MEA	63.6	69.0	75.7	105.8	6.9%
Latin America	30.2	32.9	36.2	51.0	7.1%
Total	**448.4**	**480.3**	**521.4**	**702.4**	**6.1%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the large enterprises segment by region. North America is expected to grow from USD 131.1 million in 2018 to USD 169.3 million by 2023, at a CAGR of 5.2% during the forecast period. The APAC region is expected to grow from USD 160.4 million in 2018 to USD 225.4 million by 2023, at the second highest CAGR of 7.0% during the forecast period

10 DATA HISTORIAN MARKET ANALYSIS, BY END-USER

KEY FINDINGS

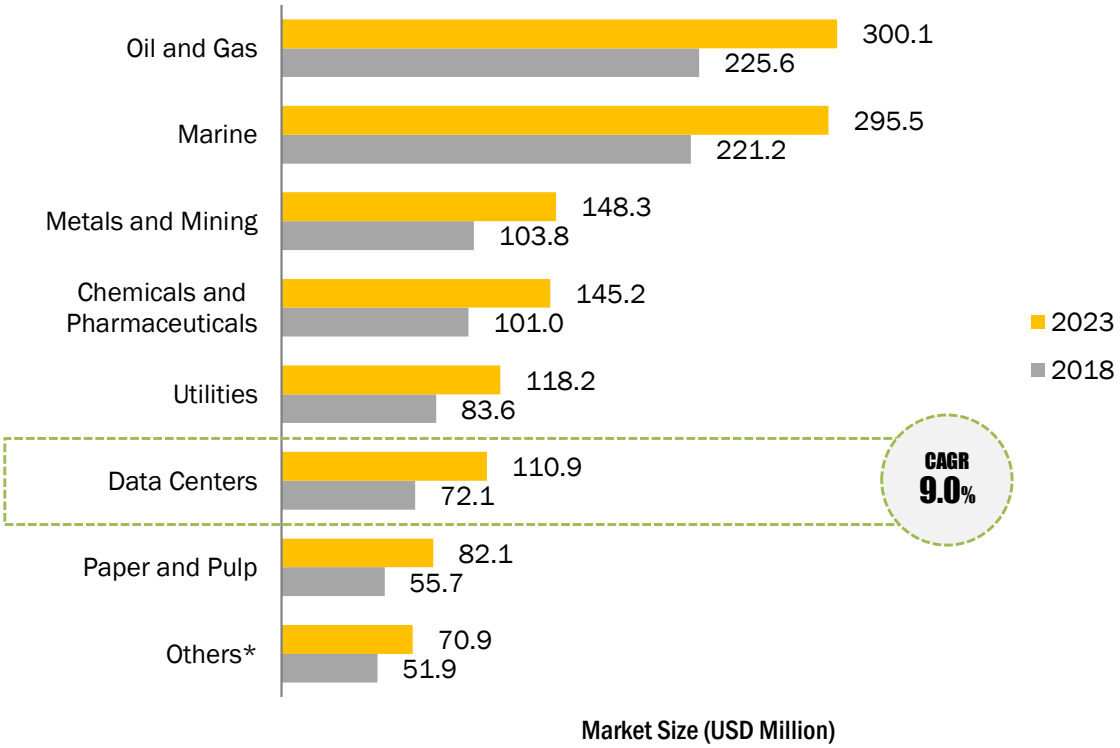
- The proliferation of industrial data and the increasing demand for solutions to improve the operational performance of enterprises are expected to be driving the adoption of data historian solutions and services.
- The oil and gas end-user segment is estimated to hold the largest market share and expected to grow from USD 225.6 million in 2018 to USD 300.1 million by 2023, at a CAGR of 5.9% during the forecast period, due to the increasing demand for predictive maintenance solutions in the oil and gas end-user segment.
- Digitization has reorganized numerous industries through disruptive technological changes. The growth of the shipbuilding industry for offshore support containers and cargoes are the main growth drivers for this end-user segment.
- In chemicals and pharmaceuticals segment, Latin America is expected to grow from USD 9.5 million in 2018 to USD 14.1 million by 2023, at the highest CAGR of 8.4%. This is owing to rising need to understand the past data for enhancing future performances.
- Rapid deployment of cloud-based applications has driven the data center traffic, thereby increasing the adoption of IIoT solutions, this is expected to accelerate the demand for data centers in the coming years.

10.1 INTRODUCTION

Data historian solutions are gaining traction across various end-user industries, owing to the proliferation of data and the demand for these solutions to improve the operational performance in enterprises. The data historian market has been segmented by end-user into oil and gas, marine, chemicals and pharmaceuticals, paper and pulp, metals and mining, utilities, data centers, and others. The other end-users segment includes food and beverage, infrastructure, heavy engineering and automotive, and railway.

The figure and table below highlight the data historian market size by end-user. The data center is expected to grow from USD 72.1 million in 2018 to USD 110.9 million by 2023, at the highest CAGR of 9.0% during the forecast period. The oil and gas end-user segment is estimated to hold the largest market share and expected to grow from USD 225.6 million in 2018 to USD 300.1 million by 2023, at a CAGR of 5.9% during the forecast period, due to the increasing demand for predictive maintenance solutions.

FIGURE 25 DATA CENTER IS EXPECTED TO GROW AT THE HIGHEST CAGR DURING THE FORECAST PERIOD



*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

TABLE 24 DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End User	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	195.6	208.9	225.6	300.1	5.9%
Marine	191.2	204.2	221.2	295.5	6.0%
Chemicals and Pharmaceuticals	83.2	91.1	101.0	145.2	7.5%
Paper and Pulp	45.0	49.7	55.7	82.1	8.1%
Metal and Mining	85.9	93.8	103.8	148.3	7.4%
Utilities	69.6	75.7	83.6	118.2	7.2%
Data Center	56.5	63.4	72.1	110.9	9.0%
Others*	44.2	47.5	51.9	70.9	6.4%
Total	**771.3**	**834.3**	**914.9**	**1,271.1**	**6.8%**

e: estimated, p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

10.2 OIL AND GAS

The oil and gas is a multi-billion dollar industry and needs regular optimization of business processes. Technologies today enable generation and collection of vast amounts of data, which is used for gaining additional insights to decide upon better process and asset performance monitoring to accelerate revenues. Oil and gas explorations require potential care of machinery and instruments. Moreover, the exploration areas are usually away from the land, and it is necessary to maintain the relevant equipment. As mentioned above, the oil and gas being a multi-billion dollar industry, even the smallest breakdown in production equipment leads to heavy losses. Hence, companies operating in this industry greatly rely on the past data to analyze any machine's condition to avoid future breakdowns by using the predictive maintenance capabilities of the deployed data historian solution.

TABLE 25 OIL AND GAS: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	46.3	48.7	51.8	65.7	4.8%
Europe	44.3	46.7	49.9	63.5	5.0%
APAC	60.2	64.7	70.4	95.7	6.3%
MEA	32.4	35.2	38.8	54.6	7.1%
Latin America	12.4	13.5	14.8	20.7	6.9%
Total	**195.6**	**208.9**	**225.6**	**300.1**	**5.9%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the oil and gas end-user segment by region. APAC is expected to grow from USD 70.4 million in 2018 to USD 95.7 million by 2023, at the highest CAGR of 6.3% during the forecast period. North America is estimated to hold the second largest market share and expected to grow from USD 51.8 million in 2018 to USD 65.7 million by 2023, at a CAGR of 4.8% during the forecast period.

10.3 MARINE

Digitization is reshaping many industries and has led to disruptive changes. The growth of the shipbuilding industry for offshore support containers and cargoes are the main growth drivers for this end-user segment. Furthermore, with the increasing number of containers gaining connectivity and the number of digital solutions available in the market, there are risk implications in the maritime industry. Containers require constant maintenance to ensure reliability and availability throughout their life cycle; data historian solutions bridge the transition to move from time-based to a predictive and condition-based fleet maintenance procedure. The need to achieve operational efficiency, asset performance management, and real-time monitoring for business decision-making are some factors that are driving the adoption of data historian solutions in the maritime industry.

TABLE 26 MARINE: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	34.7	37.4	40.8	56.0	6.5%
Europe	47.9	50.1	53.1	65.9	4.4%
APAC	62.5	66.6	72.0	95.4	5.8%
MEA	35.9	38.9	42.7	59.7	6.9%
Latin America	10.3	11.3	12.6	18.4	7.9%
Total	**191.2**	**204.2**	**221.2**	**295.5**	**6.0%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the marine end-user segment by region. The market size in the North America region is expected to grow from USD 40.8 million in 2018 to USD 56.0 million by 2023, at the notable CAGR of 6.5% during the forecast period. APAC is expected to have the largest market size of USD 72.0 million in 2018 and reach USD 95.4 million by 2023, at a CAGR of 5.8% during the forecast period.

10.4 CHEMICALS AND PHARMACEUTICALS

Data historian solutions collect real-time data from automation and other systems to store time-stamped data at high speed and maintain the sequence of data. The Track and Trace (TnT) serialization initiative to preserve historical data in the chemical and pharma industry is creating a greater need for capturing historic production records. This is to help maintain the quality of drugs and avoid counterfeiting of products. Additionally, it also helps in identifying the root cause of the problem in preventing any undesirable event in the production sequence. Data historian solutions and services offer new insights to enhance controls and also deliver information about the process and the equipment needed to rectify maintenance issues.

TABLE 27 CHEMICAL AND PHARMACEUTICALS: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	23.1	25.2	27.8	39.5	7.2%
Europe	21.3	23.1	25.3	35.3	6.9%
APAC	23.1	25.6	28.8	42.8	8.2%
MEA	8.1	8.8	9.6	13.5	6.9%
Latin America	7.6	8.4	9.5	14.1	8.4%
Total	**83.2**	**91.1**	**101.0**	**145.2**	**7.5%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the chemical and pharmaceuticals end-user segment by region. Latin America is expected to grow from USD 9.5 million in 2018 to USD 14.1 million by 2023, at the highest CAGR of 8.4%. APAC is expected to have the largest market size of USD 28.8 million in 2018 to reach USD 42.8 million by 2023, at a CAGR of 8.2%.

10.5 PAPER AND PULP

Operators in the pulp and paper industry are under pressure to increase the profits, enhance capital utilization, and bring about rapid inventory turnover. Data integration has become a challenge, as companies are merging and trying to collaborate with each other. In the pulp and paper industry, data historian solutions are used to produce runtime displays for interactive reports, which are later entered into historical records. Furthermore, data historian solutions capture machine-generated data and analyze it to make optimum use of the assets.

TABLE 28 PAPER AND PULP: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	11.6	12.6	13.8	19.5	7.1%
Europe	8.9	9.6	10.6	15.0	7.1%
APAC	13.9	15.7	17.9	27.9	9.2%
MEA	6.9	7.7	8.6	12.8	8.2%
Latin America	3.8	4.2	4.7	7.0	8.3%
Total	**45.0**	**49.7**	**55.7**	**82.1**	**8.1%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the paper and pulp end-user segment by region. The market in APAC is expected to grow from USD 17.9 million in 2018 to USD 27.9 million by 2023, at the highest CAGR of 9.2%. Latin America expected expand at the second highest CAGR of 8.3% and is expected to reach USD 7.0 million by 2023.

10.6 METALS AND MINING

The metals and mining industry has to manage unpredictability in every aspect of the business, as it operates in one of the toughest regulatory environments and is in the face of constantly changing commodity prices. The volatility of mineral ore prices and metal prices makes it crucial for the mining industry to cut down on operating and maintenance costs, thereby driving the demand for data historian solutions and the relevant services. The growth of the metals and mining industry in the APAC countries, such as China, Australia, and India is further driving the market growth in the segment. Moreover, safety becomes a major concern, owing to the risky mining environment and the necessity to care for equipment and prevent them from breakdowns.

TABLE 29 METALS AND MINING: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	28.9	30.6	32.8	42.3	5.2%
Europe	14.2	15.8	17.8	26.9	8.5%
APAC	25.5	28.6	32.7	50.5	9.1%
MEA	9.3	10.2	11.3	16.4	7.7%
Latin America	8.1	8.6	9.3	12.2	5.6%
Total	**85.9**	**93.8**	**103.8**	**148.3**	**7.4%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the metals and mining end-user segment by region. North America is expected to hold the largest market size and grow from USD 32.8 million in 2018 to USD 42.3 million by 2023, at a CAGR of 5.2%. APAC is expected to grow from USD 32.7 million in 2018 to USD 50.5 million by 2023 at the highest CAGR of 9.1% during the forecast period.

10.7 UTILITIES

As operational processes and tools within the grid have increased over the years, the amount of data being generated and collected has also increased. Earlier, utilities were only able to analyze data through whiteboards, complex spreadsheets, and BI reports; however, with technological adoption, the industry is now moving to a reactive analysis (both descriptive and diagnostic) and incorporating a much higher volume of historical data with more complexities and quicker analysis.

TABLE 30 UTILITIES: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	19.3	20.2	21.5	27.1	4.7%
Europe	17.7	18.8	20.1	26.0	5.3%
APAC	16.2	18.8	22.0	36.5	10.6%
MEA	10.4	11.5	12.9	19.2	8.2%
Latin America	5.9	6.4	7.0	9.5	6.4%
Total	**69.6**	**75.7**	**83.6**	**118.2**	**7.2%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the utilities end-user segment by region. The market size in APAC is expected to grow from USD 22.0 million in 2018 to USD 36.5 million by 2023, at the highest CAGR of 10.6% during the forecast period. North America is expected to have the second largest market size of USD 21.5 million in 2018 and reach USD 27.1 million by 2023, at a CAGR of 4.7% during the forecast period.

10.8 DATA CENTERS

The increasing popularity of cloud computing is driven by the benefits provided by the dynamically scalable, pay-as-you-go cloud deployment mode. Both consumer and business applications are contributing to the growing dominance of cloud-based services. This rapid use of cloud applications has driven the data center traffic, thereby increasing IoT applications, such as smart cities, connected cars, and other connected wearable health devices, which are expected to accelerate the demand for data centers in the coming years. Thus, considering the reliability of numerous business over cloud, the data centers are likely to be kept smooth and functional. Data historian solutions and services help understand the condition of a data center server and keep it from breaking down to avoid business losses.

TABLE 31 DATA CENTERS: DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	15.4	17.1	19.2	28.7	8.3%
Europe	12.4	13.8	15.4	22.9	8.2%
APAC	18.5	21.0	24.1	38.0	9.5%
MEA	6.9	7.9	9.2	14.8	10.0%
Latin America	3.2	3.6	4.1	6.4	9.0%
Total	**56.5**	**63.4**	**72.1**	**110.9**	**9.0%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the market size of the data centers end-user segment by region. The market size in APAC is expected to grow from USD 24.1 million in 2018 to USD 38.0 million by 2023, at the second highest CAGR of 9.5% during the forecast period. MEA is expected to expand at the highest CAGR of 10.0% to reach USD 14.8 million by 2023.

10.9 OTHERS

The others end-user segment comprises food and beverage, infrastructure, heavy engineering and automotive, and railways. Plant connectivity brings the ability to drive operational intelligence and improve manufacturing collaboration. However, connectivity is not about connecting endpoints, but also about connecting applications, and ultimately connecting people. It integrates the SCADA software and the historian software, which helps aggregate, merge, and analyze industrial big data to generate a heavy RoI. Through connectivity, the historian solution connects with numerous data sources and visualizes the data for monitoring and controlling. Process performance improves with the implementation of operational intelligence, which can be leveraged to use search capabilities. For instance, time series process data combined with operator data facilitates users with the ability to accurately forecast the possible machine failures and breakdowns during the manufacturing process.

TABLE 32 OTHERS: DATA HISTORIAN MARKET SIZE, BY END USERS, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	13.5	13.8	14.3	16.1	2.5%
Europe	10.6	11.6	12.8	18.0	7.1%
APAC	11.6	13.1	14.9	23.3	9.3%
MEA	5.8	6.2	6.8	9.3	6.4%
Latin America	2.7	2.9	3.1	4.2	6.1%
Total	**44.2**	**47.5**	**51.9**	**70.9**	**6.4%**

e: estimated, p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis.

The table above highlights the market size of the others end-user segment by region. APAC is estimated to hold the largest market size and expected to grow from USD 14.9 million in 2018 to USD 23.3 million by 2023, at a CAGR of 9.3%. Europe is expected to grow from USD 12.8 million in 2018 to USD 18.0 million by 2023, at the CAGR of 7.1% during the forecast period.

11 DATA HISTORIAN MARKET, BY REGION

KEY FINDINGS

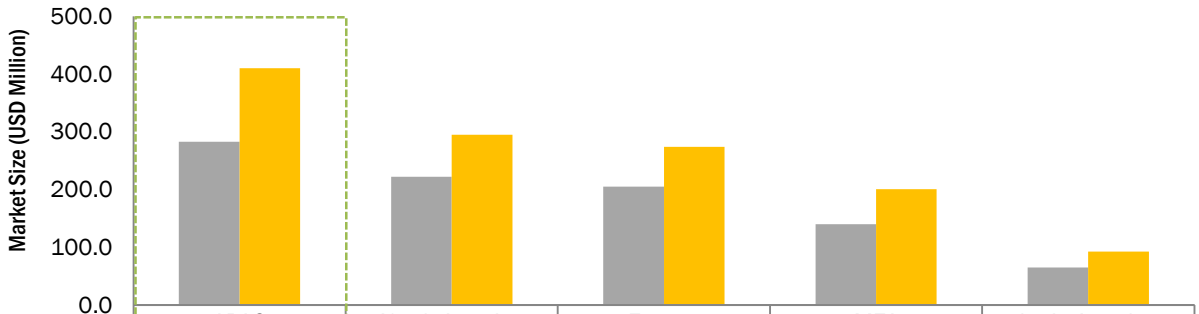
- North America is estimated to have a significant share in the data historian market with a total market share of 24.3% in 2018, growing at a CAGR of 5.8% during the forecast period. This high growth rate can be attributed to the rapid advancements in technology and higher adoption rates across major end-users.
- The APAC region is estimated to grow at the highest CAGR of 7.7% during the forecast period and projected to reach USD 282.7 million by 2023.
- Latin America and MEA are estimated to hold marginal shares in the data historian market; however, the trend is expected to change with the advancements in manufacturing and increasing automation in these regions.
- The increasing investment in digitalization has led to the higher deployment of advanced manufacturing solutions across industries in APAC region, resulting in vast amounts of data being generated from these devices. This, in turn, would demand technologically advanced analytics solutions to enhance the customer experience for various end-users.
- The software segment in APAC is expected to maintain its dominance in terms of revenue generation, growing at a CAGR of 7.4% during the forecast period.

11.1 INTRODUCTION

The data historian market has been segmented into 5 major geographic regions, namely, North America, Europe, APAC, MEA, and Latin America. The data historian solutions are radically transforming business models across the globe. Significantly, the growth of the data historian market is being driven by various factors, including the continuous disruption of new technologies, dynamic socioeconomic and political landscape, growing digitalization, and massive interconnectivity.

North America, followed by Europe, is estimated to hold the largest share of the data historian market. Developed infrastructure, high economic growth, and growing technological advancements are some of the driving factors for the growth of the market in North America and Europe. Moreover, regulatory instability and implementation of GDPR are expected to impact the European market. APAC is expected to grow at the growth in terms of adoption, considering the emerging needs for faster transactions. The Latin American region is expected to follow MEA in implementing data historian solutions, owing to the increased adoption by marine, and oil and gas industries. This section provides region-wise industry patterns, market potential, and forecasts based on components, applications, deployment modes, organization size, and end-users.

FIGURE 26 ASIA PACIFIC IS EXPECTED TO GROW AT THE HIGHEST CAGR IN THE DATA HISTORIAN MARKET DURING THE FORECAST PERIOD



	APAC	North America	Europe	MEA	Latin America
2018	282.7	222.1	205.0	140.0	65.1
2023	410.1	294.8	273.5	200.2	92.5
CAGR	7.7%	5.8%	5.9%	7.4%	7.3%

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

TABLE 33 DATA HISTORIAN MARKET SIZE, BY REGION, 2016–2023 (USD MILLION)

Region	2016	2017	2018-e	2023-p	CAGR (2018–2023)
North America	192.8	205.5	222.1	294.8	5.8%
Europe	177.4	189.4	205.0	273.5	5.9%
APAC	231.4	254.1	282.7	410.1	7.7%
MEA	115.7	126.4	140.0	200.2	7.4%
Latin America	54.0	58.9	65.1	92.5	7.3%
Total	**771.3**	**834.3**	**914.9**	**1,271.1**	**6.8%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by region. APAC is estimated to hold the largest market size of USD 282.7 million in 2018, which is projected to reach USD 410.1 million by 2023, at the highest CAGR of 7.7%. Continuous developments and the adoption of various technologies across all the major end-users are expected to drive the growth of the market in APAC. The growing adoption of cloud infrastructure, especially among the SMEs, is expected to be increasing the demand for data historian software and services in the APAC region.

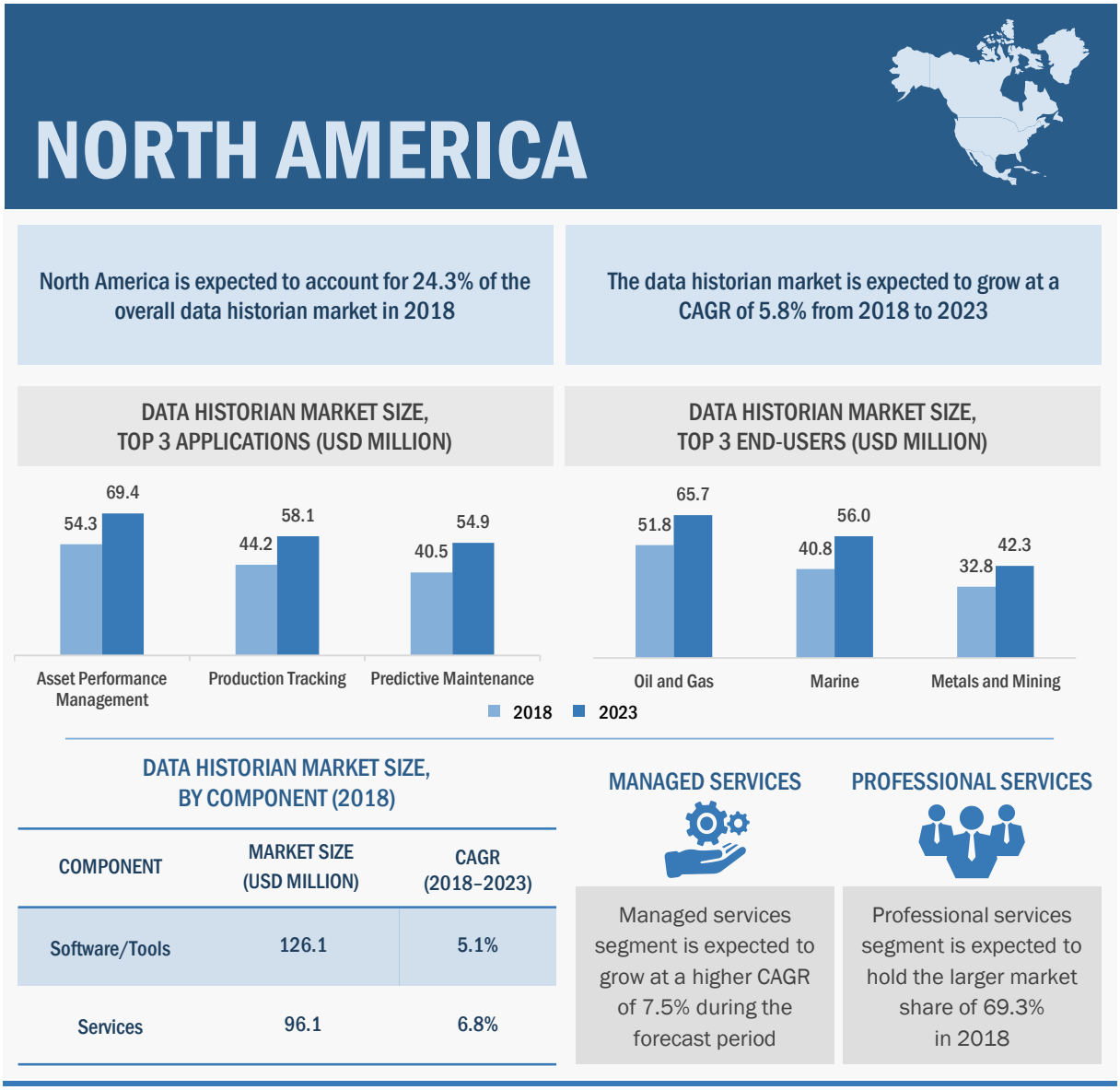
11.2 NORTH AMERICA

In North America, enterprises belonging to various end-user segments have been significantly using data historian solutions. Therefore, this region is expected to dominate the market in terms of providing growth opportunities to data historian solution providers. The region is the major and the fastest adopter of technologies, such as AI and SCADA. Moreover, a tremendous growth in customer-generated data is expected in this region in the coming years. Organizations operating in this region are highly dependable on this data, and hence are likely to adopt solutions that would enable the consolidation of data, which is collected in silos. Furthermore, migration facilitates technologies, such as the integration of big data and BI tools toward data management, which further simplifies other business-related operations.

The US and Canada are the major countries that contribute to the growth of the data historian market in North America. North America has witnessed rapid adoption of digitalization technologies and high levels of consumer usage as compared to the other developed regions.

End-user segments such as oil and gas, marine, chemicals and pharmaceuticals, paper and pulp, metals and mining, utilities, data centers, and others (food and beverage, infrastructure, heavy engineering and automotive, and railways) are the most promising in this region.

FIGURE 27 NORTH AMERICA: MARKET SNAPSHOT



Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

11.2.1 BY COUNTRY

TABLE 34 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY COUNTRY, 2016–2023 (USD MILLION)

Country	2016	2017	2018-e	2023-p	CAGR (2018–2023)
US	146.5	155.0	166.3	215.1	5.3%
Canada	46.3	50.5	55.9	79.8	7.4%
Total	**192.8**	**205.5**	**222.1**	**294.8**	**5.8%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by country in North America. The US is expected to maintain its dominance in terms of revenue generation, growing at a CAGR of 5.3% during the forecast period. The market size in the US is expected to grow from USD 166.3 million in 2018 to USD 215.1 million by 2023.

11.2.1.1 United States

According to the federal data release in 2016, enterprises in the US still dominate the region, as they invest largely in R&D. Such investments have resulted in the higher adoption of data management solutions in the US. Furthermore, the dominance of technology-based industries and enterprises have created huge opportunities in the country for the expansion of the data historian market.

11.2.1.2 Canada

Due to its well-established economy, Canada has witnessed huge amounts of investments in data historian projects. The demand for data historian software and services is rising with the growing investment in data management solutions for better decision-making. Companies operating in the region are focused on delivering advanced solutions, and so, they would efficiently use data historian solutions and services for decreasing the downtime and delivering agility and speed to keep pace with the changing legislation.

11.2.2 BY APPLICATION

TABLE 35 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	38.6	41.0	44.2	58.1	5.6%
Environmental Auditing	30.9	33.3	36.5	50.6	6.7%
Asset Performance Management	48.2	50.8	54.3	69.4	5.0%
GRC Management	27.0	29.0	31.6	42.9	6.3%
Predictive Maintenance	34.7	37.2	40.5	54.9	6.3%
Others*	13.5	14.2	15.1	18.9	4.7%
Total	**192.8**	**205.5**	**222.1**	**294.8**	**5.8%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application in North America. The asset performance management application is estimated to have the largest market size of USD 54.3 million in 2018 and projected to reach USD 69.4 million by 2023, at a CAGR of 5.0% during the forecast period.

11.2.3 BY COMPONENT

TABLE 36 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	111.8	117.9	126.1	161.3	5.1%
Services	81.0	87.6	96.1	133.5	6.8%
Total	**192.8**	**205.5**	**222.1**	**294.8**	**5.8%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component in North America. The software/tools segment is expected to maintain its dominance in terms of revenue generation, growing at a CAGR of 5.1% during the forecast period.

TABLE 37 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	24.3	26.6	29.5	42.5	7.5%
Professional Services	56.7	61.0	66.6	91.0	6.5%
Total	**81.0**	**87.6**	**96.1**	**133.5**	**6.8%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by service in North America. The professional services segment is expected to grow from USD 66.6 million in 2018 to USD 91.0 million by 2023, at a CAGR of 6.5%. Whereas, the managed services segment is projected to grow from USD 29.5 million in 2018 to USD 42.5 million by 2023, at a CAGR of 7.5%.

TABLE 38 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY PROFESSIONAL SERVICE, 2016–2023 (USD MILLION)

Professional Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	23.8	25.9	28.6	42.5	8.2%
Support and Maintenance Services	32.9	35.1	38.0	48.6	5.0%
Total	**56.7**	**61.0**	**66.6**	**91.0**	**6.5%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by professional service in North America. The consulting services segment is projected to grow at a higher CAGR of 8.2% during the forecast period. These services help enterprises in lowering their risks, reducing their complexities, and increasing their RoI. Moreover, they can be customized, easily applicable, and enabled to deliver the maximum product assurance.

11.2.4 BY DEPLOYMENT MODE

TABLE 39 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	64.9	67.7	71.5	88.1	4.2%
Cloud	47.0	50.3	54.5	73.2	6.1%
Total	**111.8**	**117.9**	**126.1**	**161.3**	**5.1%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode in North America. The on-premises deployment mode is projected to grow from USD 71.5 million in 2018 to USD 88.06 million by 2023, at a CAGR of 4.2% during the forecast period. The cloud deployment mode is projected to grow at a higher CAGR of 6.1% during the forecast period. The significant rise in the growth of cloud computing is mainly because of its features, such as enhanced flexibility, better disaster recovery management, automatic software update, increased collaboration, and overall operational cost reduction.

11.2.5 BY ORGANIZATION SIZE

TABLE 40 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	115.7	122.3	131.1	169.3	5.2%
SMEs	77.1	83.2	91.0	125.5	6.6%
Total	**192.8**	**205.5**	**222.1**	**294.8**	**5.8%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size in North America. The large enterprises segment is estimated to dominate the market during the forecast period; it is expected to grow from USD 131.1 million in 2018 to USD 169.3 million by 2023, at a CAGR of 5.2%.

11.2.6 BY END-USER

TABLE 41 NORTH AMERICA: DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End-user	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	46.3	48.7	51.8	65.7	4.8%
Marine	34.7	37.4	40.8	56.0	6.5%
Chemicals and Pharmaceuticals	23.1	25.2	27.8	39.5	7.2%
Paper and Pulp	11.6	12.6	13.8	19.5	7.1%
Metals and Mining	28.9	30.6	32.8	42.3	5.2%
Utilities	19.3	20.2	21.5	27.1	4.7%
Data Centers	15.4	17.1	19.2	28.7	8.3%
Others*	13.5	13.8	14.3	16.1	2.5%
Total	**192.8**	**205.5**	**222.1**	**294.8**	**5.8%**

e: estimated; p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by end-user in North America. The oil and gas end-user segment is estimated to have the largest market size of USD 51.8 million in 2018, which is projected to reach USD 65.7 million by 2023, at a CAGR of 4.8% during the forecast period.

11.3 EUROPE

Data historian vendors in Europe face data-related challenges in meeting the demands of global businesses and simultaneously handling regulatory requirements. New technologies and business models are being rapidly introduced to the European market, due to the dynamic business needs. Constant innovation and the increasing expenditure on R&D from companies in the region is a result of the widespread shift in customers' needs and the evolving new technologies, which, in turn, change the business models in data-driven industries.

Europe comprises both developed as well as developing economies. As per the present market scenario, the SMEs in the key European countries, such as the UK, Germany, and France are investing in incorporating data management solutions that can align the data according to the time series to leverage the data benefits, reduce unwanted costs, avoid excessive time consumption, as well as, concentrate on core competencies.

11.3.1 BY COUNTRY

TABLE 42 EUROPE: DATA HISTORIAN MARKET SIZE, BY COUNTRY, 2016–2023 (USD MILLION)

Country	2016	2017	2018-e	2023-p	CAGR (2018–2023)
UK	35.5	38.3	41.9	57.8	6.6%
Germany	39.0	42.0	45.7	62.4	6.4%
France	26.6	29.2	32.6	47.4	7.8%
Rest of Europe	76.3	79.9	84.8	106.0	4.6%
Total	**177.4**	**189.4**	**205.0**	**273.5**	**5.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by country in Europe. The market size in the rest of Europe is expected to grow from USD 84.8 million in 2018 to USD 106.0 million by 2023, at a CAGR of 4.6% during the forecast period.

11.3.1.1 United Kingdom

The country has shown a noteworthy rise in the adoption of data management solutions, which has led to the higher adoption of data historian software and services. Lately, the technology-based companies in the UK are rapidly driven by numerous strategies, such as mergers and acquisitions and strategic partnerships. Such strategies involve merging of the data and the respective business applications, which has resulted in complications in retrieving the data and aligning it with the time series. This is when data historian solutions come into play in storing the data according to its time series. Additionally, the European policymakers are encouraging governments to emphasize over data and adopt advanced solutions to capture and analyze the collected data for decision-making.

11.3.1.2 Germany

Industry 4.0 regulations, along with significant funding from major AI players, are expected to act as the major growth drivers for the adoption of data historian software and services in Germany. Organizations in the country are investing in new technologies to maintain a competitive edge in the market. It is one of the leading adopters of advanced technological solutions, such as cloud technologies, data historian software, data management solution, migration solutions, and analytics solutions in the European region. Numerous end-users, such as chemicals and pharmaceutical, and utilities, are majorly adopting data historian solutions to reduce complications while also being able to strategize their operational activities. Enterprises are utilizing the potential of data historian and management tools for better decision-making, which facilitates them in sustaining in a competitive environment.

Germany is the largest automotive manufacturer in Europe and one of the largest producers of steel and electrical engineering equipment. The need for data historian applications, such as predictive maintenance, production tracking, environmental auditing, and GRC management are the key factors for the market growth in Germany.

11.3.1.3 France

France has a huge potential for AI and is increasing its funding to AI startups. This move is fueling the development of the AI ecosystem in France. France is witnessing a number of favorable investments, for instance, in January 2017, Serena Capital (France), a venture capital firm, invested USD 85 million in big data and AI startups, so that these technologies can be used for various end-users, including oil and gas, data centers, and utilities. This has enhanced the adoption of data historian solutions in this country.

11.3.1.4 Rest of Europe

Europe is one of the developed regions that is adopting advanced technologies and methods, which is facilitating a way for increased adoption of data management solutions among organizations. The rest of Europe includes Spain, Italy, Sweden, and Switzerland. Significant improvements in the data historian process are enabling better decision-making skills for enterprises by optimizing their data, thus fueling the overall market growth in Europe.

11.3.2 BY APPLICATION

TABLE 43 EUROPE: DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	31.9	34.6	38.1	53.4	7.0%
Environmental Auditing	35.5	38.7	42.8	61.0	7.3%
Asset Performance Management	42.6	44.5	47.2	58.6	4.4%
GRC Management	26.6	28.0	29.9	38.0	4.9%
Predictive Maintenance	30.2	32.5	35.4	48.5	6.5%
Others*	10.6	11.1	11.6	14.1	3.9%
Total	**177.4**	**189.4**	**205.0**	**273.5**	**5.9%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application in Europe. The asset performance management application is estimated to have the largest market size of USD 47.2 million in 2018, which is projected to reach USD 58.6 million by 2023, at a CAGR of 4.4% during the forecast period.

11.3.3 BY COMPONENT

TABLE 44 EUROPE: DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	106.4	112.3	120.0	153.8	5.1%
Services	71.0	77.1	85.0	119.8	7.1%
Total	**177.4**	**189.4**	**205.0**	**273.5**	**5.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component in Europe. The software/tools segment is expected to maintain its dominance in terms of revenue generation. This segment is expected to grow from USD 120.0 million in 2018 to USD 153.8 million by 2023, at a CAGR of 5.1%.

TABLE 45 EUROPE: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	22.7	25.0	27.9	40.8	7.9%
Professional Services	48.3	52.1	57.1	79.0	6.7%
Total	**71.0**	**77.1**	**85.0**	**119.8**	**7.1%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by service in Europe. The professional services segment is expected to grow from USD 57.1 million in 2018 to USD 79.0 million by 2023, at a CAGR of 6.7% during the forecast period.

TABLE 46 EUROPE: DATA HISTORIAN MARKET SIZE, BY PROFESSIONAL SERVICE, 2016–2023 (USD MILLION)

Professional Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	19.3	21.1	23.4	33.7	7.5%
Support and Maintenance Services	29.0	31.0	33.6	45.3	6.1%
Total	**48.3**	**52.1**	**57.1**	**79.0**	**6.7%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by professional service in Europe. The support and maintenance services segment is expected to grow from USD 33.6 million in 2018 to USD 45.3 million by 2023, at a CAGR of 6.1% during the forecast period.

11.3.4 BY DEPLOYMENT MODE

TABLE 47 EUROPE: DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	64.9	67.9	71.9	89.2	4.4%
Cloud	41.5	44.4	48.1	64.6	6.1%
Total	**106.4**	**112.3**	**120.0**	**153.8**	**5.1%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode in Europe. The cloud deployment mode is expected to grow from USD 48.1 million in 2018 to USD 64.6 million by 2023, at the highest CAGR of 6.1% during the forecast period.

11.3.5 BY ORGANIZATION SIZE

TABLE 48 EUROPE: DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	104.7	110.4	118.0	150.0	5.1%
SMEs	72.7	79.0	87.0	122.6	7.1%
Total	**177.4**	**189.4**	**205.0**	**273.5**	**5.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size in Europe. The large enterprises segment is expected to dominate the market with the market size of USD 118.0 million in 2018, which is projected to reach USD 150.0 million by 2023, at a CAGR of 5.1% during the forecast period.

11.3.6 BY END-USER

TABLE 49 EUROPE: DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End-user	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	44.3	46.7	49.9	63.5	5.0%
Marine	47.9	50.1	53.1	65.9	4.4%
Chemicals and Pharmaceuticals	21.3	23.1	25.3	35.3	6.9%
Paper and Pulp	8.9	9.6	10.6	15.0	7.1%
Metal and Mining	14.2	15.8	17.8	26.9	8.5%
Utilities	17.7	18.8	20.1	26.0	5.3%
Data Centers	12.4	13.8	15.4	22.9	8.2%
Others*	10.6	11.6	12.8	18.0	7.1%
Total	**177.4**	**189.4**	**205.0**	**273.5**	**5.9%**

e: estimated; p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

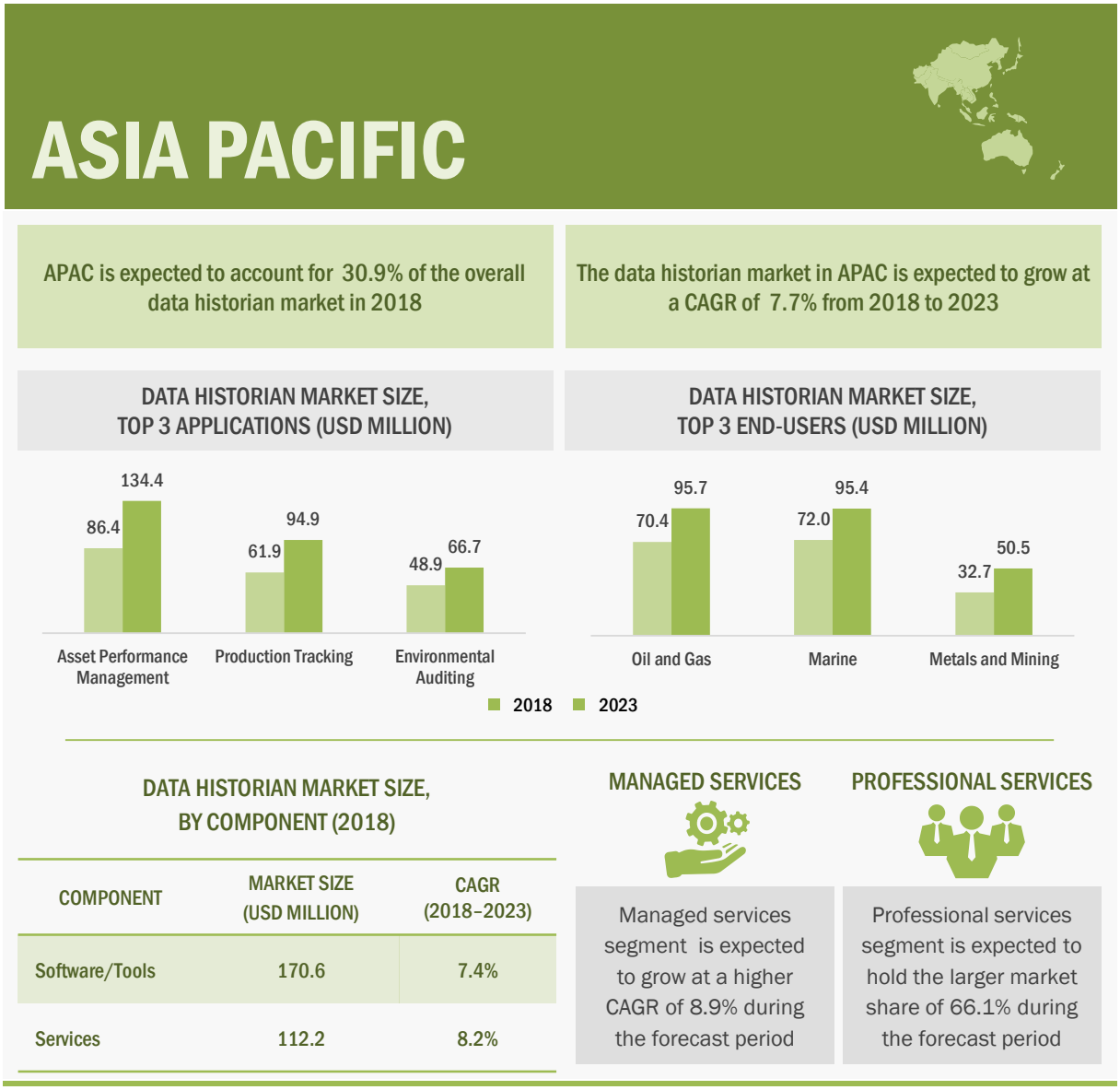
Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by end-user in Europe. The marine end-user segment is estimated to have the largest market size of USD 53.1 million in 2018, which is projected to reach USD 65.9 million by 2023, at a CAGR of 4.4% during the forecast period.

11.4 ASIA PACIFIC

The increasing need for improved business productivity, supported by competently designed data management solutions offered by vendors operating in the APAC region, is expected to make it a high potential region for the growth of the data historian market. Many Asian countries have adopted the latest technologies, which have turned data into a major asset for development. Therefore, information-intensive data management technologies are the leading technology trends. With the increasing number of partnerships and mergers in this region, the necessity for data consolidation has given rise to the migration of data in a centralized environment. The major countries in APAC are technology-driven and have major opportunities in terms of investments and revenues. These countries include Australia and New Zealand (ANZ), China, Japan, and Singapore. Rapid digitalization in these countries has resulted in the production of bulks of unstructured data. The region has shown an untapped potential in the adoption of enterprise data management solutions, as a result of which, most of the companies are entering the APAC region to enhance their market reach. Therefore, to overcome the challenges arising out of the rapidly growing volumes of high-velocity data, companies are using data historian solutions to store the data on the basis of time series. This is one of the major factors that is accelerating the growth of the data historian market in the APAC region.

FIGURE 28 ASIA PACIFIC: MARKET SNAPSHOT



Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

11.4.1 BY COUNTRY

TABLE 50 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY COUNTRY, 2016–2023 (USD MILLION)

Country	2016	2017	2018-e	2023-p	CAGR (2018–2023)
China	76.3	83.0	91.4	128.9	7.1%
ANZ	32.4	36.2	41.0	62.4	8.8%
Singapore	13.9	15.7	18.1	28.5	9.5%
Japan	69.4	75.7	83.6	118.7	7.3%
Rest of APAC	39.4	43.5	48.6	71.5	8.0%
Total	**231.4**	**254.1**	**282.7**	**410.1**	**7.7%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by country in APAC. China is expected to grow from USD 91.4 million in 2018 to USD 128.9 million by 2023, at a CAGR of 7.1% during the forecast period.

11.4.1.1 China

In terms of technological adoption, China has been at the forefront in the APAC region. Although the adoption has declined as compared to the other developed countries across the globe, China is still leading the APAC market in terms of revenue generation. Data historian solutions have observed a widespread implementation in China, owing to the increasing digitalization and the implications of several regulatory compliances in the country.

11.4.1.2 Japan

Japan is rapidly growing in terms of adopting data historian solutions for use across various end-user segments. Being the world's 3rd largest economy, the country is rapidly investing in new technologies to maintain its position in the global market. It majorly focuses on food and beverages, infrastructure, and automotive services. Among these sectors, the automotive services and food and beverages sectors are growing rapidly, owing to the advent of big data and IoT technologies. These sectors deal with huge amounts of data that is generated through numerous sources. As a result, organizations are in need of arranging different types of data on the time series to enhance the decision-making capabilities of inventory management, logistics, forecasting, resourcing, and sales teams. Data historian solution providers have started expanding their footprint in Japan, owing to the increase in use of big data and data historian solutions in this country.

11.4.1.3 Singapore

Singapore is one of the leading countries in terms of adopting data historian solutions. Singaporean companies are looking for new opportunities by adopting strategies, such as partnerships and acquisitions. For instance, ICONICS partnered with the Singapore-based business unit of Microsoft and won the CityNext Partner of the Year 2017 Award for providing excellent solutions based on Microsoft's technology.

11.4.1.4 Australia and New Zealand

Australia and Singapore are early adopters of data historian solutions in the APAC region. The governments of these countries are taking initiatives to adopt various data management solutions, owing to the advent of big data to drive service delivery. Companies are rapidly entering into strategic partnerships, alliances, and acquisitions to expand their presence in ANZ. These initiatives by companies would help increase the adoption of data historian solutions in ANZ.

11.4.1.5 Rest of APAC

Data historian solutions are well-adopted among various end-user segments in the rest of APAC region. With slow but gradual technological advancements and the evolution of core technologies, organizations in the rest of APAC are using data historian solutions, considering the low costs and less maintenance charges involved. As a result, there are no technological or financial barriers to the widespread deployment of technologies in cost-sensitive APAC countries. In many APAC countries, data historian solutions are adopted for their lower overall operational costs and to improve business operations and productivity. Major end-user segments, such as oil and gas, marine, chemicals and pharmaceuticals, paper and pulp, metals and mining, utilities, data centers, and others (food and beverage, infrastructure, heavy engineering and automotive, and railways) in countries such as India and Korea have deployed data historian software and services for advanced data management, thereby making an impact on the overall APAC market.

11.4.2 BY APPLICATION

TABLE 51 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	48.6	54.5	61.9	94.9	8.9%
Environmental Auditing	41.6	44.8	48.9	66.7	6.4%
Asset Performance Management	67.1	75.7	86.4	134.4	9.2%
GRC Management	27.8	29.4	31.6	41.2	5.4%
Predictive Maintenance	32.4	35.0	38.2	52.7	6.6%
Others*	13.9	14.7	15.7	20.2	5.1%
Total	**231.4**	**254.1**	**282.7**	**410.1**	**7.7%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application in APAC. The asset performance management application is estimated to have the largest market size of USD 86.4 million in 2018, which is projected to reach USD 134.4 million by 2023, at a CAGR of 9.2% during the forecast period.

11.4.3 BY COMPONENT

TABLE 52 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	141.1	154.1	170.6	243.5	7.4%
Services	90.2	99.9	112.2	166.5	8.2%
Total	**231.4**	**254.1**	**282.7**	**410.1**	**7.7%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component in APAC. The services segment is expected to hold a higher CAGR of 8.2% during the forecast period.

TABLE 53 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	29.8	33.4	37.9	58.2	8.9%
Professional Services	60.5	66.6	74.2	108.4	7.9%
Total	**90.2**	**99.9**	**112.2**	**166.5**	**8.2%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by service in APAC. The professional services segment is expected to grow from USD 74.2 million in 2018 to USD 108.4 million by 2023, at a CAGR of 7.9% during the forecast period.

TABLE 54 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY PROFESSIONAL SERVICE, 2016–2023 (USD MILLION)

Professional Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	23.6	26.3	29.8	45.3	8.7%
Support and Maintenance Services	36.9	40.2	44.4	63.0	7.3%
Total	**60.5**	**66.6**	**74.2**	**108.4**	**7.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by professional service in APAC. The support and maintenance services segment is expected to grow from USD 44.4 million in 2018 to USD 63.0 million by 2023, at a CAGR of 7.3% during the forecast period.

11.4.4 BY DEPLOYMENT MODE

TABLE 55 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	101.6	110.0	120.6	167.5	6.8%
Cloud	39.5	44.2	50.0	76.0	8.7%
Total	**141.1**	**154.1**	**170.6**	**243.5**	**7.4%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode in APAC. The on-premises deployment mode is expected to grow from USD 120.6 million in 2018 to USD 167.5 million by 2023, at a CAGR of 6.8% during the forecast period.

11.4.5 BY ORGANIZATION SIZE

TABLE 56 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	134.2	145.8	160.4	225.4	7.0%
SMEs	97.2	108.3	122.3	184.7	8.6%
Total	**231.4**	**254.1**	**282.7**	**410.1**	**7.7%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size in APAC. The large enterprises segment is expected to dominate the market with the market size of USD 160.4 million in 2018, which is projected to reach USD 225.4 million by 2023, growing at a CAGR of 7.0%.

11.4.6 BY END-USER

TABLE 57 ASIA PACIFIC: DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End-user	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	60.2	64.7	70.4	95.7	6.3%
Marine	62.5	66.6	72.0	95.4	5.8%
Chemicals and Pharmaceuticals	23.1	25.6	28.8	42.8	8.2%
Paper and Pulp	13.9	15.7	17.9	27.9	9.2%
Metals and Mining	25.5	28.6	32.7	50.5	9.1%
Utilities	16.2	18.8	22.0	36.5	10.6%
Data Centers	18.5	21.0	24.1	38.0	9.5%
Others*	11.6	13.1	14.9	23.3	9.3%
Total	**231.4**	**254.1**	**282.7**	**410.1**	**7.7%**

e: estimated; p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by end-user in APAC. The marine end-user segment is estimated to have the largest market size of USD 72.0 million in 2018 and expected to reach USD 95.4 million by 2023, at a CAGR of 5.8% during the forecast period.

11.5 LATIN AMERICA

The Latin American region includes major countries, such as Brazil and Mexico. According to the Energy Information Administration (EIA), in 2016, the production of petroleum and other liquids increased from 3.18 million b/d in 2015 to 3.23 million b/d in 2016. According to International Energy Outlook, the crude oil production in Brazil is expected to increase by 1.95 million b/d from 2015 to 2040, which indicates greater offshore production after 2030. In addition, the Brazilian Government plans to invest more in other renewable sources of energy to generate power for the industrial sector. The country is one of the largest producers of mineral ores, metals, and mining materials, which accounted for up to 2% of its GDP in 2016. The increasing demand for energy efficiency in the growing manufacturing, and oil and gas sectors is expected to drive the adoption of data historian solutions in the country. The major players in the country include ABB, GE, and Siemens.

11.5.1 BY COUNTRY

TABLE 58 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY COUNTRY, 2016–2023 (USD MILLION)

Country	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Brazil	26.3	28.3	31.0	42.7	6.6%
Mexico	9.3	10.2	11.5	16.8	8.0%
Rest of Latin America	18.4	20.3	22.6	33.0	7.9%
Total	**54.0**	**58.9**	**65.1**	**92.5**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by country in Latin America. Mexico is expected to grow from USD 11.5 million in 2018 to USD 16.8 million by 2023, at the highest CAGR of 8.0% during the forecast period.

11.5.1.1 Brazil

IIoT has radically changed the interaction of businesses and governments with the physical world. The increasing adoption of IIoT among SMEs and large organizations in Brazil have replaced manual data collection and subjective judgments with automated data collection, analysis, and measurements. This helps SMEs save money, improve their security, develop new services, and even create new business models. Data historian solutions typically target verticals or micro-verticals, merging innovation with pragmatism to solve industry-specific problems. Although data historian and IoT solutions require technical expertise to build, the Brazilian SMEs do not need to be technology experts to quickly deploy and benefit from them. In Brazil, organizations are utilizing data historian solutions to augment business processes and operations and provide meaningful insights for better business decision-making and enhance the overall efficiency. Moreover, despite the significant rate of adoption, the country has shown a moderate demand for effective and efficient adoption of data historian solutions to organize various types of data in a structured format, thereby enhancing the industrial efficiency.

11.5.1.2 Mexico

IIoT is one of the top areas of interest among the SMEs and large enterprises in the Mexican region because of its numerous business advantages. The first is operational cost-savings and efficiency through dramatic processes improvements, and the second is enabling new business models with new revenue streams and competitive advantage. Organizations in Mexico are planning to invest in big data solutions, which can drive the adoption of data historian software/tools also. The adoption of data historian solutions is expected to increase at a largely faster rate, due to its ability to help optimize the production process for operational excellence and overall efficiency. By 2023, it is expected that IIoT and time series database solution providers in the Mexican region would work closely with connectivity, cloud computing, and data management providers to usher an industrial revolution.

11.5.1.3 Rest of Latin America

According to export.gov, the demand for electricity is expected to grow by 95,000 GWh in 2020. According to the National Energy Strategy 2012–2020, the Chile Government plans to diversify the country's energy mix and pledge a clean energy mandate of 20% electricity generation by 2025. Ecuador also plans to develop energy using the renewable sources of energy in the coming years. The rest of Latin American countries include Argentina, Costa Rica, Panama, and Chile, which are expected to observe a significant adoption of data historian solutions.

11.5.2 BY APPLICATION

TABLE 59 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	11.3	12.3	13.6	19.2	7.1%
Environmental Auditing	9.7	10.4	11.4	15.4	6.3%
Asset Performance Management	11.9	13.1	14.6	21.4	7.9%
GRC Management	7.6	8.3	9.2	13.4	7.8%
Predictive Maintenance	8.6	9.5	10.6	15.5	7.9%
Others*	4.9	5.2	5.6	7.5	6.0%
Total	**54.0**	**58.9**	**65.1**	**92.5**	**7.3%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application in Latin America. The asset performance management application is estimated to have the largest market size of USD 14.6 million in 2018, which is projected to reach USD 21.4 million by 2023, at a CAGR of 7.9% during the forecast period.

11.5.3 BY COMPONENT

TABLE 60 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	36.7	39.8	43.7	61.2	6.9%
Services	17.3	19.1	21.3	31.3	8.0%
Total	**54.0**	**58.9**	**65.1**	**92.5**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component in Latin America. The software/tools segment is expected to maintain its dominance in terms of revenue generation, growing at a CAGR of 6.9% during the forecast period.

TABLE 61 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	6.6	7.4	8.4	13.0	9.1%
Professional Services	10.7	11.7	12.9	18.4	7.3%
Total	**17.3**	**19.1**	**21.3**	**31.3**	**8.0%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by service in Latin America. The professional services segment is expected to grow from USD 12.9 million in 2018 to USD 18.4 million by 2023, at a CAGR of 7.3% during the forecast period.

TABLE 62 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY PROFESSIONAL SERVICE, 2016–2023 (USD MILLION)

Professional Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	4.5	5.0	5.6	8.2	8.0%
Support and Maintenance Services	6.2	6.7	7.4	10.2	6.7%
Total	**10.7**	**11.7**	**12.9**	**18.4**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by professional service in Latin America. The support and maintenance services segment is expected to grow from USD 7.4 million in 2018 to USD 10.2 million by 2023, at a CAGR of 6.7% during the forecast period.

11.5.4 BY DEPLOYMENT MODE

TABLE 63 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	25.0	26.8	29.2	39.6	6.3%
Cloud	11.7	13.0	14.6	21.6	8.2%
Total	**36.7**	**39.8**	**43.7**	**61.2**	**6.9%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode in Latin America. The cloud deployment mode is expected to grow from USD 14.6 million in 2018 to USD 21.6 million by 2023, at the highest CAGR of 8.2% during the forecast period.

11.5.5 BY ORGANIZATION SIZE

TABLE 64 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	30.2	32.9	36.2	51.0	7.1%
SMEs	23.8	26.0	28.9	41.5	7.5%
Total	**54.0**	**58.9**	**65.1**	**92.5**	**7.3%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size in Latin America. The large enterprises segment is expected to dominate the market with the market size of USD 36.2 million in 2018, which is projected to reach USD 51.0 million by 2023, growing at a CAGR of 7.5% during the forecast period.

11.5.6 BY END-USER

TABLE 65 LATIN AMERICA: DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End-user	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	12.4	13.5	14.8	20.7	6.9%
Marine	10.3	11.3	12.6	18.4	7.9%
Chemicals and Pharmaceuticals	7.6	8.4	9.5	14.1	8.4%
Paper and Pulp	3.8	4.2	4.7	7.0	8.3%
Metals and Mining	8.1	8.6	9.3	12.2	5.6%
Utilities	5.9	6.4	7.0	9.5	6.4%
Data Centers	3.2	3.6	4.1	6.4	9.0%
Others*	2.7	2.9	3.1	4.2	6.1%
Total	**54.0**	**58.9**	**65.1**	**92.5**	**7.3%**

e: estimated; p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by end-user in Latin America. The oil and gas end-user segment is estimated to have the largest market size of USD 14.8 million in 2018 and expected to reach USD 20.7 million by 2023, at a CAGR of 6.9% during the forecast period.

11.6 MIDDLE EAST AND AFRICA

The data historian market is also witnessing a huge growth in the MEA region. The main reason for this adoption rate is the increasing evolution of technologies for collaborating data from machines and importing it over a repository. Industry 4.0 is expected to impact the region by developing smart factories, which will manage processes and issues. Moreover, IIoT is expected to bring disruptive changes to the industry through its extensive ability to collect machine data and later utilize it for the betterment of processes throughout the production life cycle. Companies in this region are leveraging the past machine data to predict future breakdowns and potential outcomes. Moreover, the establishment of Semmco, a UK-based design and manufacturing engineering company in Dubai, has indicated the development and growing digitization in the region. Major countries contributing to the adoption of data historian solutions in the MEA region are United Arab Emirates (UAE), Kingdom of Saudi Arabia (KSA), Qatar, South Africa, and the rest of MEA.

11.6.1 BY COUNTRY

TABLE 66 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY COUNTRY, 2016–2023 (USD MILLION)

Country	2016	2017	2018-e	2023-p	CAGR (2018–2023)
UAE	12.7	14.2	16.0	24.1	8.5%
KSA	18.5	20.6	23.1	34.6	8.4%
Qatar	9.3	10.4	11.9	18.5	9.2%
South Africa	30.1	32.7	36.1	51.1	7.2%
Rest of MEA	45.1	48.5	52.9	72.0	6.4%
Total	**115.7**	**126.4**	**140.0**	**200.2**	**7.4%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by country in MEA. The market size of the rest of MEA is expected to grow from USD 52.9 million in 2018 to USD 72.0 million by 2023, at a CAGR of 6.4% during the forecast period.

11.6.1.1 United Arab Emirates

UAE is one of the most significant oil producers in the world with proven reserves of oil worth of USD 97.8 billion barrels as of 2015. Just like Saudi Arabia, the country is pushing for digitalization in its oil and gas sector and implementing technologies to enhance the production and mitigate the losses caused due to unplanned downtimes. Some of the major players in UAE are ABB, Schneider Electric, and Siemens. UAE's institutional framework, infrastructure, macroeconomic stability, and ICT usage have seen improvements over the past few years, and with highly efficient goods companies, a strong macroeconomic environment, and the government's efficiency, the region presents several opportunities for investors and technology vendors.

11.6.1.2 Kingdom of Saudi Arabia

This era of technological disruption has created a huge impact on organizations operating in the manufacturing industry. Companies are implementing innovative technologies to transform manufacturing processes and excel in creating breakthrough factories of the future. The country has initiated the Saudi Industry 4.0 Summit, which is dedicated to the manufacturing and industrial sector. This initiative will help organizations explore new business opportunities and prepare to address the potential threats in the country. This summit is a major initiative to bring into picture innovative technologies for the betterment of various production processes in the manufacturing industry.

11.6.1.3 Qatar

As per the Gas Exporting Countries Forum, Qatar holds the third-largest natural gas reserves after Russia and Iran, and accounts for 14% share of the global natural gas reserves. The availability of cheap natural gas has also ensured a manufacturing boom in the country with the Qatari Government announcing major economic reforms in 2017 for the promotion of the manufacturing sector. Such recent sanctions from the country have resulted in the increasing demand for energy cost reduction, thus driving the demand for solutions to improve the production efficiency in the country. Some of the major players in Qatar are ABB, GE, and Siemens. Moreover, Qatar is building strategies and working on its capacity and infrastructure to be at the forefront of digital societies as detailed in the 2030 Qatar National Vision.

11.6.1.4 South Africa

South Africa has been exporting natural resources for decades, which has been the major reason for its de-industrialization and shrinking manufacturing sector. However, in today's customer-centric market landscape, manufacturers are undertaking massive changes to meet their customers' demands and deliver the best customer experience. The rising need for automation is driving the adoption of IIoT in this country, and this is ultimately impacting the manufacturing and response times, thus benefitting organizations. Companies such as General Electric and Siemens are building IIoT platforms to offer better features, support, and ecosystems for large, complex assets, infrastructures, and products.

11.6.1.5 Rest of MEA

The Middle East is rich in oil and other related products. Their extraction and refining industries constitute a major share of the revenue. IoT offers several opportunities for the oil and gas companies in this region to integrate their platforms globally, automate their processes, improve their efficiency, reduce their dependency on humans, and provide enhanced safety. This region has seen a rise in urbanization in the recent years, which has led to an increased demand for energy. To meet such demands, new power generation projects are being undertaken, which are expected to implement smart technologies. Israel and Saudi Arabia are expected to be the prominent markets for IIoT in this region, and there are similar opportunities in other Middle Eastern countries as well.

11.6.2 BY APPLICATION

TABLE 67 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY APPLICATION, 2016–2023 (USD MILLION)

Application	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Production Tracking	17.4	18.8	20.6	28.8	6.9%
Environmental Auditing	23.1	25.8	29.2	44.3	8.7%
Asset Performance Management	31.2	33.7	36.9	50.8	6.6%
GRC Management	20.8	23.1	26.1	39.1	8.4%
Predictive Maintenance	13.9	15.0	16.5	23.0	6.8%
Others*	9.3	9.9	10.7	14.3	6.0%
Total	**115.7**	**126.4**	**140.0**	**200.2**	**7.4%**

e: estimated; p: projected

*Note: *Others includes security and quality control management*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by application in MEA. The asset performance management application is estimated to have the largest market size of USD 36.9 million in 2018, which is projected to reach USD 50.8 million by 2023, at a CAGR of 6.6% during the forecast period.

11.6.3 BY COMPONENT

TABLE 68 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY COMPONENT, 2016–2023 (USD MILLION)

Component	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Software/Tools	71.7	78.1	86.2	122.1	7.2%
Services	44.0	48.3	53.8	78.1	7.7%
Total	**115.7**	**126.4**	**140.0**	**200.2**	**7.4%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by component in MEA. The software/tools segment is expected to maintain its dominance in terms of revenue generation, growing at a CAGR of 7.2% during the forecast period.

TABLE 69 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY SERVICE, 2016–2023 (USD MILLION)

Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Managed Services	15.4	17.0	19.0	28.1	8.1%
Professional Services	28.6	31.3	34.7	50.0	7.6%
Total	**44.0**	**48.3**	**53.8**	**78.1**	**7.7%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by service in MEA. The professional services segment is expected to grow from USD 34.7 million in 2018 to USD 50.0 million by 2023, at a CAGR of 7.6 % during the forecast period.

TABLE 70 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY PROFESSIONAL SERVICE, 2016–2023 (USD MILLION)

Professional Service	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Consulting Services	10.6	11.6	13.0	18.8	7.8%
Support and Maintenance Services	18.0	19.7	21.8	31.1	7.4%
Total	**28.6**	**31.3**	**34.7**	**50.0**	**7.6%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by professional service in MEA. The support and maintenance services segment is expected to grow from USD 21.8 million in 2018 to reach USD 31.1 million by 2023, at a CAGR of 7.4%.

11.6.4 BY DEPLOYMENT MODE

TABLE 71 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY DEPLOYMENT MODE, 2016–2023 (USD MILLION)

Deployment mode	2016	2017	2018-e	2023-p	CAGR (2018–2023)
On-premises	51.6	55.7	60.9	84.0	6.6%
Cloud	20.1	22.4	25.3	38.1	8.6%
Total	**71.7**	**78.1**	**86.2**	**122.1**	**7.2%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by deployment mode in MEA. The on-premises deployment mode is expected to grow from USD 60.9 million in 2018 to reach 84.0 million by 2023, at a CAGR of 6.6%.

11.6.5 BY ORGANIZATION SIZE

TABLE 72 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY ORGANIZATION SIZE, 2016–2023 (USD MILLION)

Organization Size	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Large Enterprises	63.6	69.0	75.7	105.8	6.9%
SMEs	52.1	57.4	64.2	94.5	8.0%
Total	**115.7**	**126.4**	**140.0**	**200.2**	**7.4%**

e: estimated; p: projected

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by organization size in MEA. The large enterprises segment is expected to dominate the market with the larger market size of USD 75.7 million in 2018, which is projected to reach USD 105.8 million by 2023, growing at a CAGR of 6.9% during the forecast period.

11.6.6 BY END-USER

TABLE 73 MIDDLE EAST AND AFRICA: DATA HISTORIAN MARKET SIZE, BY END-USER, 2016–2023 (USD MILLION)

End-user	2016	2017	2018-e	2023-p	CAGR (2018–2023)
Oil and Gas	32.4	35.2	38.8	54.6	7.1%
Marine	35.9	38.9	42.7	59.7	6.9%
Chemicals and Pharmaceuticals	8.1	8.8	9.6	13.5	6.9%
Paper and Pulp	6.9	7.7	8.6	12.8	8.2%
Metals and Mining	9.3	10.2	11.3	16.4	7.7%
Utilities	10.4	11.5	12.9	19.2	8.2%
Data Centers	6.9	7.9	9.2	14.8	10.0%
Others*	5.8	6.2	6.8	9.3	6.4%
Total	**115.7**	**126.4**	**140.0**	**200.2**	**7.4%**

e: estimated; p: projected

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Source: Secondary Literature, Expert Interviews, and MarketsandMarkets Analysis

The table above highlights the data historian market size by end-user in MEA. The marine end-user segment is estimated to have the largest market size of USD 42.7 million in 2018, which is projected to reach USD 59.7 million by 2023, at a CAGR of 6.9% during the forecast period.

12 COMPETITIVE LANDSCAPE

12.1 OVERVIEW

The competitive landscape describes the analysis of the growth strategies implemented by the key players in the data historian market. This section includes strategies such as partnerships and collaborations, agreements, new product launches, product upgradations, and expansions that were carried out by the top market players during 2015–2018 to expand their market shares and enhance their data historian related product offerings in the market.

FIGURE 29 KEY DEVELOPMENTS BY THE LEADING PLAYERS IN THE DATA HISTORIAN MARKET, 2015–2018

COMPANY NAME	ORGANIC GROWTH STRATEGIES		INORGANIC GROWTH STRATEGIES
	New Product Launches	Product Upgradations and Business Expansions	Partnerships, Agreements, and Collaborations
General Electric			In November 2016, the company launched a dedicated program for ISVs designed for the development of a marketplace for Predix applications. This is expected to solve industry challenges
Siemens AG		In December 2016, Siemens established 20 centers in 17 countries for digital customer application in the industrial sector	
Aveva Group		In January 2015, Aveva Group opened a new office in the KSA. This new office has strengthened the company's presence in the Middle East, further enhancing its network	In April 2018, Aveva expanded its partnership with EOH, an IT service management company, to improve sub-Saharan African sales and support Aveva's software portfolio
Yokogawa	In May 2018, Yokogawa launched amnimo Inc., a business unit for identifying, developing, and delivering services to add value to the IIoT architecture developed by Yokogawa	In July 2016, Yokogawa released an update to Exaquantum PIMS. The new update includes various enhancements, such as improved web-based functionality, support for Windows 10, and new data analysis functionality	In June 2017, Yokogawa partnered with Sinopec Engineering, a Sinopec Group company. Sinopec Engineering designs and builds oil refineries and petrochemical plants
Honeywell	In January 2018, Honeywell launched its new platform, Honeywell Connected Plant Uniformance Cloud Historian for industrial usage. This is a SaaS, which would help in the analysis and visualization of the operational data to enhance plant uptime and manage asset across the organization		

Note: indicates events that would have a significant impact on the market
Source: Press Releases, Expert Interviews, and MarketsandMarkets Analysis

12.2 PROMINENT PLAYERS IN THE DATA HISTORIAN MARKET

The table below categorizes the leading data historian software providers into 3 major categories, namely, leaders, challengers, and niche players.

The leaders' category comprises vendors who have a strong and established product portfolio and a strong market presence. These players cater to a wide range of industry verticals and have strong business strategies. The companies in this category include General Electric, IBM, ABB, Rockwell Automation, Emerson, Honeywell, and Siemens.

The challengers' category includes vendors who have a prominent market presence and robust business strategies to achieve continuous market growth. The companies in this category include Yokogawa, Aveva Group, OSIsoft, and ICONICS.

The niche players' category consists of vendors who have the potential to broaden their product portfolios to compete with the other market players. Companies in this category include InfluxData, Canary Labs, and Open Automation Software.

CATEGORY	COMPANY
Leaders	General Electric, IBM, ABB, Rockwell Automation, Emerson, Honeywell, and Siemens
Challengers	Yokogawa, Aveva Group, OSIsoft, and ICONICS
Niche Players	InfluxData, Canary Labs, and Open Automation Software

Note: The positioning of the companies in the different categories is based on their geographic footprint, breadth and depth of product offering, product feature and functionality, channel strategy and fit, and the effectiveness of organic and inorganic growth strategies in the data historian market. Secondary research, along with in-depth primary interviews conducted with the key industry leaders, has contributed to this analysis.

Source: Annual Reports, Press Releases, Investor Presentations, Primary Interviews, and MarketsandMarkets Analysis

12.3 COMPETITIVE SCENARIO

The data historian market has been highly competitive and comprises several global and domestic market players. This section of the report studies the growth strategies adopted by the market players between 2015 and 2018. The players in this market have adopted various strategies to expand their presence and increase their market shares. New product launches and product upgradations, expansions, and partnerships and collaborations are the major strategies adopted by the key players to achieve growth in the data historian market.

12.3.1 NEW PRODUCT LAUNCHES AND PRODUCT UPGRADATIONS

Several companies in the data historian market have adopted this strategy to enhance their product portfolios and meet their customers' emerging demands. Honeywell, InfluxData, ICONICS, and Savigent Software are some of the major companies that have adopted this strategy.

TABLE 74 NEW PRODUCT LAUNCHES AND PRODUCT UPGRADATIONS, 2015–2018

DATE	COMPANY NAME	DESCRIPTION
January 2018	Honeywell (US)	Honeywell launched its new platform, namely, Honeywell Connected Plant Uniformance Cloud Historian for industrial usage. This is a Software-as-a-Service (SaaS), which would help in the analysis and visualization of the operational data to enhance plant uptime and manage assets across the organization.
December 2017	InfluxData (US)	InfluxData released the industry's first advanced Kubernetes auto scaling and Prometheus read/write support. The new release would enable developers to efficiently control and utilize their containers by determining Kubernetes auto scaling based on any metric generated by K8s and collected with InfluxData.
November 2016	ICONICS (US)	ICONICS introduced the holographic Human–Machine Interface (HMI), which consists of 2D and 3D holograms integrated with GENESIS64 HMI/SCADA, ICONICS AnalytiX solutions, and hyper historian and data historian. This integration provides fault detection and diagnostics, additional insights to users, and time-saving maintenance operations in various industries.
May 2015	Savigent Software (US)	Savigent Software introduced version 6.0 of its manufacturing, operations, and management suite to help manufacturing organizations manage their asset data. This new version leverages capabilities such as the productivity of developers and engineers, advanced administration, high reporting capabilities, and performance update for Savigent Historian.

Source: Press Releases

12.3.2 PARTNERSHIPS, COLLABORATIONS, AND AGREEMENTS

Aveva Group, Yokogawa, OSIsoft, and General Electric are some of the players that have adopted this growth strategy to avail the benefits of technology sharing.

TABLE 75 PARTNERSHIPS, COLLABORATIONS, AND AGREEMENTS, 2015–2018

DATE	COMPANY NAME	DESCRIPTION
May 2018	General Electric (US) and SIG Combibloc (Switzerland)	GE forged a strategic partnership with SIG Combibloc to power digital innovation in food and beverages packaging.
April 2018	Aveva Group (UK) and EOH (South Africa)	Aveva expanded its partnership with EOH, an IT service management company to improve Sub-Saharan African sales and support for Aveva's software portfolio.
October 2017	General Electric (US) and Apple (US)	Apple and GE partnered for delivering industrial apps, which are designed to bring predictive data and analytics from the Predix Platform.
June 2017	Yokogawa (Japan) and Sinopec Engineering (China)	Yokogawa partnered with Sinopec Engineering, a Sinopec Group Company. Sinopec Engineering designs and builds oil refineries and petrochemical plants. This partnership recognized Yokogawa as a reliable partner for engineering, project execution, and other capabilities for business expansion.
April 2017	OSIsoft (US) and Software AG (Germany)	Software AG partnered with OSIsoft. This partnership combines enterprise-wide IT and operations data with the Software AG Digital Business Platform for improved analytics, machine learning, integration, and rapid IoT solution development.

Source: Press Releases

12.3.3 EXPANSIONS

The players who have adopted the business expansion strategy in the data historian market include InfluxData, Siemens, and Aveva Group.

TABLE 76 BUSINESS EXPANSIONS, 2015–2018

DATE	COMPANY NAME	DESCRIPTION
March 2018	InfluxData (US)	InfluxData announced its continued expansion in the EMEA region to meet the growing global demand for its time series database metrics and events platform, and support the existing and new customers in the region.
December 2017	Siemens (Germany)	Siemens established 20 centers in 17 countries for digital customer application in the industrial sector. Customers are increasingly using digital platforms for their daily transactions and Siemens is the first international business enterprise to set up 20 facilities for digital client applications in the industrial sector.
January 2015	Aveva Group (US)	Aveva Group opened a new office in the KSA. This new office strengthened the company's presence in the Middle East region, further enhancing its network.

Source: Press Releases

12.3.4 ACQUISITIONS

The players who have adopted the acquisition strategy in the data historian market include Rockwell Automation, ABB, and PTC.

TABLE 77 ACQUISITIONS, 2016

DATE	COMPANY NAME	DESCRIPTION
October 2016	Rockwell Automation (US) and MAVERICK Technologies (US)	Rockwell Automation acquired MAVERICK Technologies to deliver innovative control and information solutions to customers. MAVERICK Technologies is the largest independent systems integrator in North America and is a global leader in industrial automation.
May 2016	ABB (Switzerland) and SVIA (Sweden)	ABB acquired SVIA, a leading provider of robot automation. The acquisition expanded the product portfolio of ABB by reducing engineering costs and providing complete solutions based on the Internet of Things, Services, and People (IoTSP). ABB's Discrete Automation and Motion division puts SVIA as part of its robotics business unit.
January 2016	PTC (US) and Kepware (US)	PTC acquired Kepware, a provider of communications connectivity and analytics solutions to industrial automation environments through its software. The acquisition bolstered PTC's IIoT portfolio through Kepware's communication platform, KEPServerEX. It strengthened PTC's ThingWorx IoT technology platform.

Source: Press Releases

13 COMPANY PROFILES

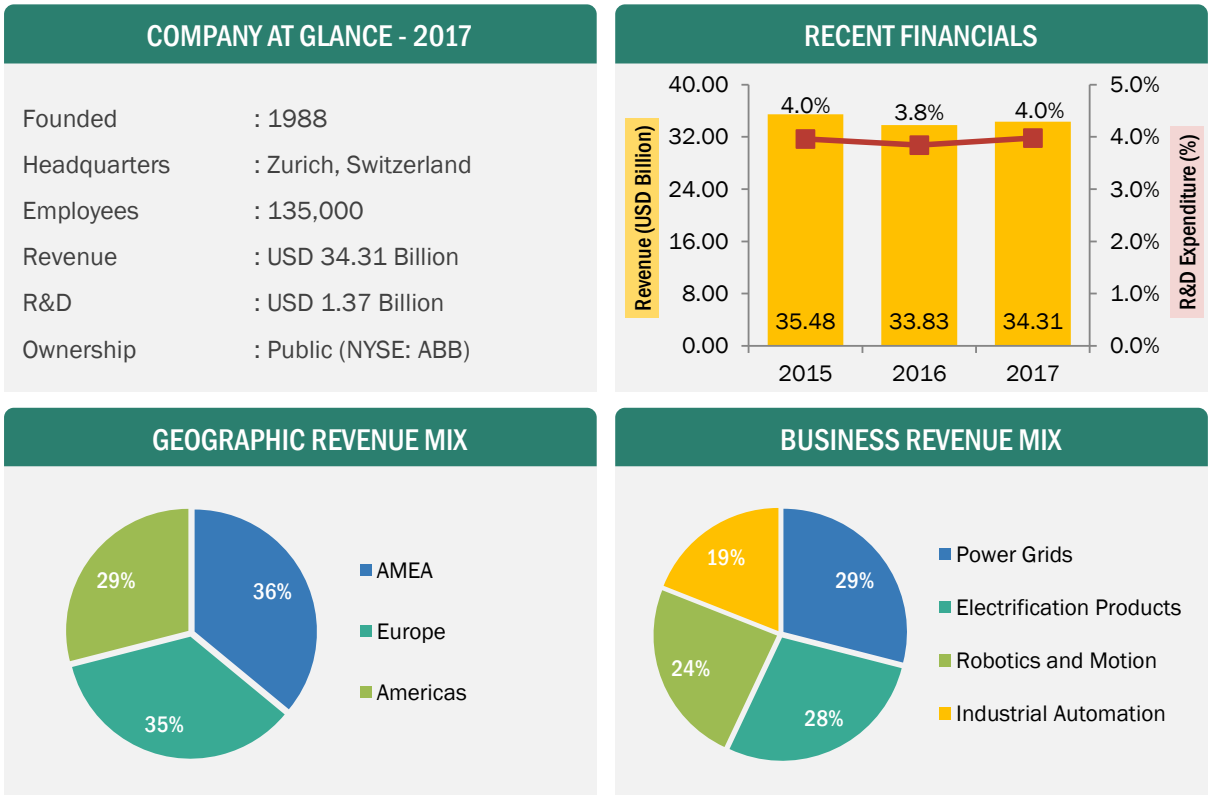
13.1 ABB

13.1.1 BUSINESS OVERVIEW

ABB was founded in 1988 through a merger between Asea AB (Sweden) and BBC Brown Boveri AG (Switzerland). The company provides automation solutions for all types of power generation plants and grid integration, as well as services for generation, transmission, and distribution of electricity. ABB operates through 4 business segments, including power grids, electrification products, robotics and motion, and industrial automation.

Additionally, the company offers various products, including enterprise asset management, IT/OT convergence, mobile workforce management, and among others. Moreover, its product portfolio ranges from manufacturing of light switches to control systems, electrical transformers, and robots. The company has its presence globally in more than 100 countries and largely focuses on technological innovations and R&Ds. It serves various industry verticals such as automotive, energy and power, chemical, transportation, and real estate. The company operates in the data historian market through its product known as Enterprise Historian. This is a collaborative suite of numerous software that enables enterprises store and manage their historical and real-time production information. ABB also provides professional services such as maintenance, upgradation, system integration, and on-demand custom engineering services.

FIGURE 30 ABB: COMPANY SNAPSHOT



Note 1: The company's financial year ends on 31st December.

Note 2: AMEA = Asia, Middle East, and Africa

Source: Company Website, Annual Reports, and SEC Filings

13.1.2 SOLUTIONS OFFERED

ABB provides the following solutions:

SOLUTION	DESCRIPTION
Enterprise Historian	The solution enables organizations to avail the basic services offered by it. Moreover, the company has introduced its various versions, including Enterprise Historian Professional, Enterprise Historian Select, and Optional Software for Enterprise Historian.

Source: Company Website

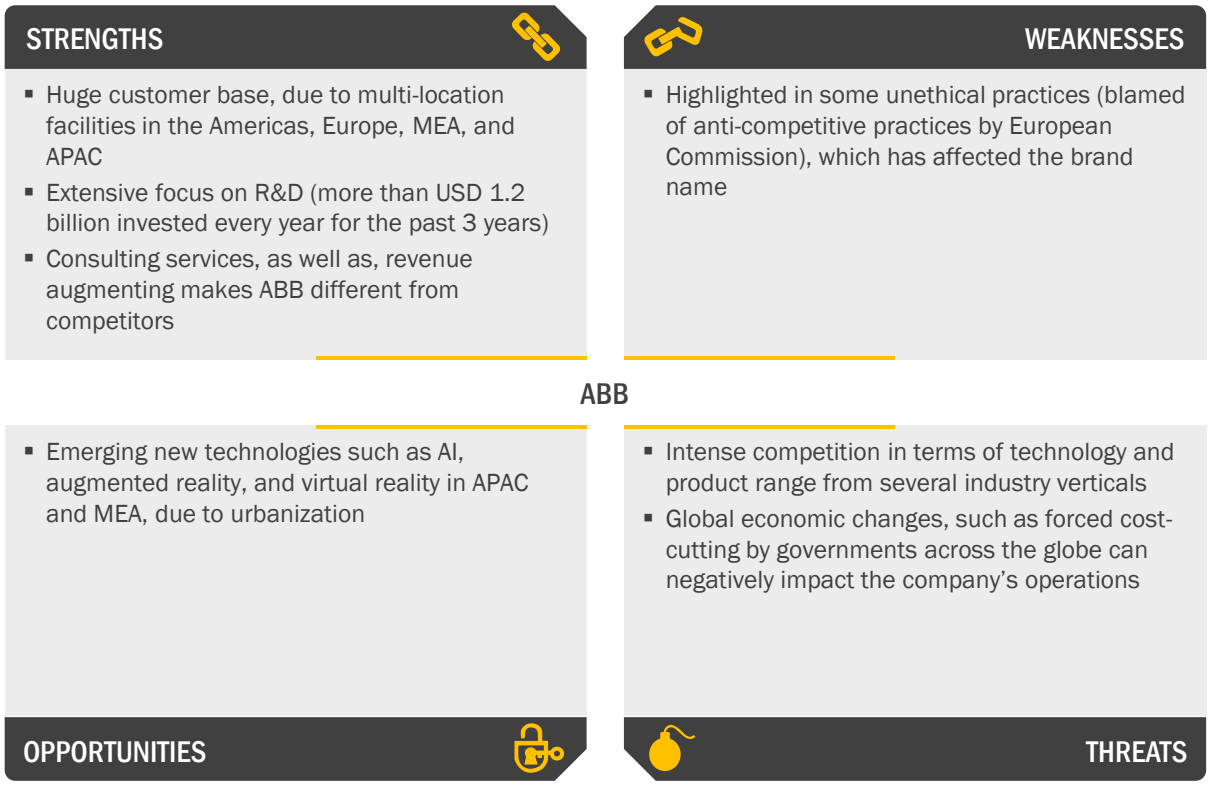
13.1.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
March 2017	New Product Launch	ABB launched digital solutions to help end users including transport, utilities, infrastructure, and among others.
October 2016	New Product Launch	ABB launched a “plug and play” micro-grid solution for distributed power generation. It has a cloud-based remote services that provides access to cost-effective uninterrupted power supply for industries in remote areas during planned and unplanned power outage from the main grid.
August 2016	New Product Launch	ABB launched a digital substation model at the CIGRE conference and exhibition in Paris. The model includes Disconnecting Circuit Breaker (DCB) with Fiber Optic Current Sensor (FOCS), Relion protection and control Intelligent Electronic Device (IED), and Micro SCADA promonitoring system. It helps in more sophisticated monitoring, diagnostics, and protection of digital grids in power plants.
May 2016	Acquisition	ABB acquired SVIA (Sweden), which is a leading provider of robot automation. the acquisition expanded the product portfolio of ABB by reducing engineering costs and providing complete solutions based on the IoTSP. ABB’s Discrete Automation and Motion division puts SVIA as part of robotics business unit.

Source: Company Website and Press Releases

13.1.4 SWOT ANALYSIS

FIGURE 31 ABB: SWOT ANALYSIS



Source: Company Website, Annual Reports, and SEC Filings

13.1.5 MNM VIEW

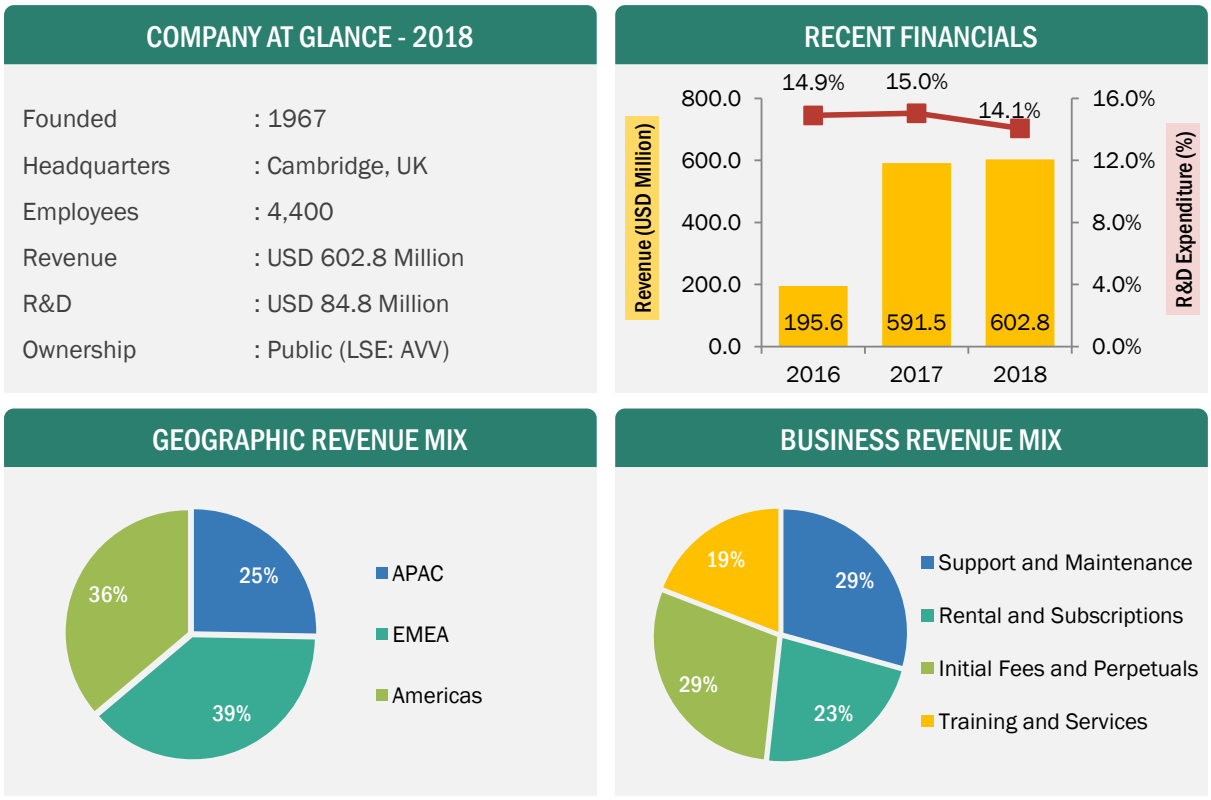
ABB is one of the leaders in the power and automation industry. The company's improving productivity and streamlining of procedures, along with its presence in the emerging markets have helped ABB benchmark its business operations against a set of industry standards. The company nurtures its growth through acquisitions and partnerships with strategic companies such as SVIA, and Ericsson, which would be beneficial. The "plug and play" micro-grid solution for the distributed power generation would be a disruptive technology that would supply power to industries in both planned and unplanned outage from the main grid. It invests significantly in acquisitions to expand its product portfolio and strengthen the position in the market. The company focuses on improving its competitive position in the present market and aims to bridge geographic gaps, product and technology gaps, or specific end-market exposures gaps through the strategic acquisition and business integration strategy. With regard to this, the company has a strong presence in the American and European markets.

13.2 AVEVA GROUP

13.2.1 BUSINESS OVERVIEW

Aveva Group is a holdings company that provides engineering, designing, and information management software to customers located worldwide. The company was founded in 1967 and is headquartered in Cambridge, the UK. It sells software products directly to end-users, as well as indirectly through resellers. It serves customers in various industry verticals, such as oil and gas, building and infrastructure, chemical processing and petrochemical, marine and offshore, power and utilities, mining and mineral, pulp and paper, fabrication, pharmaceutical, process, and plant. The company provides products to improve the engineering efficiency of industrial processes, and monitor and control processes for optimized decision-making. Furthermore, Aveva Group provides support and training services to its customers.

FIGURE 32 AVEVA GROUP: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.2.2 TOOLS AND SERVICES OFFERED

Aveva Group offers the following tools in the data historian market:

TOOL	DESCRIPTION
Enterprise Historian	It offers real-time data management that connects the Information Technology/Operational Technology (IT/OT) information gap. Moreover, it provides company-wide access to the information, which further can be transformed into an actionable insight. Additionally, it can be easily integrated with other software products to include predictive analytics, business intelligence, and mobile access.
Historian	It is a plant data historian, which is used to capture and store large volumes of industrial plant data for operational improvements. It provides entire scenario of operational history in the production environment, also it keeps the integrity of the data regardless of the industry.
Historian Client	Historian Client is analysis and reporting software, which integrates in the existing Historian tool to deliver near real-time and historical production information to operators, engineers, and operations managers. Historian Client comprises multiple applications, which is built to maximize the value of the data stored in Historian.

Source: Company Website

Aveva Group offers the following services in the data historian market:

SERVICE	DESCRIPTION
Business Consulting	It helps to understand the gap between current capabilities and the business needs.
Monitoring and Diagnostic Services	It remotely monitors customers' industrial asset as a service.
Operations and Asset Management Services	It is used for asset performance, enterprise manufacturing intelligence, and mobile solutions services.
Security and Compliance Services	It provides consulting and implementation services for cybersecurity and regulatory compliance in life sciences and other industry verticals.

Source: Company Website

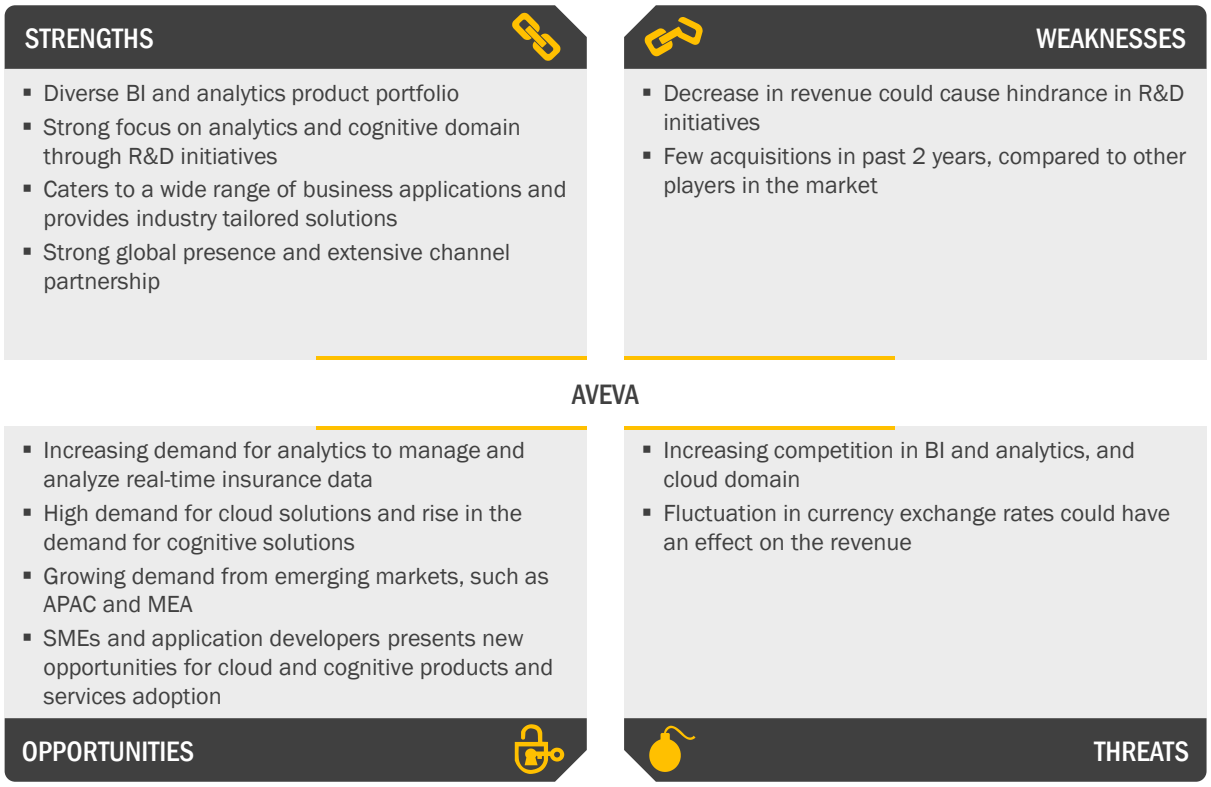
13.2.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
April 2018	Partnership	Aveva expanded its partnership with EOH, an IT services management company, to improve Sub-Saharan African sales and support Aveva's software portfolio.
January 2015	Business Expansion	Aveva opened a new office in the KSA. This new office strengthens the company's presence in the Middle East, hence further enhancing its network.

Source: Press Releases

13.2.4 SWOT ANALYSIS

FIGURE 33 AVEVA: SWOT ANALYSIS



Source: Company Website, Annual Reports, and SEC Filings

13.2.5 MNM VIEW

AVEVA's software has enabled creation of complex power and process plants, vessels, and offshore facilities. The company's Digital Asset approach ensures a constant, accurate digital representation of each physical asset, which helps its customers to work more efficiently and in a safer work environment throughout the operation cycle. In the last few years, the company has went under major collaborations, for instance, in April 2016, it collaborated with Microsoft. This collaboration has helped in transformation of decision-making process in the manufacturing industry. The recent merger with Schneider Electric Industrial Software Business (SES) is expected to drive the revenue of the company in the coming years. Moreover, the expansion of the company with its new office in KSA has resulted in extended footprint in the Middle East region.

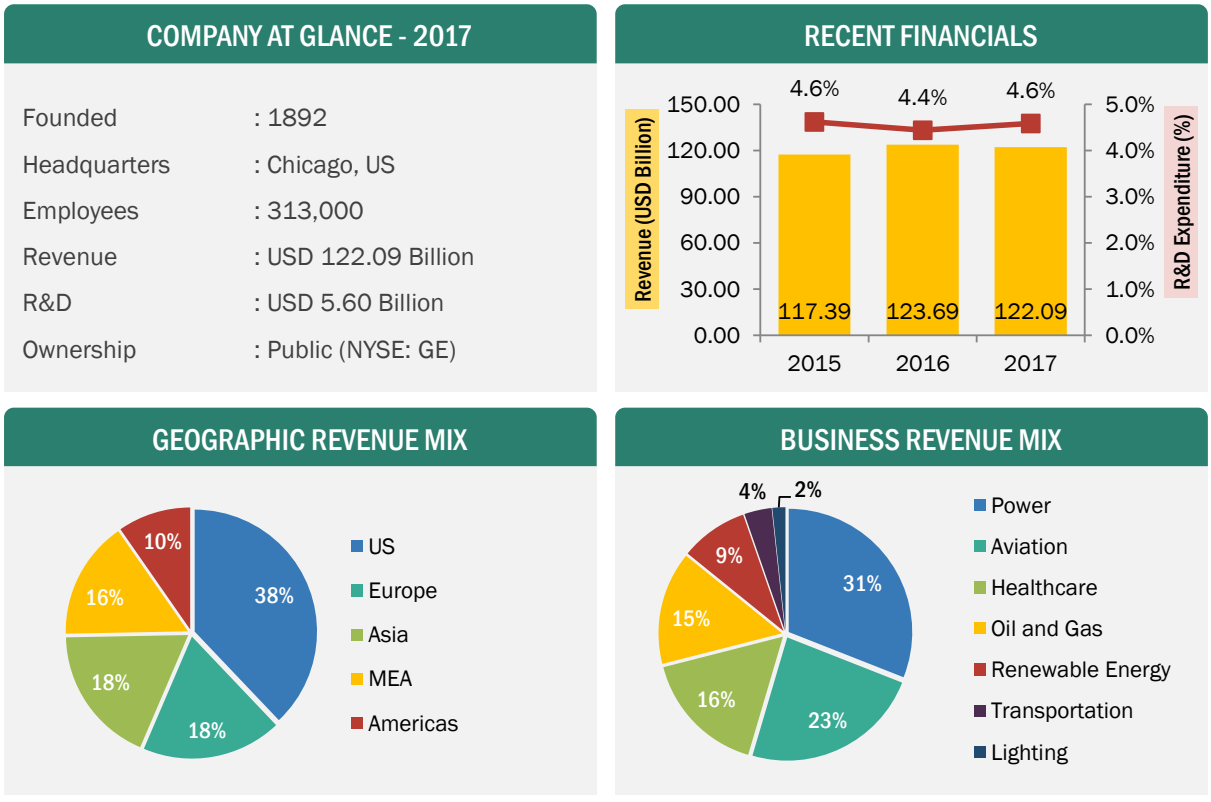
13.3 GENERAL ELECTRIC

13.3.1 BUSINESS OVERVIEW

General Electric (GE) was founded in the 1892 and is headquartered in Massachusetts, US. The company operates in the data historian market through GE Digital. GE Digital is a subsidiary of General Electric Company and develops software for manufacturing companies to manage assets and operations. It was founded in the year 2011 with headquarters in California, United States. It operates across numerous industry verticals, such as manufacturing, aviation, healthcare, mining, oil and gas, power generation and distribution, and transportation.

GE Digital's offerings are edge to cloud-based software and analytics, cybersecurity, field services management software, and industrial machine learning technology. The company launched Predix, a platform for developing IIoT applications. Furthermore in 2014, GE announced its plans for the expansion of Predix to companies developing industrial applications and services as a cloud-based service, hence enhancing the capability of the platform. This expansion led to the announcement of Predix cloud (August 2015), which was built particularly to manage various types of data generated by heavy-duty machineries, such as jet engines.

FIGURE 34 GENERAL ELECTRIC: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.3.2 TOOLS AND SERVICES OFFERED

GE Digital offers the following tool in the data historian market:

TOOL	DESCRIPTION
GE Historian	It is a software solution that collects the industrial time-series data to analyze the asset performance. It is simple to install with easy to use for web clients, along with integrated tags and drag and drop features. Moreover, it enables users to leverage constant and highly scalable data with read-write capability.

Source: Company Website

GE Digital offers the following services in the data historian market:

SERVICE	DESCRIPTION
Managed Services	These services help maintain operations from remote locations across the globe using the model-based predictive analytics technology.
Implementation Services	These services help implement a collaborative program to integrate with the existing systems and assists in making right investments in technologies as per clients requirements.

Source: Company Website

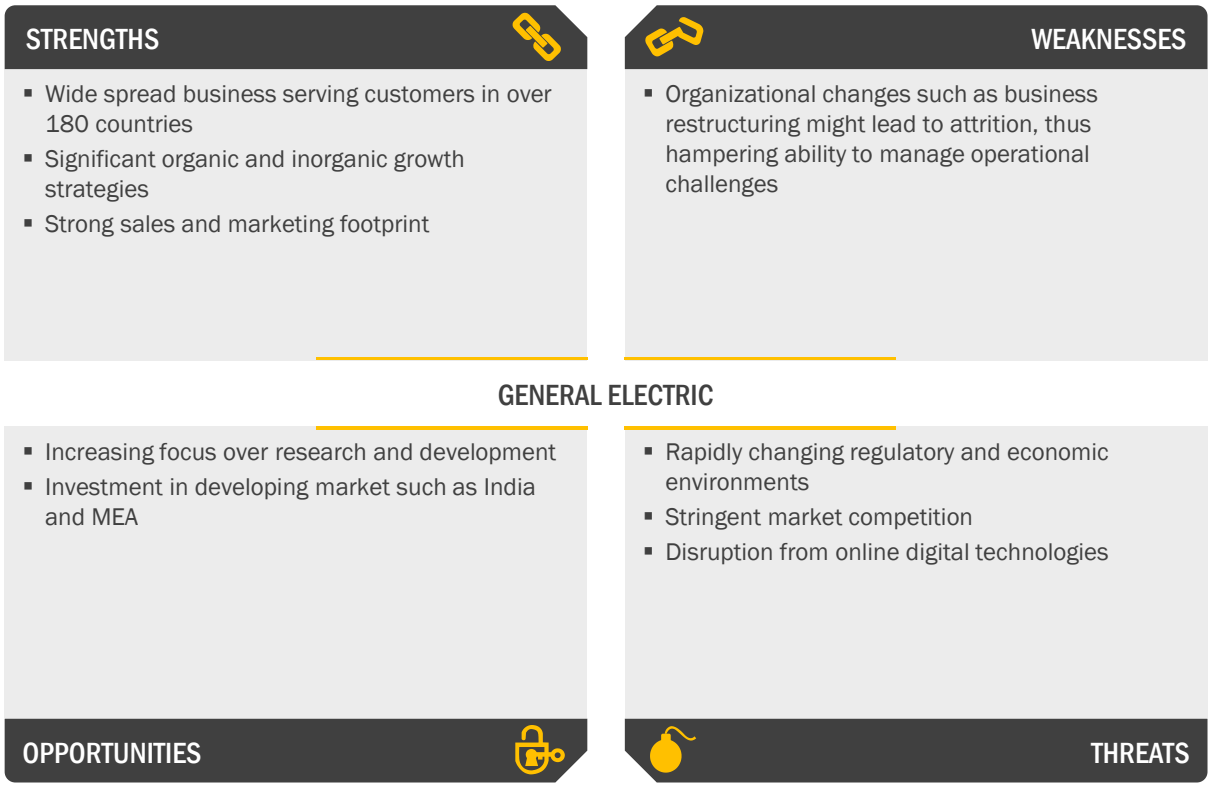
13.3.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2018	Partnership	GE went under a strategic partnership with SIG Combibloc to power digital innovation in food and beverages packaging.
November 2016	Partnership	GE Digital launched a dedicated program for Independent Software Vendor (ISV) designed for the development of a marketplace in Predix applications, thus is expected to solve industry challenges.
February 2016	Partnership	GE Digital announced GE Digital Alliance program a dedicated platform for growing the digital industrial ecosystem. This new alliance is expected to connect integrators, telecommunications services providers, independent software vendors, technology providers, and resellers with the technology and digital industrial expertise of GE.

Source: Press Releases

13.3.4 SWOT ANALYSIS

FIGURE 35 GENERAL ELECTRIC: SWOT ANALYSIS



Source: Company Website, Annual Reports, and SEC Filings

13.3.5 MNM VIEW

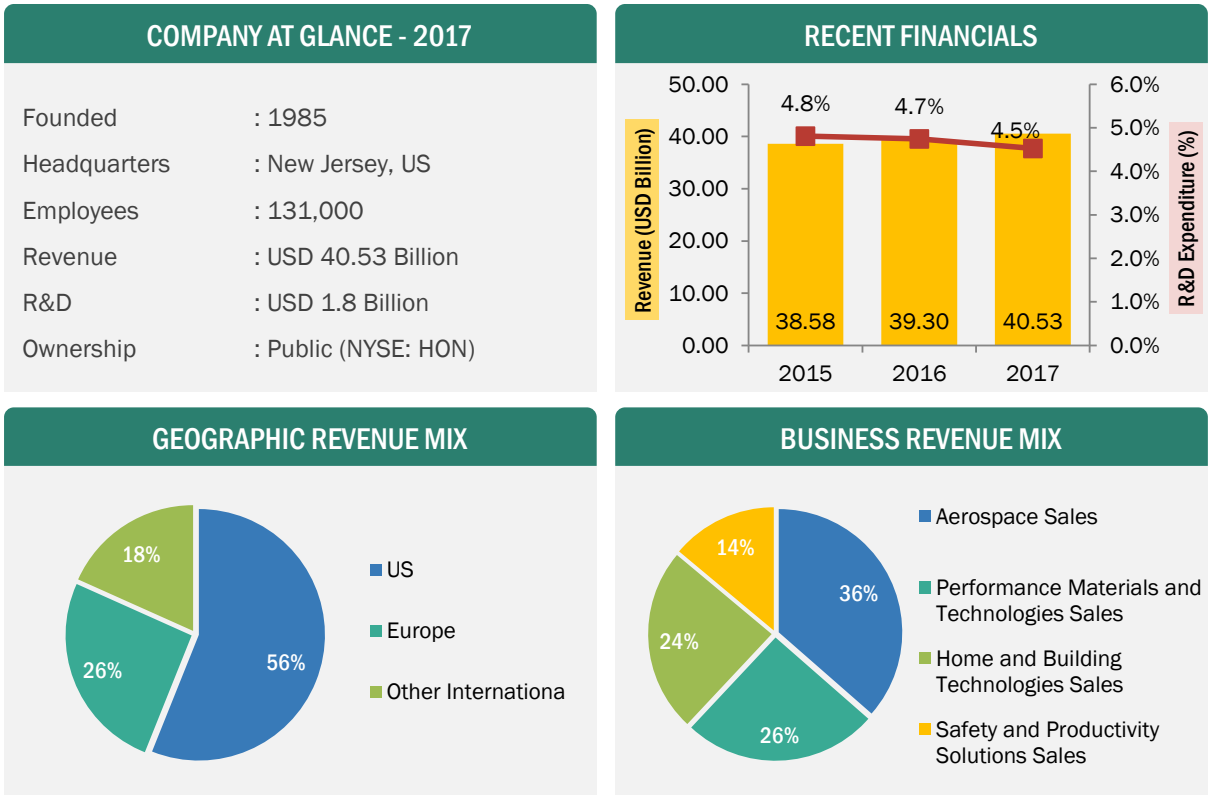
GE Digital's activities are centered on supporting the market development of its digital product offerings through a software design, f product management, while interfacing with our customers. Recently, the company has managed to drive its revenues through various development and expansion activities. GE made major acquisitions and product enhancements in 2016. For instance, in February 2016, GE launched GE Digital Alliance Program, a collaborative platform between system integrators, technology vendors, services providers and resellers, which enabled developers to become certified developers over the Predix platform. As part of the GE Digital Alliance Program, GE unveiled new collaborations with Intel, Capgemini, TCS, Deloitte, Infosys, Genpact, Softtek, and Wipro Limited. In September 2016, it acquired Meridium, the Asset Performance Management (APM) software and services provider. Furthermore, in November 2016, to expand its product offerings GE Digital announced the acquisition of BitStew Systems, Wise.io, and ServiceMax all of these companies are expected to integrate machine learning and AI to the Predix Platform. Recently, in October 2017, Apple and GE partnered for delivering industrial apps, which are designed to bring predictive data and analytics from the Predix Platform. Moreover, to implement GE's IIoT platform over apple devices such as iPhone and iPad. The 2 companies also revealed new Predix Software Development Kit (SDK) for iPhone OS (iOS).

13.4 HONEYWELL

13.4.1 BUSINESS OVERVIEW

Honeywell was founded in 1985 and is headquartered in New Jersey, US. Itis a technology and manufacturing-based company that offers energy, safety, and security solutions and technologies. The company operates in 4 segments, namely, aerospace, home and building technologies, performance materials and technologies, and safety and productivity solutions. It is well known for the total solution capabilities, life cycle services, and vertical domain expertise primarily in key industry verticals, such as chemical and petrochemical, oil and gas, mining, pharmaceutical, and pulp and paper. Honeywell provides Experion SCADA, a powerful software platform, incorporating innovative technology for HMI and SCADA. In providing process automation products and solutions, the top competitors of Honeywell are ABB, Emerson, Siemens, and Yokogawa. The extensive product portfolio of the company is capable of achieving energy visibility and optimizing energy usage. The company is globally present in more than 70 countries, including major regions such as the US and Europe.

FIGURE 36 HONEYWELL: COMPANY SNAPSHOT



Source: Company Website, Annual Reports, and SEC Filings

13.4.2 SOLUTIONS OFFERED

Honeywell provides the following solutions:

SOLUTION	DESCRIPTION
Uniformance Cloud Historian	It provides cloud-based solution for data analysis in real time using the big data technology. This helps organizations in analyzing the enterprise data in a minimal time by using the existing infrastructure.
Honeywell Connected Plant Uniformance Cloud Historian	It is a cloud-based SaaS service built on Sentience IoT platform. It is used for analysis and visualization of enterprises' data.

Source: Company Website

13.4.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
January 2018	New Product Launch	Honeywell launched its new platform known as Honeywell Connected Plant Uniformance Cloud Historian for industrial use. This SaaS, which would help organizations for analysis and visualization of the operational data to enhance industrial plant uptime and manage assets across the organization.

Source: Company Website and Press Releases

13.4.4 SWOT ANALYSIS

FIGURE 37 HONEYWELL: SWOT ANALYSIS

STRENGTHS

- Global presence, brand name, and strong position in the market.
- Wide range of services pertaining to data historian
- Strong product offerings with continuous advancements
- High expenditure on R&D

WEAKNESSES

- The company has several legal claims pending, which could adversely affect the company
- Over dependency on the US market for revenue generation

HONEYWELL

OPPORTUNITIES

- Strategic focus on overseas industry such as India, China, Brazil, and the Middle East

THREATS

- Similar capability solutions offerings from competitors, such as Emerson, Rockwell, and ABB
- It operates internationally, thus exposed to a variety of risks, such as economic instability, geopolitical instability, Forex, and regulations

Source: Company Website

13.4.5 MNM VIEW

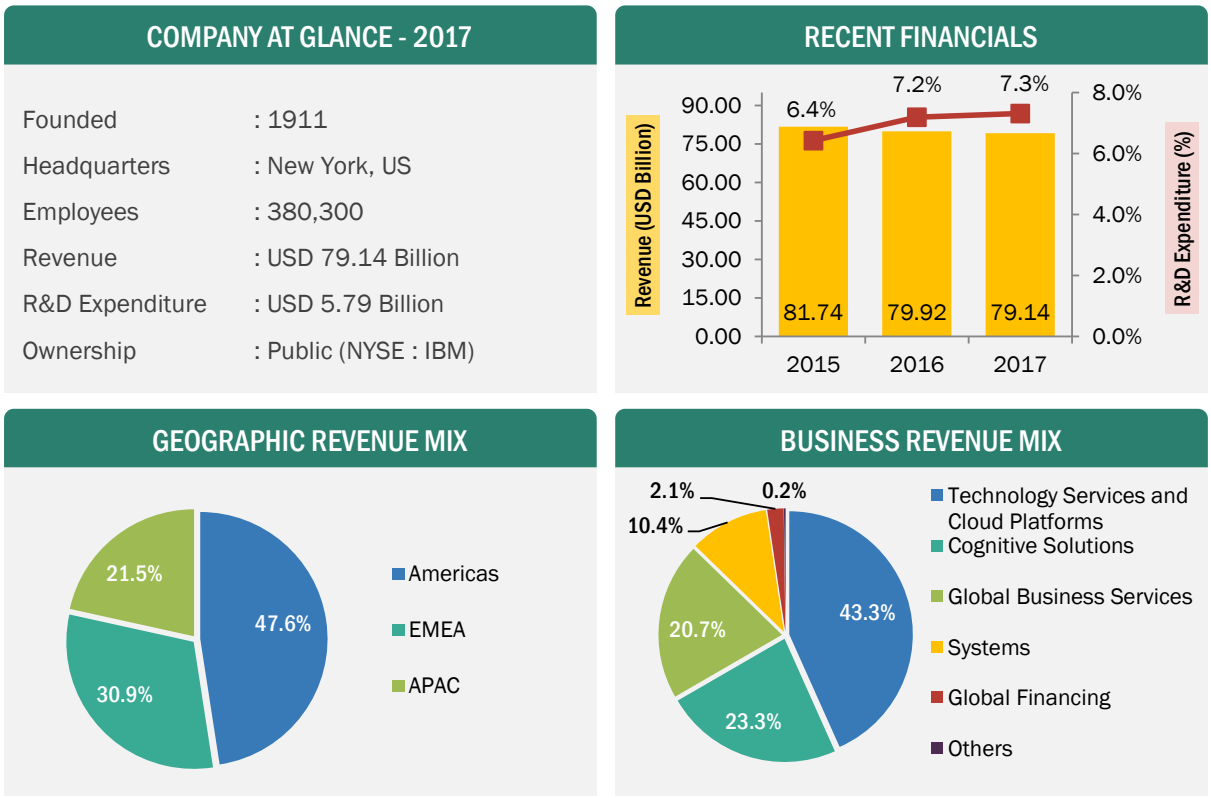
Honeywell is a Fortune 100 diversified technology and manufacturing leader serving customers worldwide. The company is developing through investing in new product development. The R&D of this company has been through an exponential growth from 4.7% in 2016 to 5.5% in 2017. It has R&D centers in the US, Europe, India, and China. This helps company introduce new products in its product lines. For instance, in January 2018, Honeywell launched its new platform known as Honeywell Connected Plant Uniformance Cloud Historian for industrial use. This is SaaS, which would help in analysis and visualization of the operational data to enhance plant uptime and manage assets across the organization.

13.5 IBM

13.5.1 BUSINESS OVERVIEW

IBM was founded in 1911 and is headquartered in New York, US. The company is a multinational computer technology and consulting corporation, which offers infrastructure, hosting, and consulting services. IBM operates through 5 major business segments, namely, technology services and cloud platforms, cognitive solutions, global business services, systems, and global financing. The company caters to various industries, which include aerospace and defense, automotive, banking, cities management, chemicals and petroleum, communications, consumer products, education, electronics, energy and utilities, financial markets, government, healthcare, insurance, life sciences, media and entertainment, metals and mining, and retail. It has existence in over 170 countries with a strong presence in the Americas, EMEA, and APAC and approximately comprises 380,300 employees as of December 31, 2017.

FIGURE 38 IBM CORPORATION: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.5.2 TOOLS AND SERVICES OFFERED

IBM offers the following tool in the data historian market:

TOOL	DESCRIPTION
Historian Data Storage	Cloudant NoSQL DB is used as Historian Storage for IBM Watson IoT Platform. It is a distributed database optimized for managing heavy workloads which comprises of large, fast-growing web and mobile apps

Source: Company Website

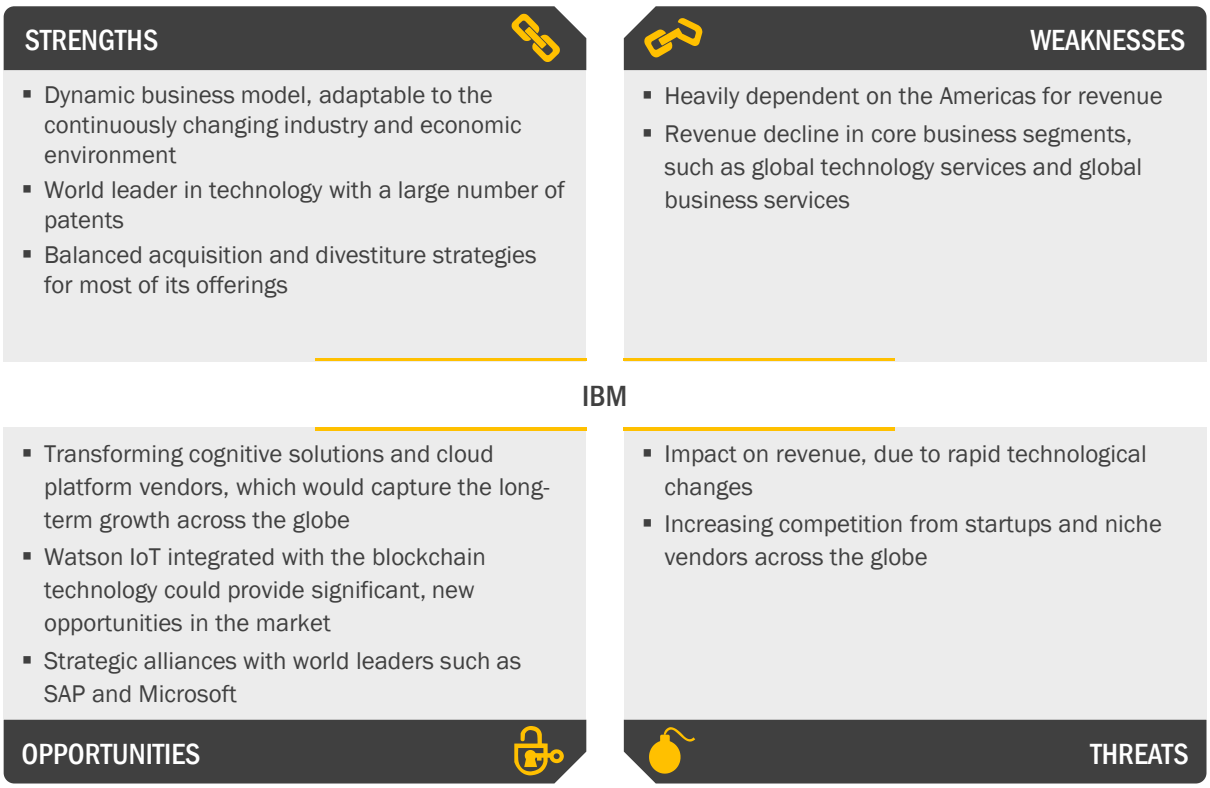
IBM offers the following services in the data historian market:

SERVICE	DESCRIPTION
Business Consulting	IBM business consultants help redesign experiences creating a new source of value to improve efficiency and transform the entire enterprise into the cognitively enhanced organization.
Technology Services	IBM technology services comprise building and running foundational systems based on client preferences, which help reduce costs and improve profits.
Industry Expertise	IBM assists organizations to choose and adopt the best solutions available to help them reduce costs.
Training and Skills	IBM's training and skills services aid users to build expertise and get recognized in specific products and technologies.

Source: Company Website

13.5.3 SWOT ANALYSIS

FIGURE 39 IBM: SWOT ANALYSIS



Source: Company Website, Annual Reports, and SEC Filings

13.5.4 MNM VIEW

IBM provides a comprehensive set of analytics products and services apt for requirements from users with different skill levels. The company's products are tailored and cater to a wide range of business applications, such as customer retention, cross-sell and up-sell, distribution optimization, claims optimization and fraud prevention, underwriting optimization, financial performance management, and risk management and compliance. It has adopted organic and inorganic growth strategies to improve the market share and increase the annual revenue. IBM strengthens its product portfolio through frequent product upgradations and new product launches. Moreover, it reengineers products and services from time-to-time to meet the dynamic requirements of its customers. Focusing on its BI and analytics portfolio, the company expends nearly half of its R&D budget on its analytics and cognitive segment. IBM strategically opts for inorganic growth strategies, which include collaborations and partnerships with companies that would help IBM perform its functions in a better manner and increase its customer base accordingly, thus aiming to increase its footprint in various industry verticals. The company has a strong global presence and continues to strengthen its regional existence through frequent business expansions. Furthermore, it leverages from the extensive partner channel comprising technology partnerships, consultancies, sales, and distribution partnerships.

13.6 SIEMENS

13.6.1 BUSINESS OVERVIEW

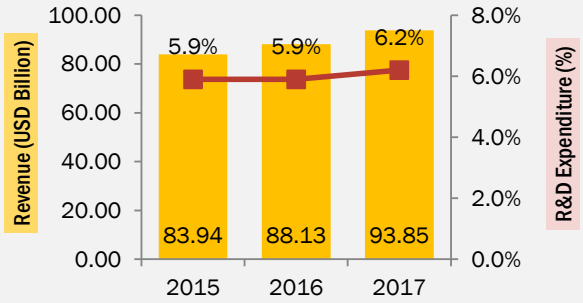
Siemens is a European engineering giant headquartered in Munich, Germany and was founded in 1847. The company specializes in electrical engineering and electronics-related products and services. It is a global technology powerhouse reputed for its engineering excellence, innovation, quality, and reliability for more than 165 years. Siemens is a public company listed on the Frankfurt Stock Exchange. The company operates through business segments, such as financial services, power and gas, wind power and renewables, energy management, healthcare, building technologies, mobility, digital factory, and process industries and drives. The company is a major provider of power transmission solutions and a pioneer in infrastructure solutions, as well as automation, drive, and software solutions.

FIGURE 40 SIEMENS: COMPANY SNAPSHOT

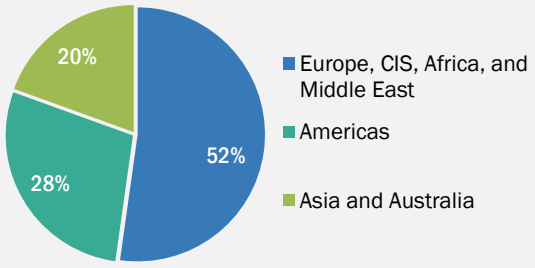
COMPANY AT GLANCE - 2017

Founded	: 1847
Headquarters	: Munich, Germany
Employees	: 372,000
Revenue	: USD 93.85 Billion
R&D	: USD 5.84 Billion
Ownership	: Public (NSE: SIEMENS)

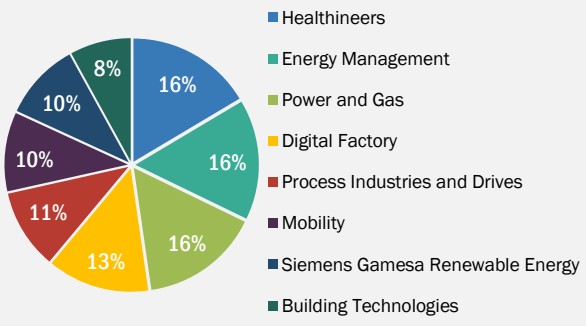
RECENT FINANCIALS



GEOGRAPHIC REVENUE MIX



BUSINESS REVENUE MIX



Source: Company Website and SEC Filings

13.6.2 TOOLS AND SERVICES OFFERED

Siemens AG offers the following tool in the data historian market:

TOOL	DESCRIPTION
SIMATIC Process Historian	SIMATIC Process Historian is a real-time database for a variety of products and variations that serve as central facts interface to the agency at the administration level. It serves as a central long-term archive for any quantity of method statistics and messages from one of a kind record sources.

Source: Company Website

Siemens AG offers the following service in the data historian market:

SERVICE	DESCRIPTION
Industry Services	The Industry Services portfolio offers corrective, preventive, predictive, and Digital Industry Services over the entire life cycle of products, machines, and plants on a global scale and from a single provider.

Source: Company Website

13.6.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2018	Product Upgradation	Siemens expanded its digitalization solutions for the process industry verticals. The company has met technical fundamentals for implementing Industry 4.0. As a result, these capabilities help tackle challenges specific to the process industry verticals.
April 2018	Product Upgradation	Siemens AG launched enhanced Digital Enterprise portfolio for Industry 4.0. Through implementation of Digital Enterprise solutions, users can tap into the full potential of Industry 4.0. Customers are expected to benefit through greater flexibility, lesser time-to-market, with enhanced efficiency and better product quality.
December 2017	Business Expansion	Siemens established 20 centers for providing digital customer applications in 17 countries in the industrial sector. Hence, customers are gaining momentum in digitalization, due to the expansion and the company is considered as the first business enterprise international to set up 20 facilities for digital client applications in the industrial sector.

Source: Press Releases

13.6.4 SWOT ANALYSIS

FIGURE 41 SIEMENS : SWOT ANALYSIS

Source: Company Website, Annual Reports, and SEC Filings

13.6.5 MNM VIEW

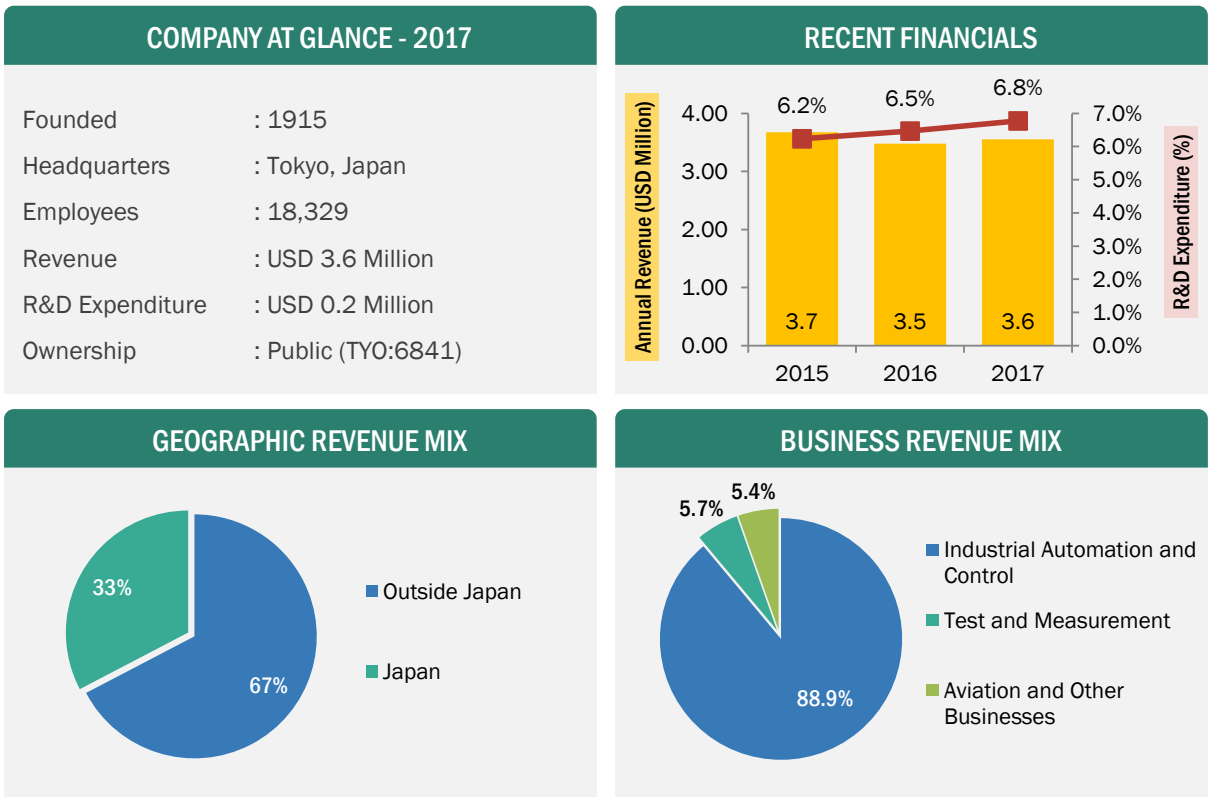
Siemens provides most energy-efficient and resource-saving technologies worldwide. The company is a pioneer in infrastructure, automation, and software solutions for the energy and utilities industry vertical. It provides a complete end-to-end range of industrial technologies, products, services, and solutions. It offers products for power quality measurement, substation automation, smart communication, cybersecurity, and smart metering infrastructure. It is a pioneer in driving the digitalization of industrial solutions and services. Electrification, automation, and digitalization are the core competencies of Siemens. The company has adopted various inorganic growth strategies to expand and strengthen its market presence. For instance, in May 2017, Siemens signed a Memorandum of Understanding (MoU) with Uganda and Sudan. According to the MoU, the company develops solutions in the areas of power supply, transportation, and healthcare. Siemens has a rich ecosystem of global channel partners to promote and offer interoperable solutions. The company's partner ecosystem includes technology partners, resellers and integration partners, application partners, and managed services partners. Siemens has a global presence in about 190 countries across the Americas, Europe, MEA, and APAC and comprises total of 3,72,000 employees worldwide.

13.7 YOKOGAWA

13.7.1 BUSINESS OVERVIEW

Yokogawa was founded in 1915 and is headquartered in Tokyo, Japan. The company engages in the provision of industrial automation, test, and dimension solutions. It operates through the following segments, including Control, Measurement, and Navigation and Other Businesses. The control segment manufactures and sells programmable controllers, industrial recorders, go with the flow meters, differential stress transmitters, and method analyzers. The Measurement segment affords waveform measuring instruments, optical communication-related measuring equipment, sign generators, confocal scanners, as well as power, temperature, and strain measuring devices. The Navigation and Other companies segment produces cockpit flat panel displays, aircraft engine meters, gyrocompass, autopilot, weather remark systems, and hydrological instruments. It has 18,329 employees worldwide and offices in Japan, India, Russia, Bahrain, Singapore, and Sao Paulo.

FIGURE 42 YOKOGAWA: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.7.2 TOOLS AND SERVICES OFFERED

Yokogawa offers the following tools in the data historian market:

TOOL	DESCRIPTION
Exaquantam	It's a plant historian suite that provides a central database through which the information can be extracted and presented to users, thus ensuring safety, reliability, and optimal plant operations.

Source: Company Website

Yokogawa offers the following services in the data historian market:

SERVICE	DESCRIPTION
Consulting Services	Consulting services comprise plant security services, life cycle planning services, and regulatory control stabilization. These services help maintain operational excellence throughout the entire plant life cycle.
Upgrade and Migration Services	The upgrading and migration services help operate the plant more efficiently and profitably. These services comprise cutover planning and implementation, safety excellence services, and technology refresh services.
Support and Maintenance Service	These are 24/7 support services to address requests from customers while the Global Response Center in Japan provides valuable backup to these Response Centers. The company also offers a wide range of services that enable quick and effective restoration of clients existing system.
Asset Performance Monitoring Service	A comprehensive suite of asset performance monitoring would improve the effectiveness of the analysis and condition-based maintenance activities.

Source: Company Website

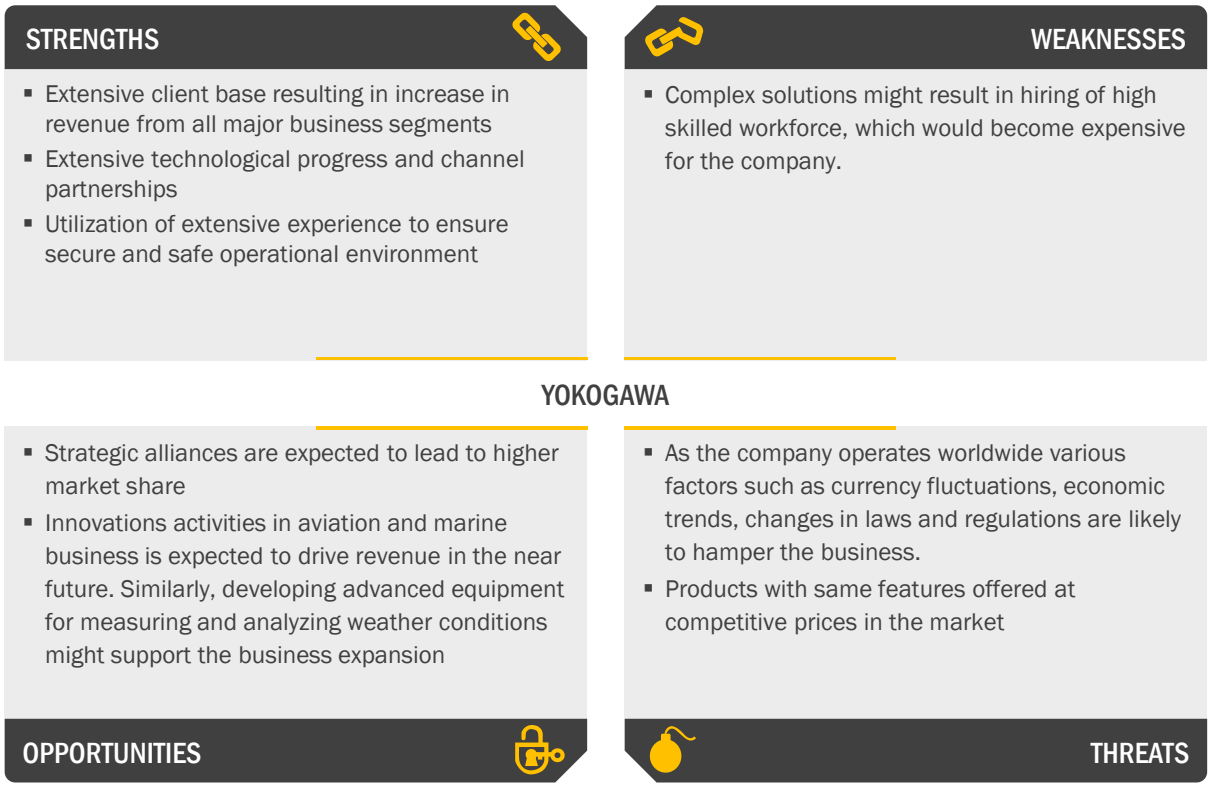
13.7.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2018	New Product Launch	Yokogawa launched amnimo Inc., a business unit for identifying, developing and delivering services to add value to the IIoT architecture developed by Yokogawa.
June 2017	Partnership	Yokogawa partnered with Sinopec Engineering, a Sinopec Group company. Sinopec Engineering designs and builds oil refineries and petrochemical plants. This partnership recognized Yokogawa as a reliable partner for engineering, project execution, and other capabilities for business expansion.
July 2016	Product Enhancement	Yokogawa released an update to Exaquantum Plant Information Management System (PIMS). The new update includes various enhancements, such as improved web-based functionality, support for Windows 10 operating system, and new data analysis functionality.

Source: Press Releases

13.7.4 SWOT ANALYSIS

FIGURE 43 YOKOGAWA: SWOT ANALYSIS



Source: Company Website, Annual Reports, and SEC Filings

13.7.5 MNM VIEW

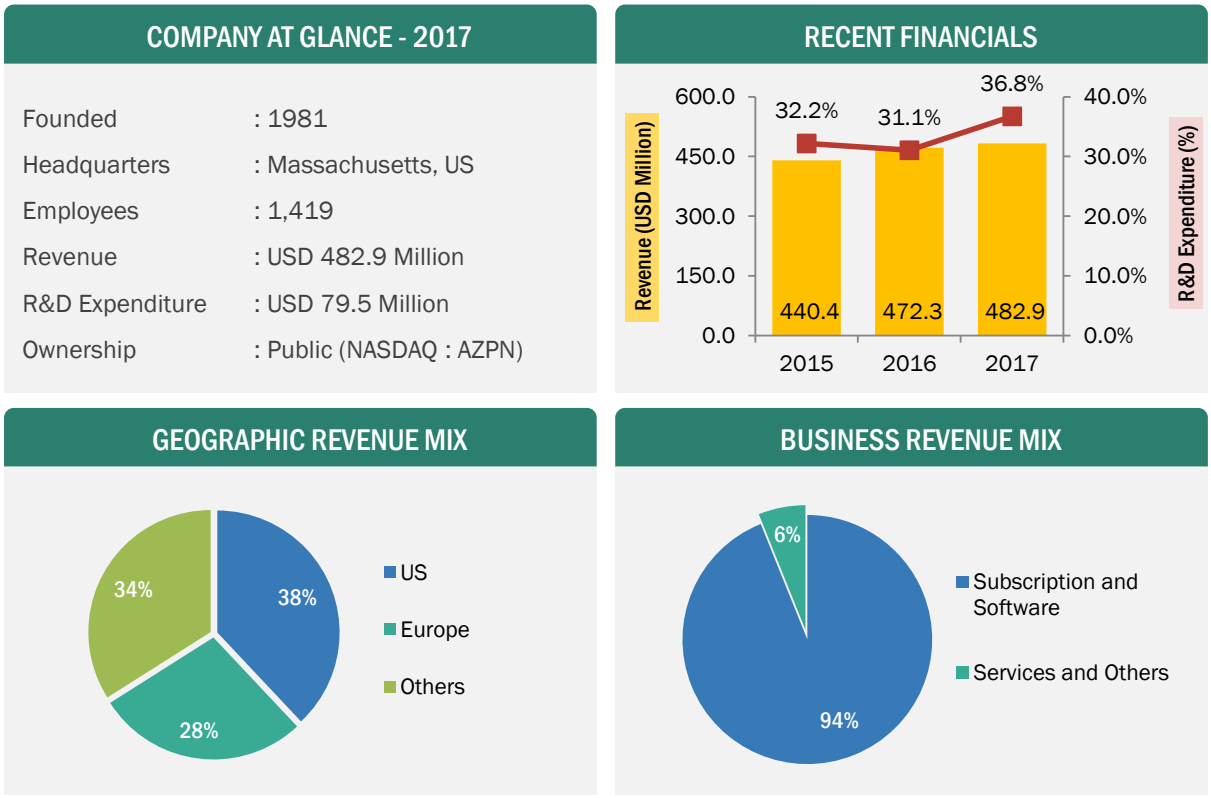
Yokogawa is a major provider of the industrial control hardware, software, and services. The company offers highly reliable sensors for real-time measurement, monitor, and control the operational floor activities. Yokogawa with its long experience in providing solutions for the industrial operations has ensured the maximum safety during the production life cycle. Furthermore, the company has extensive experience in numerous industry verticals, which include chemicals, iron and steel, pulp and paper, foods, pharmaceuticals, and oil and gas.

13.8 ASPEN TECHNOLOGY

13.8.1 BUSINESS OVERVIEW

Founded in 1981 with headquarters in Massachusetts, US, Aspen Technology is a supplier of asset optimization solutions that optimize asset design, operations, and maintenance in complex, industrial environments. It offers custom-built software to enhance the competitiveness and business profitability of its customers. The solutions help to increase efficiency and production, while reducing unplanned downtime, working capital requirements throughout the entire asset lifecycle to support operational excellence. The company has offices in over 30 countries worldwide.

FIGURE 44 ASPEN TECHNOLOGY: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.8.2 TOOLS AND SERVICES OFFERED

The company offers the following tool:

TOOL	DESCRIPTION
Aspen InfoPlus.21	Aspen Technology's InfoPlus.21 is a core element of aspenONE, a production management and execution application. InfoPlus.21 collects and stores giant volumes of data records for real-time and historical analysis and reporting. It gathers and stores massive production data which is later used for reporting. With its rich calculation, evaluation, and visualization capability and object-oriented real-time software improvement environment, it supplies a flexible and advantageous performance administration and analysis solution.

Source: Company Website

The company offers the following services:

SERVICE	DESCRIPTION
Professional Service	The professional services are to help customers in business transformation. Aspen Technologys' services help in deriving more business value from existing assets and systems. These services also ensure successful solution delivery with mitigated risks.
Training and Support Services	With its wide-ranging products, it has to ensure the information about every individual product is delivered to concerned teams and hence it has huge focus on training and support services.

Source: Company Website

13.8.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
February 2018	Partnership	Emerson partnered with Aspen Technology to provide asset optimization software solutions with global automation technologies and operational consulting services. This assists customers in optimizing production and driving operational excellence.
December 2017	Acquisition	Aspen Technology acquired RtTech Software Inc. This acquisition strengthened Aspen Technology's asset optimization strategy through a refined cloud and edge processing technology that captures and aggregates critical data from assets throughout a plant and across an enterprise.
October 2016	Acquisition	Aspen Technology acquired Mtelligence Corporation (Mtell), a provider of predictive and prescriptive maintenance for asset performance optimization. This acquisition strengthened the company's asset optimization offering.
March 2015	Acquisition	Aspen Technology acquired the BLOWDOWN software technology. This acquisition is expected to enhance aspenONE Engineering suite in plant modeling and operational capabilities.
February 2015	Product Upgrade	Aspen Technology released the version 8.8 of aspenONE to assist manufacturers to achieve operational excellence, improve profit margins, increase production, meet customer demand, and gain a competitive advantage by applying innovation across the enterprise.

Source: Press Releases

13.8.4 MNM VIEW

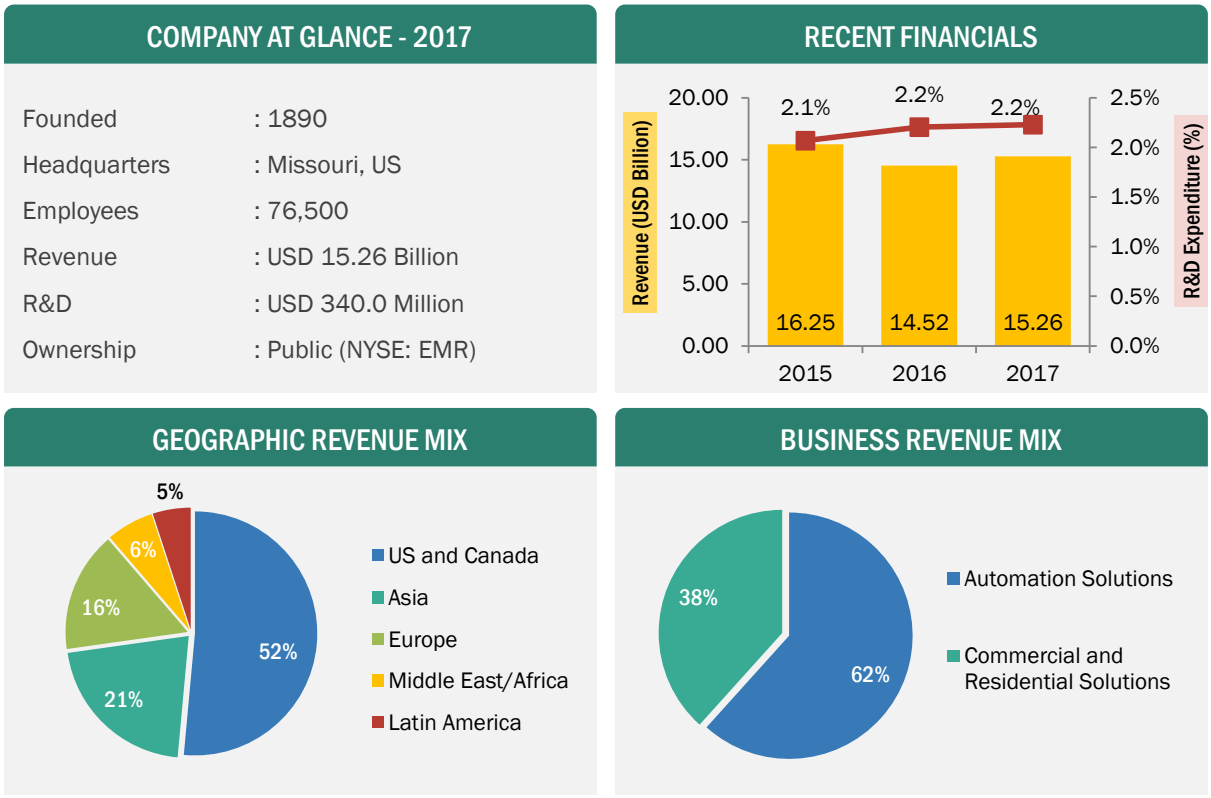
With over 30 years of business experience, the company has successfully combined advanced analytics and machine learning capabilities with its asset optimization solutions. Furthermore, constant developments in products and advancements in services have enabled its customers to enhance their productivity and profitability, thus ensuring trust and long-term relationships with existing customers. The company has approximately 2,100 customers worldwide, primarily from the process and other capital-intensive industries such as energy, engineering and construction, chemicals, pharmaceuticals, transportation, power, metals and mining, pulp and paper, and consumer packaged goods. Additionally, the company's primary growth strategy is to expand organically within its core verticals by leveraging its market position and driving the adoption of aspenONE offerings across the industry.

13.9 EMERSON

13.9.1 BUSINESS OVERVIEW

Emerson was founded in 1890 and is headquartered in Missouri, US. The company offers a range of products and services in the areas of process management, climate technologies, network power, storage solutions, professional tools, appliance solutions, motor technologies, and industrial automation. It operates in 2 segments, namely, automation solution, and commercial and residential solutions. The company caters to a wide range of industry verticals, such as automotive, chemical, oil and gas, power generation, food and beverages, and life sciences and medical.

FIGURE 45 EMERSON: COMPANY SNAPSHOT



Source: Company Website, Annual Reports, and SEC Filings

13.9.2 SOLUTIONS OFFERED

Emerson provides the following solutions:

SOLUTION	DESCRIPTION
Ovation Process Historian	It enables organizations to retrieve real-time and historical data from mass storage as per their time-series, operator actions, and sequence of events. Moreover, it provides software and hardware options to deal with multiple levels of fault.
DeltaV Advanced Continuous Historian	Advanced Continuous Historian is the additional feature of the DeltaV system, which is powered by OSIsoft technology. It enables users to integrate their Enterprise PI System with the DeltaV system to analyze the user's data.
DeltaV Continuous Historian	It is a basic version of data historian offered by the company to help organizations meet their basic requirements, such as it helps to data collection, from a single DeltaV system, and configure and integrate that data with DeltaV applications.
DeltaV History Analysis	It enables users to view the data from every computer, which is working on Microsoft Internet Explorer. This is a web-based application, which helps analyze historical batch, real time, and event data.
DeltaV Enterprise Historian	It offers a flexible system architecture and comprehensive enterprise historian client and interface connectivity.
DeltaV Plantwide Event Historian	It records all the information pertaining to operations floor equipment and activities, from every event servers and OPC alarms and store them on Microsoft Structured Query Language (SQL) server database. It ensures continuous data recording without any interruption and data loss.

Source: Company Website

13.9.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
November 2017	Partnership	Emerson expanded its existing partnership with Informetric Systems, a data collection and reporting application company. This partnership would help life sciences solution providers enable their clients to reduce 50% of time consumption of batch release process through integration of Emerson's Syncade Manufacturing Execution System (MES) and Informetric's InfoBatch, a flexible electronic batch reporting technology.
October 2016	New Product Launch	Emerson launched the holistic asset monitoring platform to help organizations improve reliability and operational plant availability.

Source: Company Website and Press Releases

13.9.4 MNM VIEW

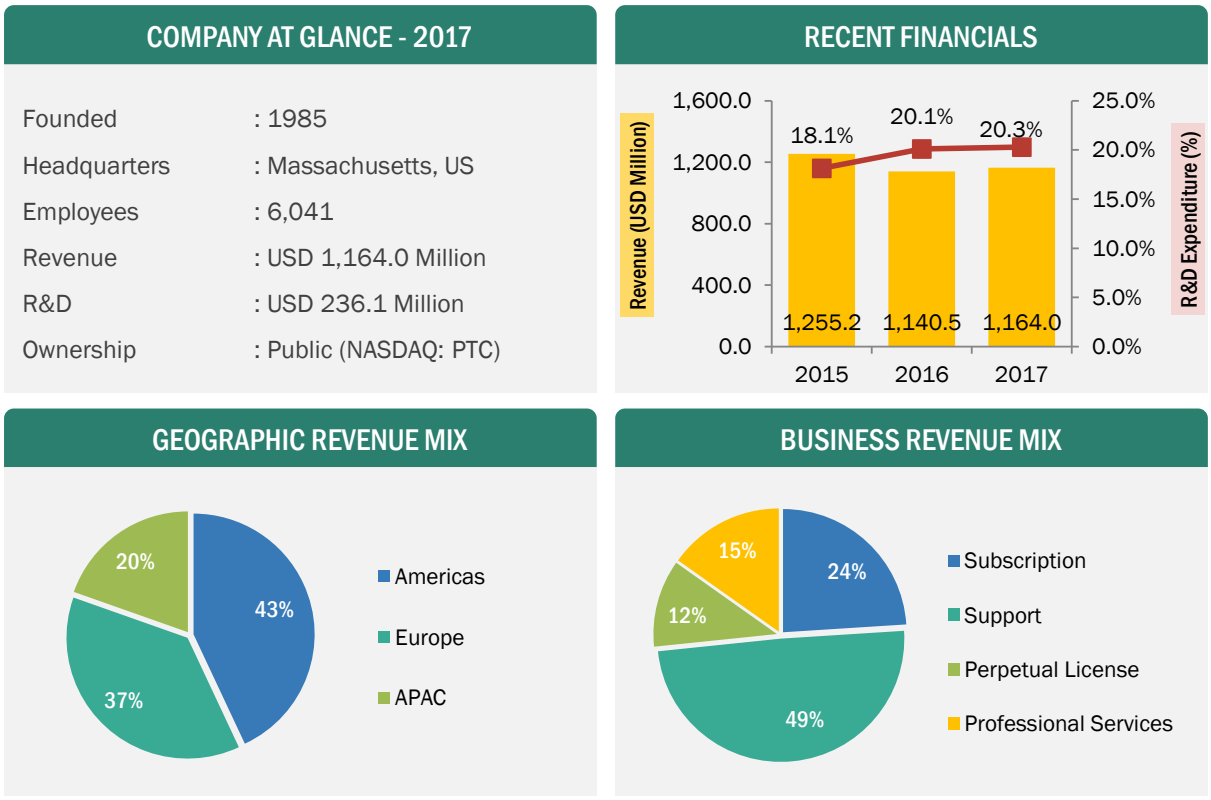
Emerson is a one of the leaders in automation solutions, which help discrete and process manufacturing companies to automate and optimize production processes. The company is fostering its growth through investing in R&D activities for developing new and innovative products. It is continuously investing more than 2% of its revenue in R&D every year. To conclude, Emerson is investing heavily in the development of new products and promising a stronger product portfolio. The company launched the holistic asset monitoring platform and AMS ARES Platform under automation solution segment to improve reliability and plant availability, and deliver data based on requirements of users. Moreover, Emerson focuses on strategic collaborations and acquisitions for strengthening its position in the market and expanding its product portfolio. In November 2017, Emerson expanded its existing partnership with Informetric Systems, a data collection and reporting application company. This partnership would help life sciences solution providers enable their clients to reduce 50% of time consumption of batch release process through integration of Emerson's Syncade MES and Informetric's InfoBatch, a flexible electronic batch reporting technology.

13.10 PTC

13.10.1 BUSINESS OVERVIEW

Founded in 1985 and headquartered in Massachusetts, US, PTC is an American software company specializing in PLM and service management solutions. The company's solutions help its customers of discrete manufacturing organizations to optimize their activities within individual business functions, including engineering, supply chain, manufacturing, and service, and coordinate these processes across the enterprise to achieve product and service advantage. PTC offers various IoT cloud solutions comprising ThingWorx IoT Platform, Axeda Machine Cloud, and Coldlight (Neuron). The major competitors of PTC are GE, IBM Corporation, Google, Amazon, Microsoft, Samsung, and Telit. PTC has a strong presence in more than 150 countries, with a global employee count of 6,041.

FIGURE 46 PTC: COMPANY SNAPSHOT



Source: Company Website and SEC Filings

13.10.2 SOLUTIONS OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Local Historian	This is a single product solution used to transfer and gather data from KEPServerEX to avoid excess data loss and improve operational productivity.

Source: Company Website

13.10.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
November 2016	Partnership	PTC extended its existing partnership with General Electric. The extended alliance empowers the joint customers of both the companies to develop custom applications by using PTC's ThingWorx platform with Predix technology suite. Furthermore, both the companies intend to market Predix and ThingWorx to their new and existing customers.
March 2015	Agreement	Smoove, a French bike developing company, selected the Internet of Things (IoT) platform of PTC. This new platform would enable Smoove bikes to collect data and share it with city administrators, facilitating better access and placement of bike stations and accommodating customers to use bikes according to their preferences.
January 2015	Acquisition	PTC acquired Kepware, a provider of communications connectivity and analytics solutions to industrial automation environments through its software. The acquisition bolstered PTC's IIoT portfolio through Kepware's communication platform, KEPServerEX. It also strengthened PTC's ThingWorx IoT technology platform.

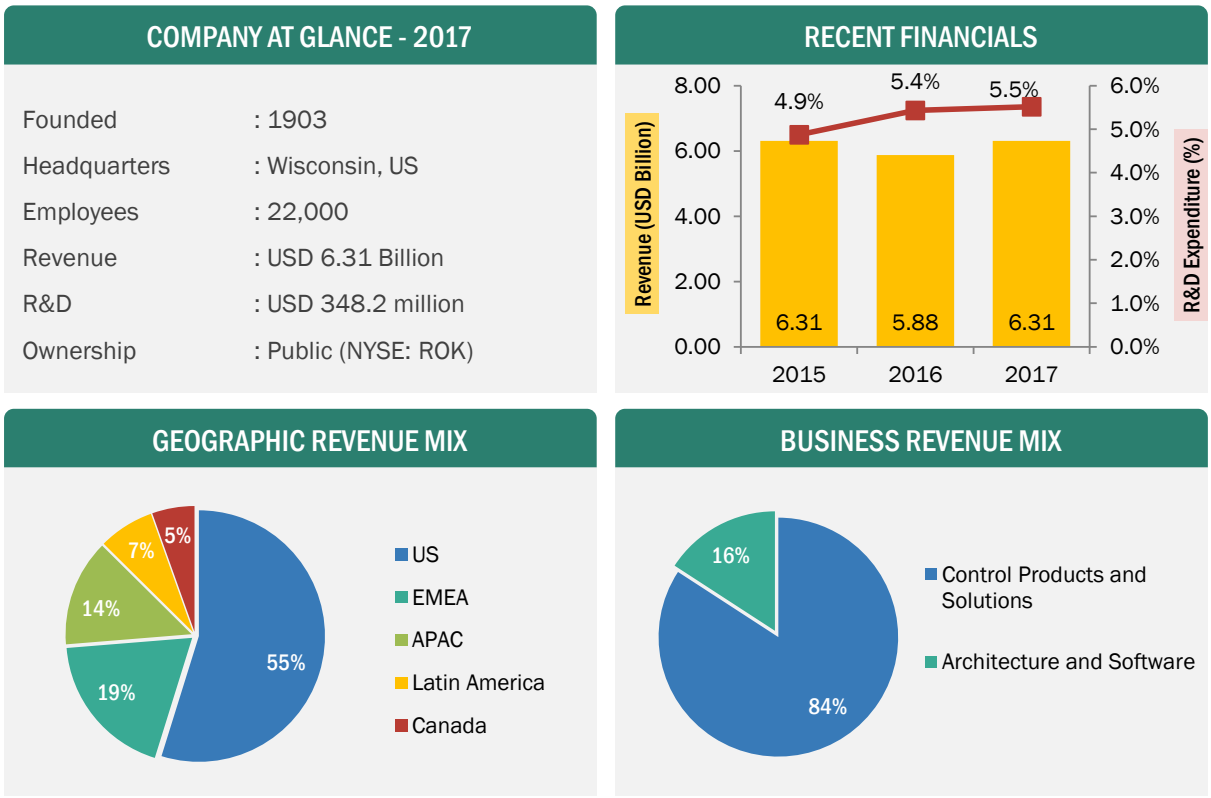
Source: Press Releases

13.11 ROCKWELL AUTOMATION

13.11.1 BUSINESS OVERVIEW

Rockwell Automation was founded in 1903 and is headquartered in Wisconsin, US. The company is one of the world's largest industrial automation power, control, and information solutions provider. It operates in 2 business segments, namely, architecture and software, and control products and solutions. The architecture and software segment offers hardware, software, and automation components that are related to SCADA. Products and services offered under the architecture and software segment is capable of controlling industrial processes and handles enterprises information. HMI as a component of the SCADA system accepts challenges in process, batch, and discrete applications and improves the productivity in various processes and discrete industries. The well-known brand of Rockwell Automation is Rockwell Software, which comprises the HMI SCADA software, RSView32, and FactoryTalk.

FIGURE 47 ROCKWELL AUTOMATION: COMPANY SNAPSHOT



Source: Company Website, Annual Reports, and SEC Filings

13.11.2 SOLUTIONS OFFERED

Rockwell Automation provides the following solutions:

SOLUTION	DESCRIPTION
FactoryTalk Historian Machine Edition (ME)	It works in a high speed while capturing data from various sources, which helps reduce the data losses. It also assists manufacturers in improving processes on a regular basis.

Source: Company Website

13.11.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
October 2016	Acquisition	Rockwell Automation acquired MAVERICK Technologies to deliver innovative control and information solutions to customers. MAVERICK Technologies is the largest independent systems integrator in North America and is a global leader in industrial automation.
September 2016	Acquisition	Rockwell Automation acquired Automation Control Products (US), a leading provider of centralized thin client, remote desktop, and server management software. SCADA provides visualization during manufacturing operations from the control room and also enables users to access content and applications securely from anywhere.

Source: Company Website and Press Releases

13.11.4 MNM VIEW

The company nurtures its growth through acquisitions and collaborations with strategic companies, strengthening its presence in the market. By acquiring MAVERICK Technologies, in October 2016, Rockwell ensured to deliver innovative control and information solutions to its customers. In September 2016, Rockwell Automation acquired Automation Control Products (US), a leader in centralized thin client, remote desktop, and server management software, thus expanding its SCADA portfolio. Furthermore, its collaboration with Cisco, in April 2016, helped enhance the IIoT security. The R&D expenditure percentage has increased from 5.4% in 2016 to 5.5% in 2017, indicating that the company is heavily investing in the development of new products and solutions to grab the future market.

13.12 ICONICS

13.12.1 BUSINESS OVERVIEW

ICONICS was founded in 1986 and is headquartered in Massachusetts, US. The company deals in various areas, including HMI/SCADA, real-time visualization, IoT, manufacturing intelligence, and operational excellence. Additionally, the company majorly focuses on the development of automation software solutions and offers web-based advanced analytics, visualization, and mobile software solutions that are certified by Open Platform Communications (OPC) Unified Architecture (UA) and Building Automation and Control Networks (BACnet). The company caters across numerous industry verticals, such as food and beverages, government infrastructure, energy and utilities, industrial automation, and manufacturing.

COMPANY AT A GLANCE

Founded	: 1986
Headquarters	: Massachusetts, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.12.2 SOLUTIONS OFFERED

The company provides the following solutions:

SOLUTION	DESCRIPTION
Hyper Historian	This is an advanced enterprise data historian solution that enables organizations to log a large volume of data and connect to numerous data sources across their infrastructure. It leverages various features such as 64-bit software and hardware architecture, high speed, high performance, enhanced reliability, and robustness. This solution is mostly used for mission-critical applications in various industries. Additionally, it facilitates features such as integrate performance calculation, data archiving from unattended operations, customized trends and charts, critical data storage and movement, diagnostic data tracing through event logs, and replay real time and historical data.

Source: Company Website and Press Releases

13.12.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
June 2017	Product Upgradation	ICONICS upgraded its cloud-based IoT solution, GENESIS64 v10.95 by adding various new features, such as asset enabled alarm counting and rollup, additional filter capabilities, accurate visualization of event and historical data,. This advanced version leverages the data historian features, including hyper scalability performance calculation engine, asynchronous expressions engine, and hyper historian debugging.
November 2016	Product Upgradation	ICONICS upgraded GENESIS64, a 64-bit HMI/SCADA software, by introducing its latest version GENESIS64 V10.95. This upgrade includes new multiple features such as hyper historian, analytix solutions, and data historian, and MobileHMI mobility suite.
November 2016	New Product Launch	ICONICS introduced the holographic HMI, which consists of 2D and 3D holograms integrated with GENESIS64 HMI/SCADA, ICONICS analytiX solutions, and hyper historian and data historian. This integration enables the fault detection and diagnostics, additional insights to users and time-saving maintenance operations in various industries.
November 2015	Product Upgradation	ICONICS upgraded its existing product MobileHMI by adding new augmented reality feature in its new version, MobileHMI V10.9 comprises data mobility suite. Augmented reality is a new frontier in HMI/SCADA and building automation applications. The new version V10.9 provides users fast data retrieval and control from code scanning and GPS location using MobileHMI.

Source: Company Website and Press Releases

13.12.4 MNM VIEW

ICONICS is one of the leaders in the industrial automation industry. The company focuses on industry verticals such as food and beverages, manufacturing, oil and gas, pharmaceuticals, power, and water supply and wastewater. The company fosters its growth in the data historian market through investing in new product development. In November 2015, ICONICS developed a new version of MobileHMI V10.9 that enabled fast data retrieval and control from code scanning and GPS location using this solution. Furthermore, in November 2016, the company introduced the HMI integrated with GENESIS64 that help organizations avail features of data historian, along with analytics. Moreover, ICONICS strengthened its partner ecosystem by entering into strategic partnership with numerous industry leaders, such as Microsoft, HPE, and Intel. It has also received gold partnership and Microsoft Partner award consecutively for 5 years. This shows that the company has been continuously building its relations with industry leaders to strengthen its partner ecosystem.

13.13 OSISOFT

13.13.1 BUSINESS OVERVIEW

OSIsoft offers an open business enterprise infrastructure to link sensor-based data, operations, and humans to allow real-time and actionable insights. The company was founded in 1980 is headquartered in California, United States. It offers PI System, a product that includes more than a numerous module to analyze, collect, deliver, find, historize, and visualize organisation information used to supply process, quality, energy, regulatory compliance, safety, security, and asset fitness enhancements across their operations. The company's product permits corporations engaged in a range of activities, such as exploration, extraction, production, generation, manner and discrete manufacturing, distribution, and provider components to leverage streaming facts to optimize their businesses. The company cater to oil and gas, chemical and petrochemical, pulp and paper, energy and utility, and material, mine, metal, and metallurgy markets; pharmaceutical, food, and lifestyles science sectors; and data centers, and information technology markets. It serves clients worldwide. OSIsoft has alliances with Mitsubishi Hitachi Power Systems Ltd., Microsoft, SAP, Cisco, and Esri.

COMPANY AT A GLANCE

Founded	: 1980
Headquarters	: California, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.13.2 TOOLS AND SERVICES OFFERED

OSIsoft offers the following tool in the data historian market:

TOOL	DESCRIPTION
PI System	The system provides historical predictive insights. It delivers premier infrastructure for industrial operations. Moreover, it helps in proactive decision-making with real-time data access and visualization.

Source: Company Website

OSIsoft offers the following services in the data historian market:

SERVICE	DESCRIPTION
Technical Support Services	These services helps in rapid identification and resolve the technical challenges with the PI System.
Field Services	With 12 training centers across the globe, OSIsoft delivers best-in-class field services.

Source: Company Website

13.13.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
April 2017	Partnership	Software AG partnered with OSIsoft. This partnership combines enterprise wide IT and operations data with Software AG's Digital Business Platform for improved analytics, machine learning, integration, and rapid IoT solution development.
September 2015	Partnership	Emerson Process Management and OSIsoft together launched OSIsoft PI Connector for Highway Addressable Remote Transducer Internet Protocol (HART-IP), a link between HART field devices and OSIsoft's PI System Enterprise Infrastructure software, for managing streaming sensor data in real time.

Source: Press Releases

13.13.4 MNM VIEW

For over 30 years customers have been leveraging over PI System to deliver process, quality, compliance, safety, and assets health improvements across operations. With its customer support throughout the implementation of PI System, users have gained faith over the product, as well as the offered services. The proactive decisive nature of the product has helped the company establish better relationships with its clients. Furthermore, PI System tools enable enhanced efficiencies, reduced loads, and improved budgets while benefitting overall operations of the organization.

13.14 AUTOMSOFT

13.14.1 BUSINESS OVERVIEW

The company is a technology provider founded in 1997, with headquarters in Dublin, Ireland and offices in the UK and the US. Automsoft emphasizes innovation and is at the forefront of complicated asset management, method optimization, visualization, and predictive analytics. Automsoft Science manages geographically dispersed assets throughout an enterprise across multiple industries in 2001, Automsoft launched the RAPID data historian. The company serves maritime, oil and gas, power and utilities, manufacturing, life sciences, smart grid, and other verticals.

COMPANY AT A GLANCE

Founded	: 1997
Headquarters	: Dublin, Ireland
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.14.2 TOOLS AND SERVICES OFFERED

The company offers the following tool:

TOOL	DESCRIPTION
Rapid Historian	Automsoft's Rapid Historian is a robust suite of effective statistics historian, facts administration, and analysis applications, which are designed to collect, analyze, and serve massive volumes of data. It helps to meet the regulatory requirement through process management and user authentication and other authentication tools.

Source: Company Website

The company offers the following services:

SERVICE	DESCRIPTION
Training and Consulting Services	These services allow to maximize business functionality and also include designing and generating standardized reports using the RAPID technology.
Technical Support Services	These services help users in identifying, investigating, and resolving their issues.

Source: Company Website

13.15 CANARY LABS

13.15.1 BUSINESS OVERVIEW

Founded in 1985 and headquartered in Pennsylvania, US, Canary Labs has developed a process data historian software that offers production monitoring and process optimization services. The company provides real-time enterprise historian and trending solutions to simplify and optimize data analysis, thereby facilitating decision makers. The company offers Enterprise Historian and Cloud Historian products to store and retrieve data on local network and cloud, respectively. The solutions offered by the company are used in the energy, manufacturing, water and wastewater, mining and metals, fiber optic and communications, facility and data center, and process industries. The company is recognized as a provider of stellar service and support at minimal cost and has more than 18,000 solutions installed across 50 countries.

COMPANY AT A GLANCE

Founded	: 1985
Headquarters	: Pennsylvania, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.15.2 SOLUTIONS OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Enterprise Historian	The Enterprise Historian solution is built on non-SQL technology, which gives customers better performance and minimizes the need for constant database management. The solution features easy data management without burdening IT, organizes tags based on asset type and application across the entire organization, and is optimized for time series data to enable organizations to work more efficiently. The company also offers Axiom, a visualization tool to view enterprise operations.
Cloud Historian	Cloud Historian is a secure solution that simplifies the collection, storage, and visualization of industrial data and supports more accurate decisions. The solution provides a new way to store and visualize enterprise data with minimal installation and hardware requirements.

Source: Company Website

13.15.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2018	Product Upgradation	Canary Labs released a new version of Axiom, 18.0.1, with a Web API for sender services. The new version of the tool has a new virtual IO subsystem for managing memory and increasing robustness.
June 2017	New Product Launch	Canary Labs introduced Canary Cloud hosted solution, a cloud solution as a service that allows enterprises to collect data and store it in the cloud without requiring a complicated deployment or database management. This has made the deployment process simple with minimum setup.

Source: Press Releases

13.16 COPA-DATA

13.16.1 BUSINESS OVERVIEW

COPA-DATA founded in 1987 and is headquartered in Salzburg, Austria. The company develops software systems for industrial automation and the energy industry. It has offices in Europe, North America, and Asia, with additional offices in over 46 countries. The company offers Zenon Historian to the data historian market. The company also provides training and eLearning courses, technical support and consulting, and research and development.

COMPANY AT A GLANCE

Founded	: 1987
Headquarters	: Salzburg, Austria
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.16.2 TOOLS AND SERVICES OFFERED

The company offers the following tools:

TOOL	DESCRIPTION
Zenon Historian	Zenon Historian offers widespread tools for archiving and report generation. It also offers a variety of services to enable users to implement individual requirements, without additional programming efforts. It records process data on a lasting basis and archives it without any numerical limitation.

Source: Company Website

The company offers the following services:

SERVICE	DESCRIPTION
Training and Support	The company provides training on essential and tailored courses to meet clients' specific requirements.

Source: Company Website

13.17 INDUCTIVE AUTOMATION

13.17.1 BUSINESS OVERVIEW

Founded in 2003 and headquartered in California, US, Inductive Automation provides industrial software that increases the overall efficiency of industrial automation in an organization. The company has created Ignition Software, an SCADA solution, using industrial-grade security technology. Built on a modern software architecture, Ignition is more secure and reliable than traditional SCADA software. Ignition Software is a powerful web-based industrial software platform with tools for the control of and reporting on cross-platform manufacturing and process automation equipment, including SCADA and IIoT.

COMPANY AT A GLANCE

Founded	: 2003
Headquarters	: California, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.17.2 SOLUTIONS OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Ignition Software	Ignition Software, provided by the company, combines an unlimited licensing model with instant web-based deployment, and the industry-leading toolset for SCADA. The solution empowers organizations to control processes, and track and display enterprise data. The real-time monitoring enables customers to view the status of their operations on any device.

Source: Company Website

13.17.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
March 2018	Partnership	Inductive Automation partnered with B+B SmartWorx powered by Advantech to create Ignition Onboard Program and provide customers better SCADA/operational solutions with IIoT capability.
February 2017	Partnership	Inductive Automation partnered with Cirrus Link Solutions to introduce Ignition Edge. The 2 companies would work together to create an affordable way to extract data from the edge and into a database, enabling customers to leverage the data for analysis and better decision-making.

Source: Press Releases

13.18 INDUSTRIAL VIDEO & CONTROL

13.18.1 BUSINESS OVERVIEW

Founded in 2001 and headquartered in Massachusetts, US, Industrial Video & Control offers industrial video management software that is used in various application areas, including industrial, military, and commercial. The company also specializes in video integration with SCADA systems, thermal cameras, hazardous area cameras, and video surveillance and provides customized solutions as per clients' needs. The company caters to various organizations, including large multinational corporations, SMEs, and government agencies.

COMPANY AT A GLANCE

Founded	: 2001
Headquarters	: Massachusetts, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.18.2 SOLUTIONS OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Longwatch Video Historian	The Longwatch Video Historian tool provided by the company enables organizations to arrange video data according to its speed, limits, distance, rate of change, and sequences. It also minimizes the time consumption while correlating the video with data and creates proper synchronization between data and sources.

Source: Company Website

13.18.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
September 2017	Partnership	Industrial Video & Control partnered with Schneider Electric to enhance the capabilities of Wonderware software portfolio of Schneider Electric.

Source: Press Releases

13.19 INFLUXDATA

13.19.1 BUSINESS OVERVIEW

Founded in 2012 and headquartered in California, US, InfluxData provides open source time series software platforms that offers applications, infrastructures, and IoT sensor monitoring and analytics solutions. The company offers products and services, which enable collection, storage, visualization and analysis of the time-series data. It provides a modern Open Source Time Series Platform built from the ground up for analyzing metrics and events for DevOps and IoT applications. InfluxData's data platform is known as the TICK stack, a combination of 4 software components that collect, store, visualize, and process the time-series data, which is measured over time. Solutions offered by the company empowers developers to build next-generation monitoring, analytics, and IoT applications. These application facilitates faster, easier, and to scale delivering real business value quickly for the data coming from humans, sensors or machines. The company has more than 125,000 active installs and has technology partners that have a technical integration between their products and InfluxData.

COMPANY AT A GLANCE

Founded	: 2012
Headquarters	: California, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.19.2 SOLUTIONS OFFERED

InfluxData offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Open Source Time Series Platform	It provides services and functionality to gather, analyze, and act on the time-series data.
InfluxDB	It is a purpose built time-series database that handles high write loads, large data set storage, and conserves space through downsampling. The solution automatically detects the expiring data and delete unwanted data from the system.

Source: Company Website

InfluxData offers the following services in the data historian market:

SERVICE	DESCRIPTION
Managed Service	InfluxCloud is a secure, fully supported and managed Database-as-a-Service (DaaS) offering, hosted on AWS platform. The company provides customization services based on the amount of storage needed by the customer.
Access Control	InfluxCloud provides closed source access control features to support role-based access control and restrict or enable certain users or groups of users from performing specific tasks.
Support Services	The company provides support for the complete underlying Open Source Platform, technical assistance to cover the entire life cycle — from development and proof-of-concept to QA/test, and production and deployment.

Source: Company Website

13.19.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
March 2018	Business Expansion	InfluxData announced its continued expansion in the EMEA region to meet the growing global demand for its time-series database metrics and events platform, and support the existing and new customers in the region.
February 2018	Funding	InfluxData raised USD 35 million series C funding to propel the company's leadership in the growing time-series database category. The funding would be used to expand R&D, sales, and marketing demand, and is further build out of the InfluxData platform.
December 2017	New Product Launch	InfluxData released industry's first advanced Kubernetes auto scaling and Prometheus read/write support. The new release would enable developers to efficiently control and utilize their containers by determining Kubernetes auto scaling based on any metric generated by K8s and collected with InfluxData.
September 2016	Funding	InfluxData secured USD 16 million series B funding led by the global investment firm Battery Ventures. The investing companies and InfluxData plan to expand InfluxData's product with the mainstream adoption of IoT and DevOps.

Source: Press Releases

13.20 KX SYSTEMS

13.20.1 BUSINESS OVERVIEW

Kx Systems was established in 1993 and is headquartered in California, US. In October 2014, First Derivatives acquired 65.2% shares of Kx Systems, turning it into a subsidiary of First Derivatives. Kx Systems offers time series database through Kx Software to major banks, hedge funds, and brokers across the globe. The major focus of the company is into building a solution that can cater to the high-volume data users and data-intensive analytics application users. Moreover, the company specializes in other areas, such as time-series analytics, big data analytics, and big numerical data.

COMPANY AT A GLANCE

Founded	: 1993
Headquarters	: California, US
Ownership	: Acquired by First Derivatives (65% Stakes)

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.20.2 SOLUTIONS OFFERED

The company provides the following solutions:

SOLUTION	DESCRIPTION
Kx for Manufacturing	This is a sensor data historian and analytics platform, which is used by a wide range of manufacturing companies to ingest, process, and analyze the real-time and historical data coming from various sensors and devices. This is a cost-effective solution, which enables easy implementation and can be deployed over cloud, on-premises, or as a hybrid solution.

Source: Company Website

13.20.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
March 2018	New Product Launch	Kx Systems launched a retail range optimization platform, which would help retailers analyze huge amounts of data through basket analytics capability and gain actionable insights. It also helps users to identify product personalization, product affinity, product recommendation engines, and cross-sell opportunities.

Source: Press Releases

13.21 LIVEDATA UTILITIES

13.21.1 BUSINESS OVERVIEW

The company is a part of LiveData, which was founded in 1991 with headquarters in Massachusetts, US. LiveData was a developer of real-time integration software, utilizing existing object-oriented technology. The company majorly caters to power generation, power transmission, and power distribution sectors. The company's product helps to monitor, synthesize, and respond to highly compound multi-faceted processes in real-time, covering a broad mix of distributed devices, diverse vendors' systems, protocols, and databases.

COMPANY AT A GLANCE

Founded	: 1991
Headquarters	: Massachusetts, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.21.2 TOOLS AND SERVICES OFFERED

The company offers the following tools:

TOOL	DESCRIPTION
Operational Historian	Operational Historian is a purpose-built database to store, archive, and retrieve time-series data across production environments. The time-series data generated by systems and devices connected to the grid fits into the historian schema. It features downsampling; keeping high-precision raw data for a limited time and archiving lower precision data with compression algorithms.

Source: Company Website

The company offers the following services:

SERVICE	DESCRIPTION
Maintenance and Support Services	They provide the users of LiveData electric power products with product support and product updates, upgrades, patches, fixes, and enhancements on an annual basis.

Source: Company Website

13.22 OPEN AUTOMATION SOFTWARE

13.22.1 BUSINESS OVERVIEW

Founded in 1993 and headquartered in Colorado, US. OAS provides an IoT framework that connects commonly used industrial and business data sources to different applications such as .NET, Web, iOS, and Android. The Universal Data Connector, combined with a wide variety of connectors for devices, databases, applications, and IoT services, is the flexible framework for enterprise systems integration. The OAS platform is a robust alternative for building an industrial automation or IoT solution. The core of the OAS platform consists of Universal Data Connector and its network architecture. The data is logged in an open format and is obtained directly from the database engine. The company utilizes both visual studio and open platform development environments to create operator interface and communication applications.

COMPANY AT A GLANCE

Founded	: 1993
Headquarters	: Colorado, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.22.2 SOLUTIONS OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Data Historian	The OAS Data Historian software allows organizations to log data to SQL Server, Oracle, Access, MySQL, Azure SQL, and CSV files in both wide and narrow table formats. The solution records IIoT data at multiple destinations with store and forward functionality to local and remote databases in an open format.

Source: Company Website

13.22.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2016	Product Upgradation	OAS upgraded its offerings to support data logging to SQL Azure databases. With OAS support for the Microsoft Azure platform, organizations can log data and alarms from multiple sources such as Modbus, .NET, Allen Bradley, Wonderware, and Cimplicity.

Source: Press Releases

13.23 PROGEA

13.23.1 BUSINESS OVERVIEW

Founded in 1990 and headquartered in Italy, Europe, Progea provides innovative industrial software and has regulated its growth by constantly investing in technological innovation and R&D. The solutions provided by the company demonstrate the quality and reliability of the products deployable in any field of automation, such as industrial automation, building automation, and process control. The company is involved in the design, development, and support of its innovative SCADA/HMI software to its global customers. Progea provides Automation Platform.NExT in the data historian market to suit every modern automation application need. The company has more than 120,000 installations globally across multiple sectors including food and beverages, automotive, manufacturing, pharmaceutical, energy, oil and gas, waste and wastewater, and building automation.

COMPANY AT A GLANCE

Founded	: 1990
Headquarters	: Italy, Europe
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.23.2 SOLUTIONS AND SERVICES OFFERED

The company offers the following solutions in the data historian market:

SOLUTION	DESCRIPTION
Automation Platform.NExT	Automation Platform.NExT provided by the company is an open source platform based on .NET framework designed by Progea. The platform enables industrial deployment with the utmost reliability and security fundamentals to mission-critical solutions. This platform empowers automation professionals as the perfect solution for supervision, HMI, control, historian, MES, and industrial analysis, IIoT, connectivity, and augmented reality.
Historian and Reporting	Historian and Reporting is a solution provided by the company for historian, data logger, analytics, and reporting. The company provides this solution for data collection, traceability, and cloud database management.

Source: Company Website

The company offers the following services in the data historian market:

SERVICE	DESCRIPTION
Customer Support Services	The customer support services are regulated by a system to deliver effective outcome. This system ensures that customers, the Movicon software users, have full accessibility to these services and are informed about the ongoing technical support procedures.

Source: Company Website

13.24 SAVIGENT SOFTWARE

13.24.1 BUSINESS OVERVIEW

Savigent Software was established in 1994 and is headquartered in Minnesota, US. The company offers streaming analytics, in-memory computing, and operational intelligence solutions across the globe. The company also specializes in workflow automation software, real-time data collection, manufacturing operations management software, contextualization and analysis, system integration, lean six sigma, business process management, and continuous improvement. Savigent Software works for numerous clients from different manufacturing areas, such as semiconductor, automotive, chemical, and consumer packaged goods.

COMPANY AT A GLANCE

Founded	: 1994
Headquarters	: Minnesota, US
Ownership	: Private

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.24.2 SOLUTIONS OFFERED

The company provides the following solutions:

SOLUTION	DESCRIPTION
Savigent Historian	This enables organizations to make comprehensive analysis by capturing and storing the data on time series basis and improves the quality of data.

Source: Company Website

13.24.3 RECENT DEVELOPMENTS

DATE	NATURE OF DEVELOPMENT	DESCRIPTION
May 2015	Product Upgradation	Savigent Software introduced version 6.0 of its manufacturing, operations, and management suite to help manufacturing organizations manage their asset data. This new version leverages capabilities such as engineer usability and improved developer, advanced administration, high reporting capabilities, and performance update for Savigent Historian.

Source: Press Releases

13.25 SORBOTICS

13.25.1 BUSINESS OVERVIEW

Sorbotics was established in 2015 and is headquartered in Florida, US. The company offers IIoT technology-based solutions across numerous industry verticals, including life sciences, transportation, food and beverages, water, and steel. Moreover, the company also offers AI and machine-learning predictive analytics solutions to government markets, and process automation industry. The company specializes into SORBA platform, SORBA Historian, SORBA SDC, SORBA machine learning, and SORBA analytics, and among others.

COMPANY AT A GLANCE

Founded	: 2015
Headquarters	: Florida , US
Ownership	: Public

Note: This is a privately held company; hence, no financial information is available in the public domain
Source: Company Website

13.25.2 SOLUTIONS OFFERED

The company provides the following solutions:

SOLUTION	DESCRIPTION
SORBA Big Data Historian	This is an enterprise data historian solution built on real-time big data analytics platform. It offers end-to-end solution to manage all the asset data across an organization. Moreover, it leverages various features such as easy setup, secure remote access, higher level of encryption and data security, and tag alarm and notifications, among others.

Source: Company Website

14 APPENDIX

14.1 INSIGHTS OF INDUSTRY EXPERTS

"Growing need for operational efficiency for manufacturers has driven investments in the data historian market."

"The advent of IoT and the increasing adoption of big data technology is driving the growth of the data historian market across the globe."

"Increasing investments in the global manufacturing and production areas is expected to aid the growth of Data Historian market."

14.2 DISCUSSION GUIDE

Currently, we are conducting a global study on Data Historian Market. The report will provide a comprehensive market and forecast analysis of the overall market, segmented by provider, application, organization size, end-user, and region. The report features detailed analysis of opportunities, market drivers, restraints, road maps, competitive landscape and profiles of key industry players.

Name
Designation
Company Name
Phone No
Email ID

Q. 1. How does the Data Historian Market look like today, and where according to you is it heading i.e. how it will look after 5 years?

Respondent Views:_____

Q. 2. What are the top 3 drivers, challenges, and opportunities in this market?

SR. NO.	DRIVERS	CHALLENGES	OPPORTUNITIES
1			
2			
3			

Respondent Views:_____

Q. 3. How are you tracking the market size of global data historian market (Considering software solutions and excluding hardware part of it) in USD XX Billion in 2018?

Respondent Views:_____

Q. 4. What could be the CAGR of this market for the next five years (2018 – 2023)?

Respondent Views:_____

Q. 5. Please rate the following "Components" according to their market share by proportion (%) in the total Data Historian market by component.

S. NO	DATA HISTORIAN MARKET – COMPONENTS	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	Solutions		
2	Services		
	Total	100%	100%

Respondent Views:_____

Q. 6. Please rate the following "Application" according to their market share by proportion (%) in the total Data Historian market by application.

Feel free to add certain major applications if we have missed out some major ones.

S. NO	DATA HISTORIAN MARKET – APPLICATIONS	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	Production Tracking		
2	Environmental Auditing		
3	Asset Performance Management		
4	GRC Management		
5	Predictive Maintenance		
6	Others*		
	Total	100%	100%

*Note: *Others includes security and quality control management*

Q. 7. Which region, according to you, is the largest in terms of market opportunity now and in the future? Please rate the following regions according to proportion (%) of total Data Historian Market.

S. NO	DATA HISTORIAN MARKET – REGIONS	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	North America		
2	Europe		
3	APAC		
4	Latin America		
5	MEA		
	Total	100%	100%

Respondent Views:_____

Q. 8. Please rate the following "Deployment Mode" according to their market share by proportion (%) in the total Data Historian market by organization size

S. NO	DATA HISTORIAN MARKET – DEPLOYMENT MODES	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	Cloud		
2	On-premises		
	Total	100%	100%

Respondent Views:_____

Q. 9. Please rate the following "Organization Size" according to their market share by proportion (%) in the total Data Historian market by organization size

S. NO	DATA HISTORIAN MARKET – ORGANIZATION SIZE	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	SMEs		
2	Large Enterprises		
	Total	100%	100%

Respondent Views:_____

Q. 10. Please rate the following "End-User" according to their market share by proportion (%) in the total Data Historian market by End-User

S. NO	DATA HISTORIAN MARKET – VERTICAL	% OF TOTAL DATA HISTORIAN MARKET- 2018	% OF TOTAL DATA HISTORIAN MARKET- 2023
1	Oil and Gas		
2	Marine		
3	Chemicals and Pharmaceuticals		
4	Paper and Pulp		
5	Metals and Mining		
6	Utilities		
7	Data Centers		
9	Others*		
	Total	100%	100%

*Note: *Others includes food and beverage, infrastructure, heavy engineering and automotive, and railways*

Respondent Views:_____

Q. 11. What would you like to see covered additionally in the report apart from the market segmentation in the report structure attached?

Respondent Views:_____

Q. 12. What according to you would be top 2-3 burning issues for which you would like to see market research reports in the future?

Respondent Views:_____

Q. 13. Who are the major global and domestic players operating in the market? Kindly list top 15 players (global and domestic)

Respondent Views:_____

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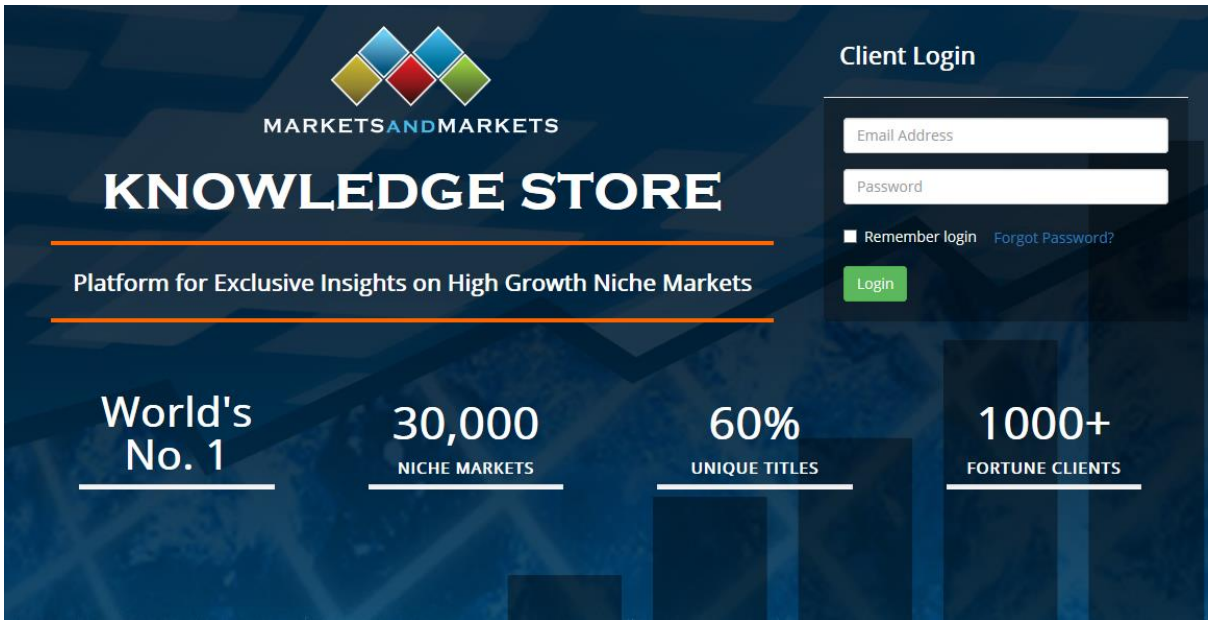

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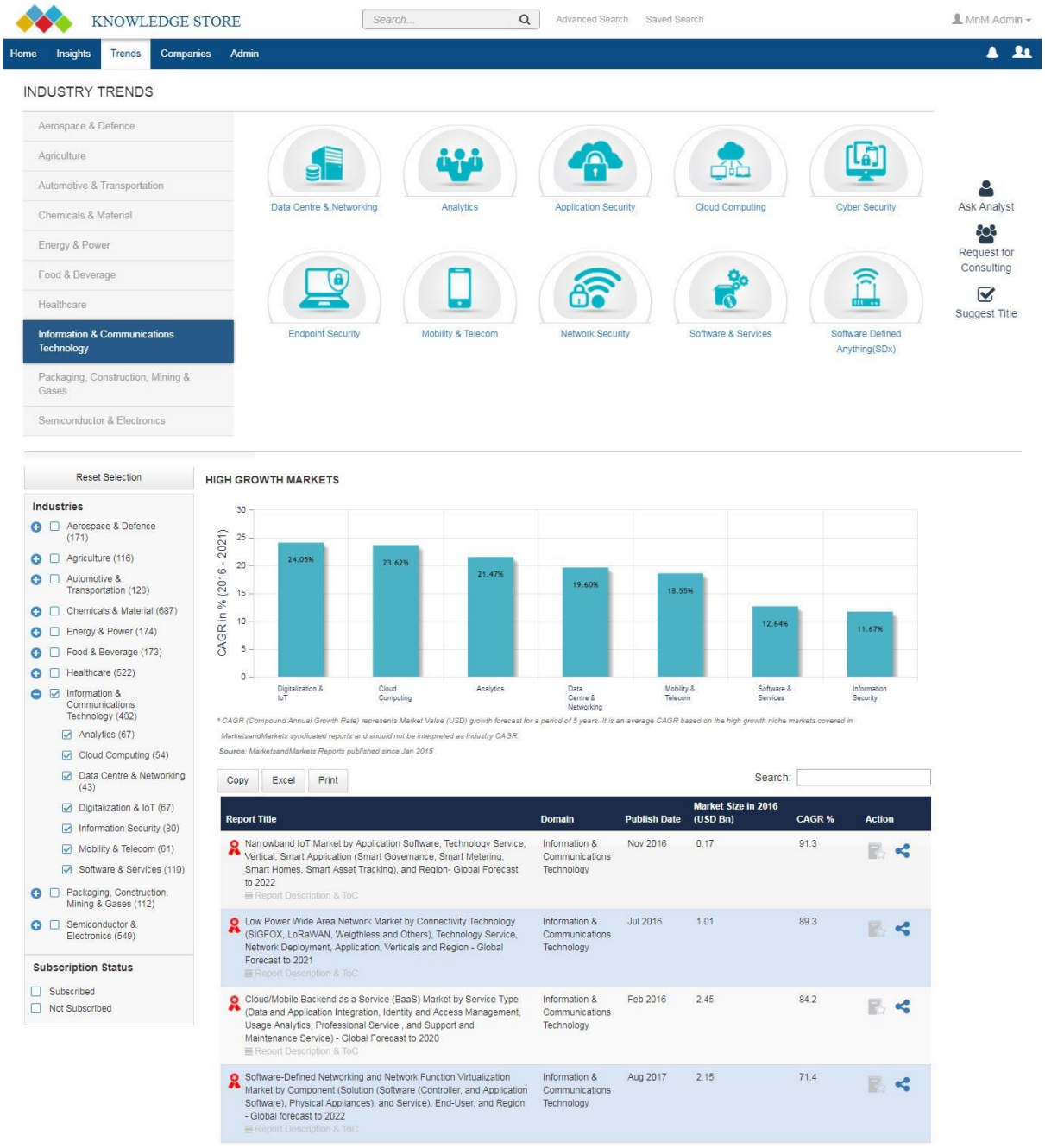

14.4 AVAILABLE CUSTOMIZATION

With the given market data, MarketsandMarkets offers customizations as per the company's specific needs. The following customization options are available for the report:

Product Analysis

- Product matrix gives a detailed comparison of the product portfolio of each company

Company Information

- Detailed analysis and profiling of additional market players up to 5

14.5 RELATED REPORTS

SR. NO.	REPORT NAME	PUBLISHED DATE
1	**INTERNET OF THINGS (IOT) DATA MANAGEMENT MARKET - GLOBAL FORECAST TO 2022** By Solution (Data Integration, Data Analytics and Visualization, Metadata Management, Data Security), Service, Deployment Type, Organization Size, Application Area, and Region https://www.marketsandmarkets.com/Market-Reports/iot-data-management-market-53767032.html	August 2017
2	**IOT IN MANUFACTURING MARKET - GLOBAL FORECAST TO 2022** By Solution (Network Management, Data Management, Device Management, Application Management, Smart Surveillance), Platform, Service (Professional and Managed), Application, Vertical Market, and Region https://www.marketsandmarkets.com/Market-Reports/iot-manufacturing-market-129197408.html	January 2018

14.6 AUTHOR DETAILS

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With an experience of over 14 years, he has been associated with ICT research for more than 10 years now. Prior to joining Markets and Markets, he has worked with firms like Frost and Sullivan, AMI-Partners, TNS Market Research and global IT major, IBM, where he worked for more than 5 years and his last role saw him as Market Segment Manager. He holds a rich experience in the technology sector working on several custom and syndicated research assignments with large Multinational Organizations.

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The role encompasses handling syndicated and custom research projects in the ICT domain. Having more than 14 years of experience with 10+ years in research, Sameer joined MarketsandMarkets from Forrester Research where he was working as a Consultant, serving the Business Technology (BT) Professionals role. The role saw him working on varied consulting/custom-research projects and communicating directly with clients, internal resources (i.e., sales, research), and third-party vendors to address queries and manage expectations to create quality deliverables. Sameer has singlehandedly driven projects that include deliverable's in the shape of data modeling, trend analysis, end-user requirements, competitive profiling, etc.

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