

# 2021 Market Analysis Results

## 2021 CIMdata PLM Market & Industry Forum

### 2021 Market Analysis Results

PLM Market & Industry Forum

A CIMdata PLM Leadership Event

8 April 2021

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### Our Mission...

*Strategic management consulting for competitive advantage in global markets*

**CIMdata is the leading independent global strategic management consulting and research authority focused exclusively on PLM and the digital transformation it enables.**

**We are dedicated to maximizing our clients' ability to design, deliver, and support innovative products and services through the application of PLM.**

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# 2021 Market Analysis Results

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### Purpose of this Presentation

*A CIMdata disclaimer*

- Deliver an overview of CIMdata's analysis of the PLM market for calendar year 2020
- Present our estimates of direct provider revenues by various categories
- Provide insight into investment changes, trends and market leaders
- Obtain provider input as to the PLM analytics they would like CIMdata to develop
- A detailed analysis of this research will be provided in CIMdata's 2021 PLM Market Analysis Report series
- All information represent CIMdata's estimates of revenues and investments

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### Important Notes

*How CIMdata prepares the global MAR data*

- CIMdata's estimates are for calendar year 2020 and may differ from a provider's fiscal year reported financials
- The relative strength of different currencies can impact growth estimates – all estimates are based on the yearly average for conversion of a currency to US dollars
- All estimates are net of royalties to eliminate any double counting of revenues
  - The royalty paid by a reseller is deducted from their revenue estimate and included within the direct revenues of the appropriate provider's estimate
- There are many acquisitions in some segments that could affect some numbers in 2020
  - We will note those during the presentation

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### Agenda

*2021 CIMdata PLM Market & Industry Forum*

- PLM Market Analysis
- Overall cPDM Market Analysis
- PLM Provider Analysis
- Provider Sector Analysis
- Concluding Remarks

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### Research Methodology Overview

*How CIMdata gathers PLM market data each year*

- Gather data through multiple means
  - Nearly 550 companies get survey workbooks via email
    - Repeated reminders increase response rate
  - Approximately 30 of the world's largest PLM companies interviewed each year
    - Often multiple times to get more insights
  - Separate research conducted in China and Japan
  - Public reporting and other market research used for data collection and cross-check, e.g., Electronic System Design Alliance (formerly EDA Consortium)
  - CIMdata global contacts used as "sanity checks" on anomalous inputs
- Total of approximately 700 companies "touched" by CIMdata process

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### Currency Fluctuations Important

*More balanced than recent years*

Currency	2020	2019	YoY Change
Euro TO US Dollar	1.13895	1.11980	1.68%
Pound TO US Dollar	1.28205	1.28700	-0.39%
Japanese Yen TO US Dollar	0.00937	0.00891	4.96%
Swiss Franc TO US Dollar	1.06496	1.01500	4.69%
Chinese Yuan TO US Dollar	0.14491	0.14800	-2.13%
Korean Won TO US Dollar	0.00085	0.00088	-4.32%
Swedish Krona TO US Dollar	0.10858	0.10575	2.60%
Brazilian Real TO US Dollar	0.18000	0.25354	-40.86%
Indian Rupee To US Dollar	0.01350	0.01420	-5.22%
Australian Dollar To US Dollar	0.68776	0.69490	-1.04%
Norwegian Krone To US Dollar	0.10624	0.11364	-6.97%

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### Acquisitions in 2020

*Some big, many tuck-ins but still at a high rate (1 of 4)*

- Autodesk continued their AEC build out with Pype and Spacemaker
- Dassault Systèmes tucked-in Proxem and NuoDB
- Koch Industries bought Infor
- PTC acquired Arena Solutions
- Siemens made three acquisitions, including Culgi

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### Acquisitions in 2020

*Some big, many tuck-ins but still at a high rate (2 of 4)*

- Altair made 5 acquisitions, including newFASANT, S&WISE Co. Ltd., Univa, Ellexus, and M-Base Engineering + software GmbH
- Ansys added two companies, including Lumerical and Analytical Graphics, Inc. (AGI)
- Hexagon added 11, including Romax Technology, MECADAT AG, CAEfatigue Limited, and DP Technology
  
- Cadence acquired Integrand
- Synopsys added 5 companies, including Qualtera

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### Acquisitions in 2020

*Some big, many tuck-ins but still at a high rate (3 of 4)*

- Accenture continued its buying spree with 18, including VanBerlo, ESR Labs, Callisto Integration, PLM Systems
- Addnode acquired Netpublicator and Scanscot Technology
- Capgemini added 3, including Advectas and WhiteSky Labs
- HCL acquired 2 companies, including DWS Limited
- Infosys added 3, including Kaleidoscope Innovation
- Tech Mahindra added two Australian consultancies
- Wipro acquired 3 companies, include Eximus Design and IVIA Servicos de Informatica

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### Acquisitions in 2020

*Some big, many tuck-ins but still at a high rate (4 of 4)*

- Aspen Technology added Camo Analytics AS and OptiPlant
- AVEVA acquired MESEnter and OSIsoft
- Bentley added NoteVault, PCSG, and GroupBC
- Honeywell acquired Sparta Systems
- Rockwell Automation added Kalypso and Flix, Inc.
- Sandvik acquired CGTech

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### Changes in Market Sample

*Looking to cover more and more of the overall PLM market*

- None of the acquisitions will affect the overall market results
  - Of course, acquisitions will affect the results of individual companies
    - E.g., Accenture growth from 2019-2020 acquisitions
  - Compensate for acquisitions by adjusting un-allocated revenues
- Will follow up in next year's process to see if any of the acquisitions are contributing to their PLM business
- Beyond acquisitions, in any given year we may add a number of companies
- For 2020, there were no major additions that affect the reported results

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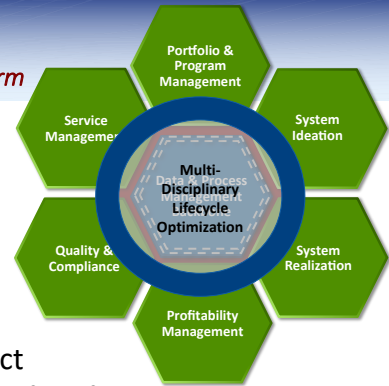
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### PLM – CIMdata's Definition

*Digital transformation of the lifecycle—enabled by a product innovation platform*

- Strategic business approach
  - **NOT** just technologies
  - Consistent set of business solutions
- Collaborative creation, use, management & dissemination of product related *intellectual assets*
  - All product/plant definition information – the virtual product
    - AEC, MCAD, EDA, ALM, SE, requirements, simulations, analytics, portfolio, formulas...
  - All product/plant process definitions – the virtual processes
    - Processes that plan, design, produce, operate, support, decommission, recycle...
- An innovation platform that supports the extended enterprise
- Spans the full lifecycle, from idea/concept through life



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### PLM Market Categories

*Three major segments comprise the PLM Market*

- collaborative Product Definition management
  - Applications and solutions to capture, manage, disseminate, visualize and collaborate on product related intellectual (digital/virtual) information, including related processes
- Tools
  - Applications that are used to create intellectual assets
  - Authoring, analysis, modeling, simulation and documentation of product and plant/facility information
- Digital Manufacturing
  - Process planning, resource definition, factory floor layout and product flow simulation and analysis (including ergonomics)

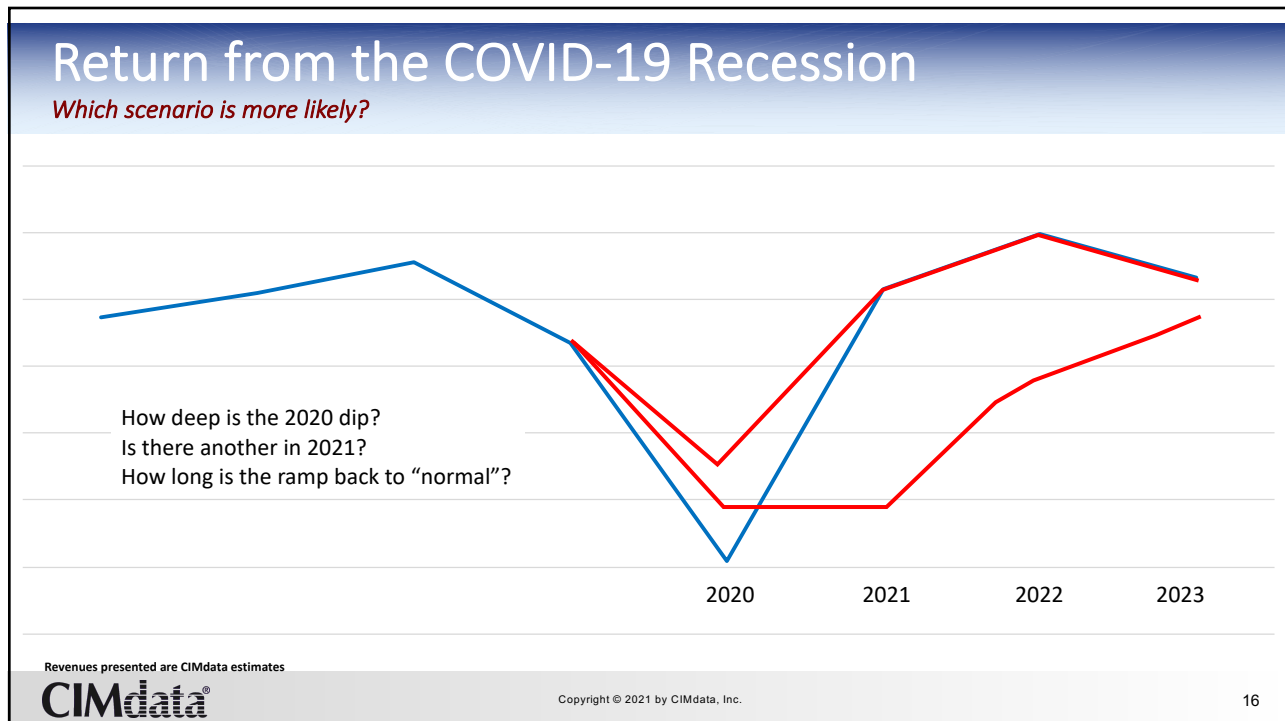
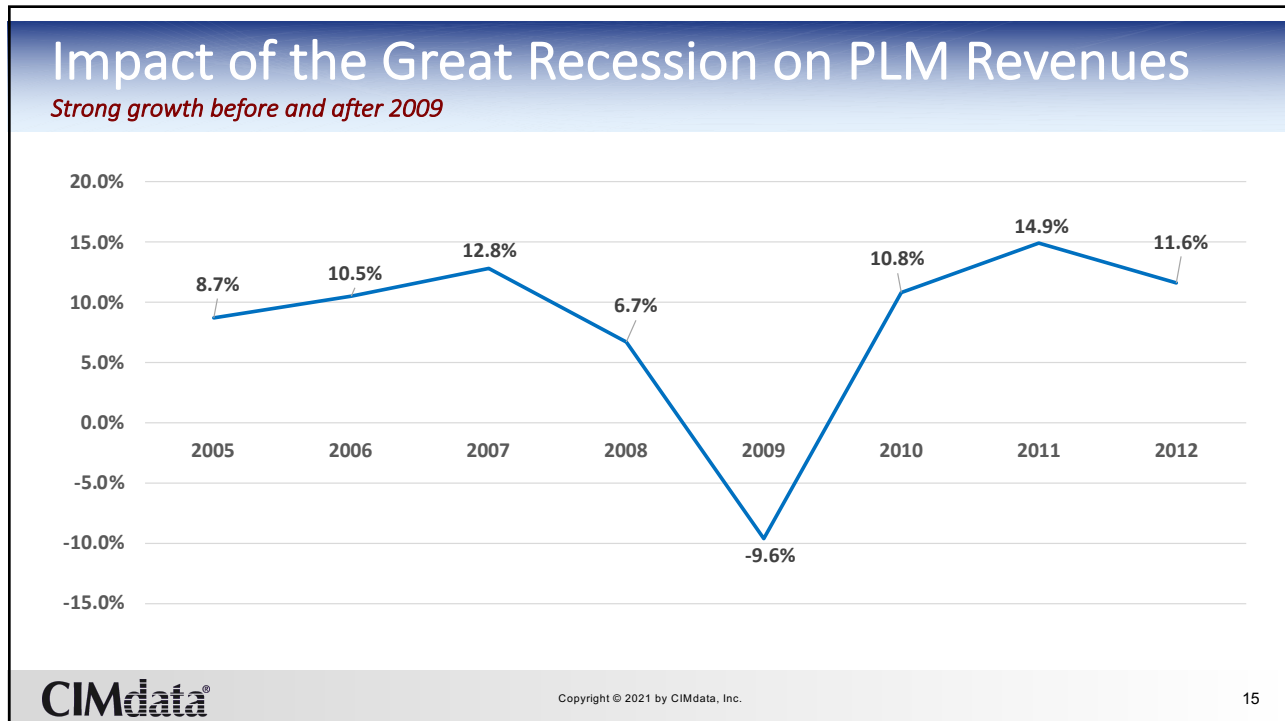
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### PLM Forecast

*Impact of changes to subscription models*

### From Last Year

- COVID-19 will have differential impacts on PLM segments
- PLM during the Great Recession, the last major disruption, offers a model
- Considered impacts of market and technology changes since then
  - Move to subscription provides some help to stop the bleeding
  - The cloud helps people work anywhere, anytime, can be an upside as the model takes hold in PLM
  - How face-to-face consulting services might have to change is a big question facing the industry
- How long will it take to get back to normal, or will there be a “new normal”?

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### Overall PLM Results

*Growth in 2020 over forecast*

- Overall PLM growth (3.46%) above forecast (-1.7%)
  - Results mixed
  - EDA, SI/Reseller/VAR the biggest surprises
- Autodesk and PTC license model transition affects certain segments
- Continued industry consolidation, new entrants, investor interest and action
  - SI/Reseller/VAR the most active segment, led by Accenture (again)
  - Major PLM players trying to differentiate, expand reach

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### 2020 Market Results

Results by segment (US\$ Millions) mostly positive

Segment	2020 Revenues	YoY Growth
cPDM Comprehensive Technology Providers	\$6,939.0	4.2%
cPDM-Focused Applications	\$2,666.1	3.9%
Digital Manufacturing	\$833.0	-6.0%
SI/Reseller/VAR	\$7,843.7	-4.2%
Tools		
MCAD-Multi Discipline	\$3,841.3	-2.2%
MCAD-Design Focused	\$3,541.3	0.7%
Non-Bundled CAM	\$1,476.4	-6.3%
Simulation & Analysis	\$7,477.2	4.2%
Other Tools (e.g., ALM)	\$1,796.2	7.6%
EDA	\$11,338.2	10.4%
AEC	\$5,539.0	9.1%
Total	\$53,291.4	3.46%

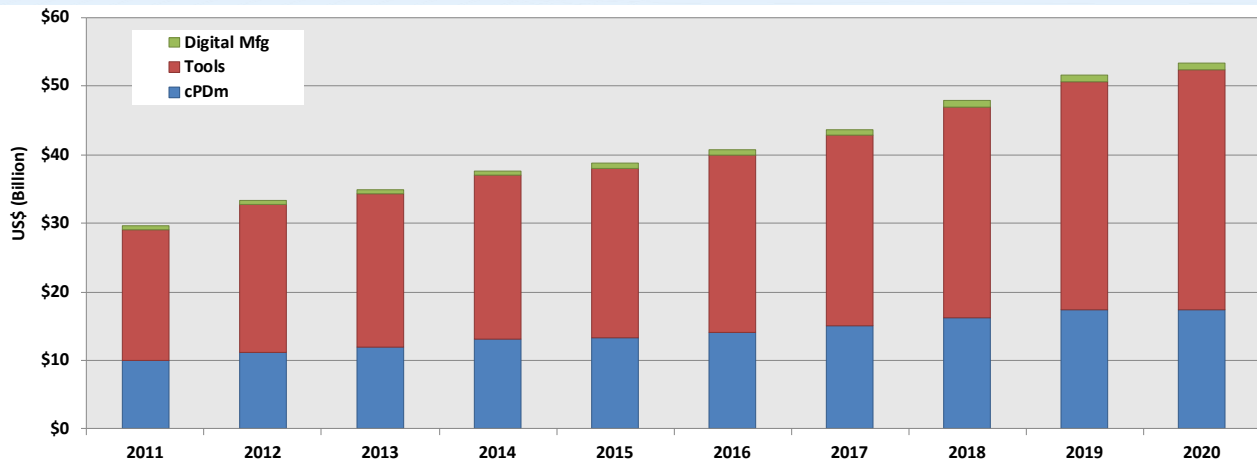
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### PLM Market Investment

Spend increased during 2020



Revenues presented are CIMdata estimates

PLM up 3.5% – \$53.3 billion



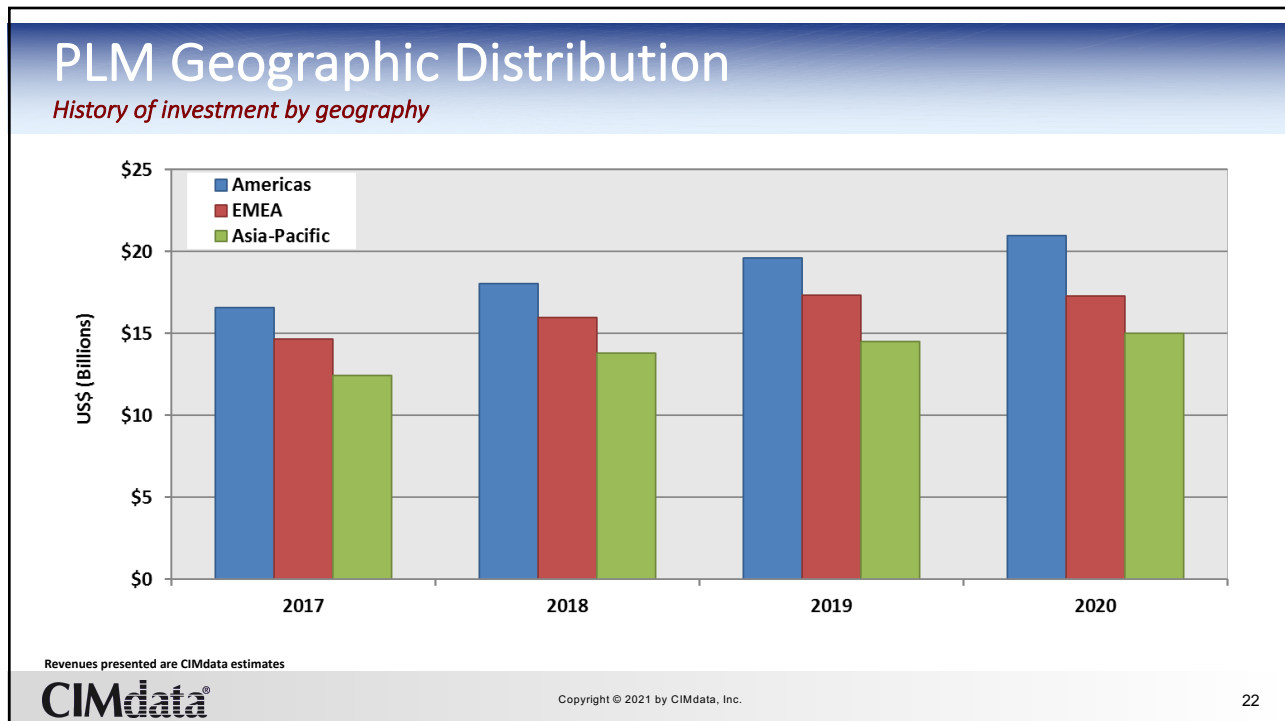
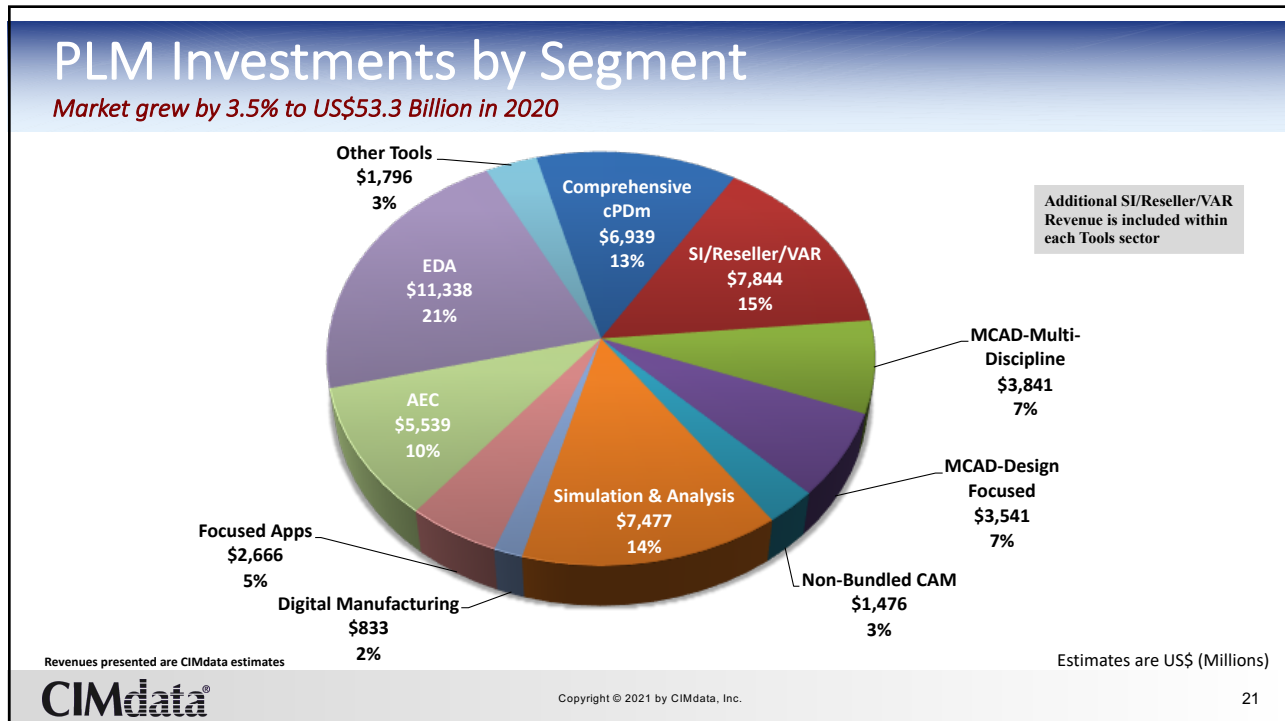
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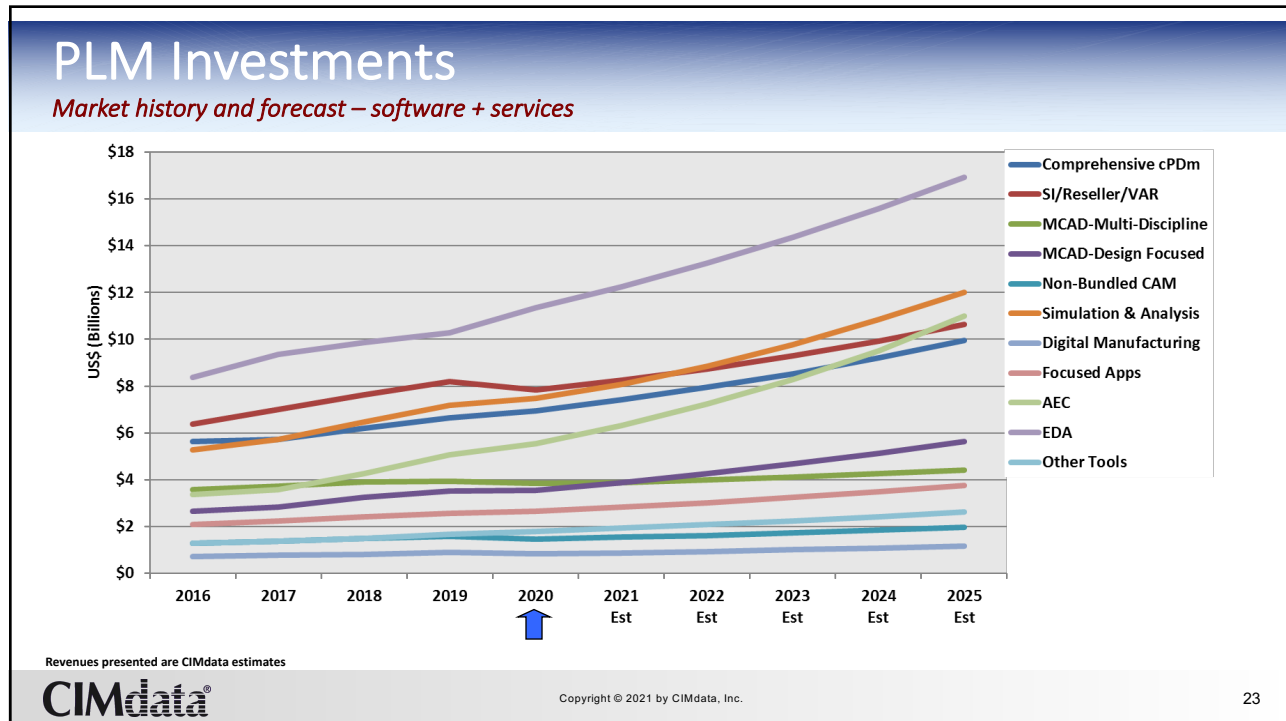
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### PLM Market in 2021

Big IT changes on-going, global economic growth stopped in its tracks by COVID-19

- What does 2020 mean for the coming years?
  - Will take some time for “business as usual” to return, at least in part
  - How fast will end use markets return to growth? Auto, A&D? Did not seem to matter in the Great Recession
- Still seems to be appetite for M&A
- CIMdata believes the market still has a lot of potential

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### Market Forecasts

For 2021 (US\$ Millions) and 5-year compound annual growth rate (CAGR)

Segment	2021 Estimate	YoY Growth	5 Year CAGR
cPDM Comprehensive Technology Providers	\$7,408.22	6.8%	7.5%
cPDM-Focused Applications	\$2,830.09	6.2%	7.1%
Digital Manufacturing	\$877.16	5.3%	6.8%
SI/Reseller/VAR	\$8,251.60	5.2%	6.3%
<b>Tools</b>			
MCAD-Multi Discipline	\$3,889.27	1.3%	2.8%
MCAD-Design Focused	\$3,877.68	9.5%	9.7%
Non-Bundled CAM	\$1,542.83	4.5%	5.8%
Simulation & Analysis	\$8,082.88	8.1%	10.0%
Other Tools (e.g., ALM)	\$1,936.35	7.8%	7.9%
EDA	\$12,245.26	8.0%	8.4%
AEC	\$6,325.56	14.2%	14.7%
<b>Total</b>	<b>\$57,266.90</b>	<b>7.5%</b>	<b>8.5%</b>



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### cPDm Segment of the PLM Market

*cPDm is a core element of a PLM environment*

- Managing intellectual assets
  - Management of product information and processes
    - Workflow, vaulting, content, document management
  - Visualization and collaboration
  - Product structure
  - Configuration and change management
  - Strategic product planning
  - Project and program management
  - Compliance and sourcing
  - Others

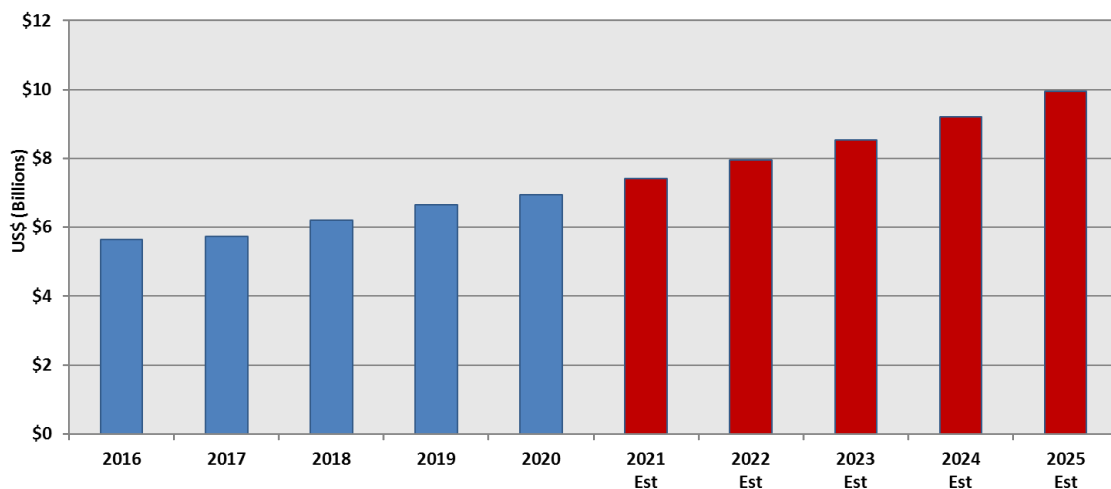


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### 2020 cPDm Revenue Distribution

*Total investment = software + services – Five year CAGR estimate = 7.5%*



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### Revenue Ratios – Software vs. Services

*Services is a major revenue area*

- Overall cPDM market: services are 29.3%
  - Driven by independent services providers
- Comprehensive cPDM providers
  - In 2020, Software was 70.7% vs. 29.3% for Services
  - In 2019, Software was 67.4% vs. 32.6% for Services
- Services ratio can change for several reasons
  - PLM solution providers developing products, packaging, and delivery bundles to reduce services
  - Cloud-based products often claim to require less services
  - Nature of services changing – more need for skills in advanced PLM topics vs. IT installation and integration

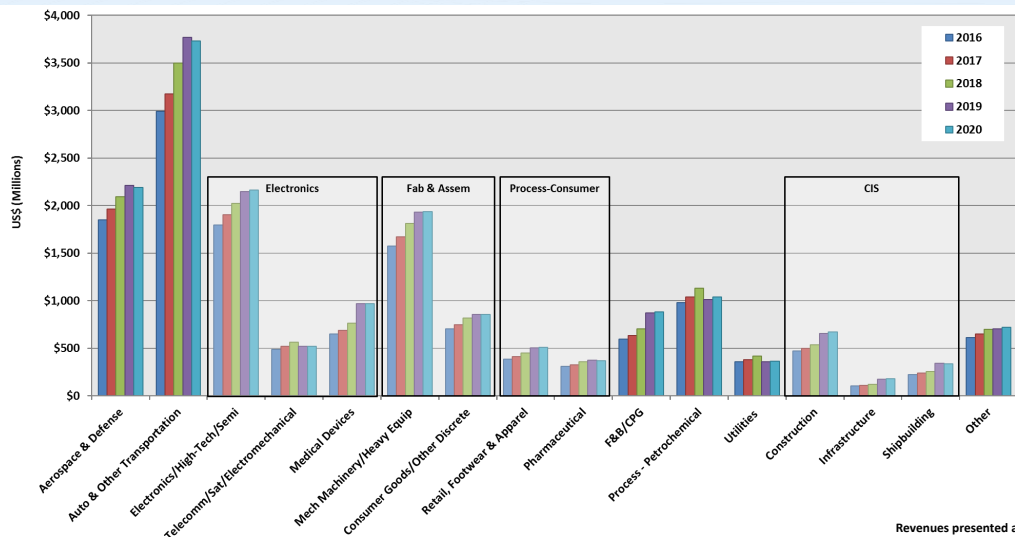


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### cPDM Investment

*Investments by industry*



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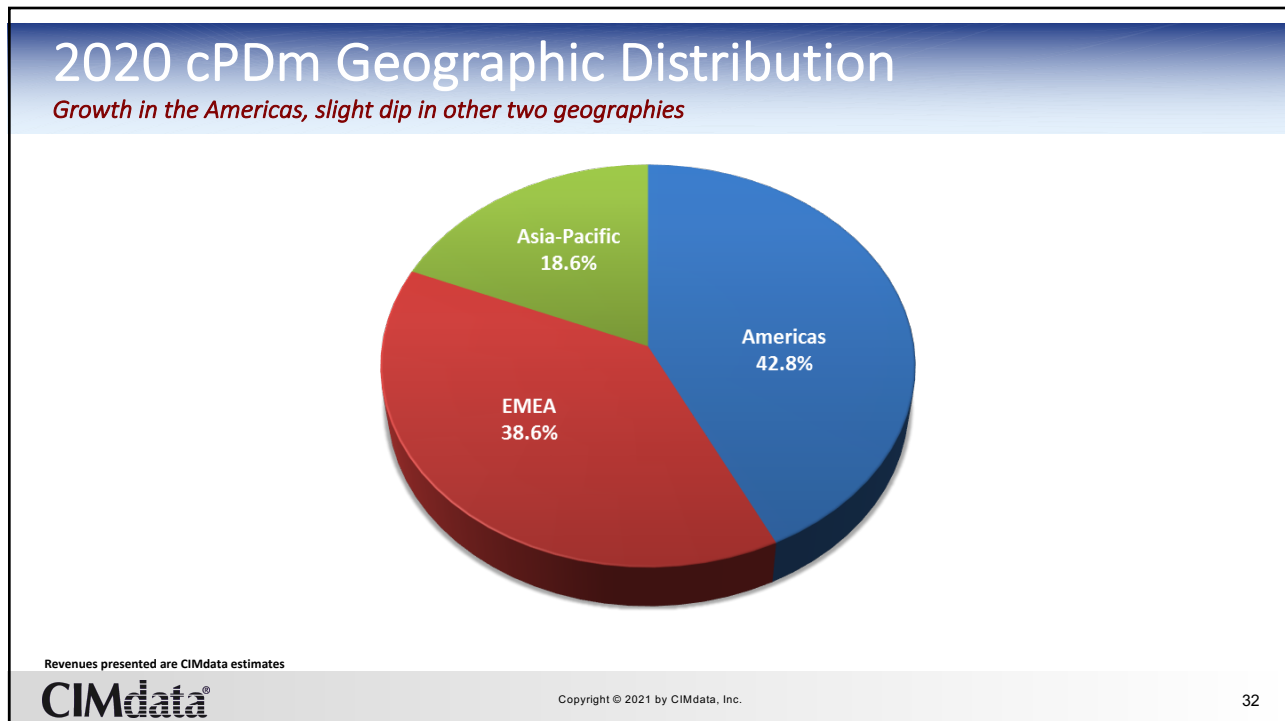
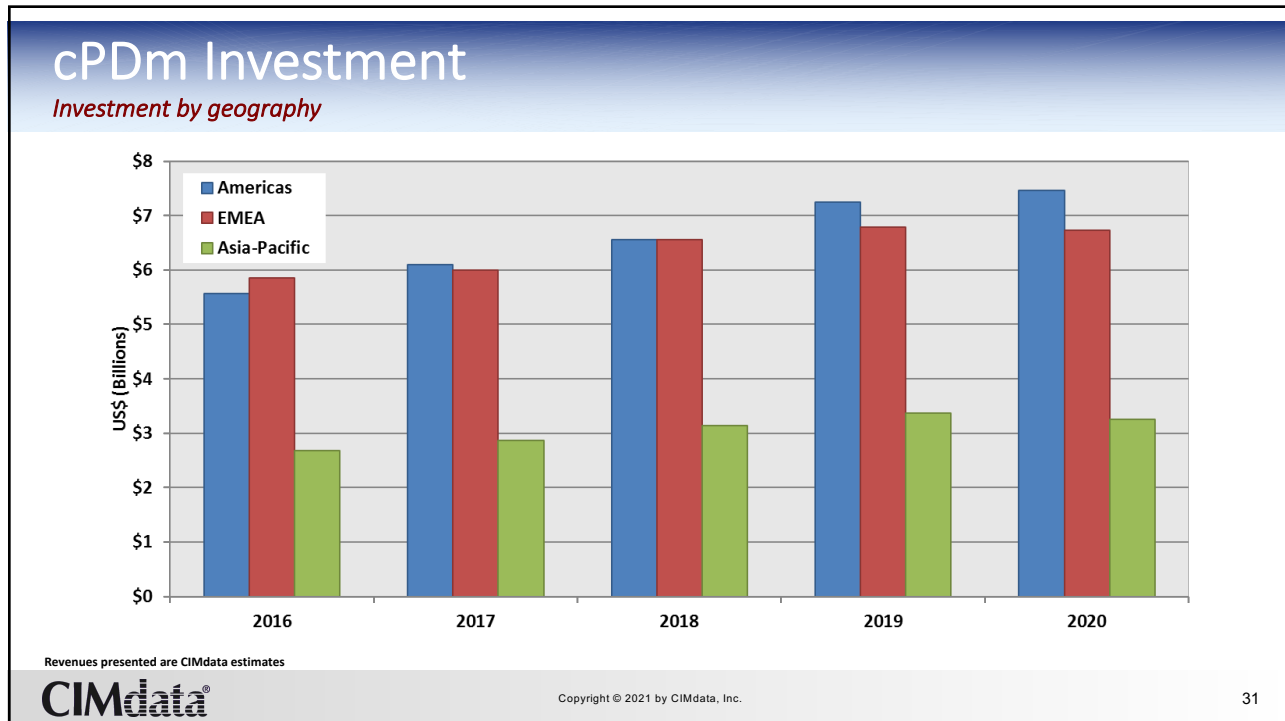


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### PLM Mindshare Leaders

*Who do people think about?*

- These companies are perceived as leading the market
  - Number, size, and scope of implementations
  - Technology and thought leadership
- All are comprehensive, lifecycle-focused providers
  - Some were leaders in the PDM market
  - Some also provide tools – primarily MCAD and S&A
- Are developing broad PLM platforms, and addressing new industries and geographies

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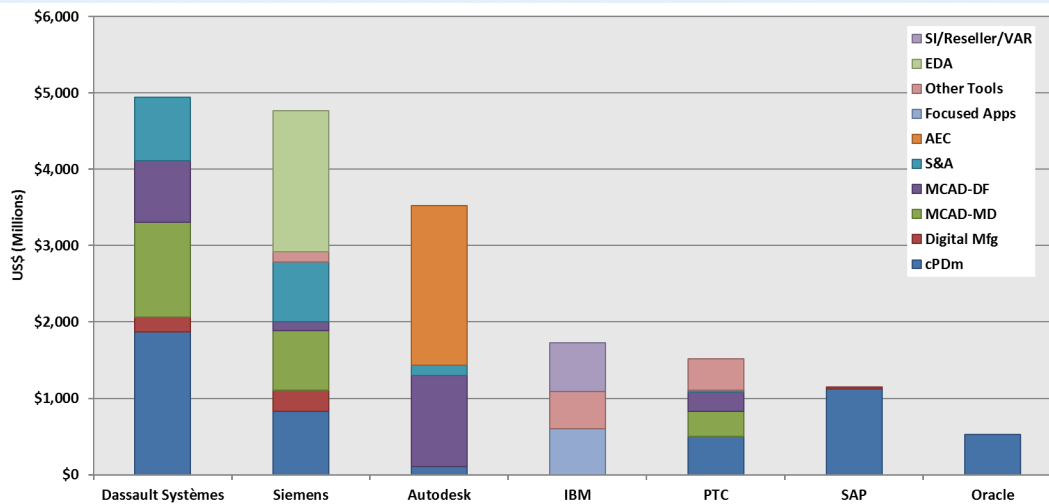
### Market Presence

*Evaluating a provider's impact in the marketplace*

- Market presence includes
  - A provider's direct revenues
  - Partner revenues built around a provider's products and technology
  - Does not double count royalties paid
- Represents a provider's overall footprint in the PLM market
- Grows with a provider's partnerships and alliances

### 2020 PLM Mindshare Leaders Revenue

*Leaders' direct revenues—led by providers of CAD tools*



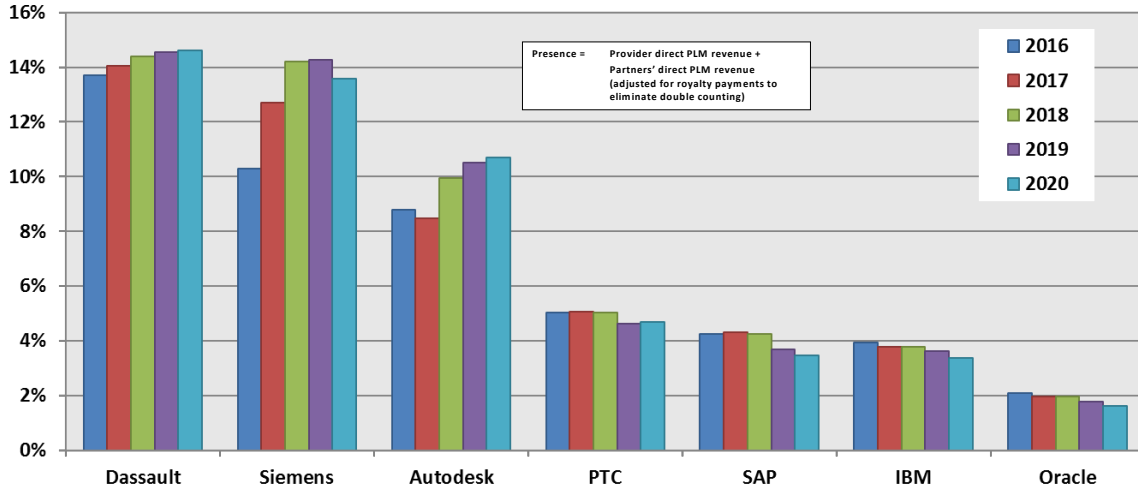
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### PLM Mindshare Leaders Market Share History

PLM mindshare leaders' five-year PLM market presence share trends



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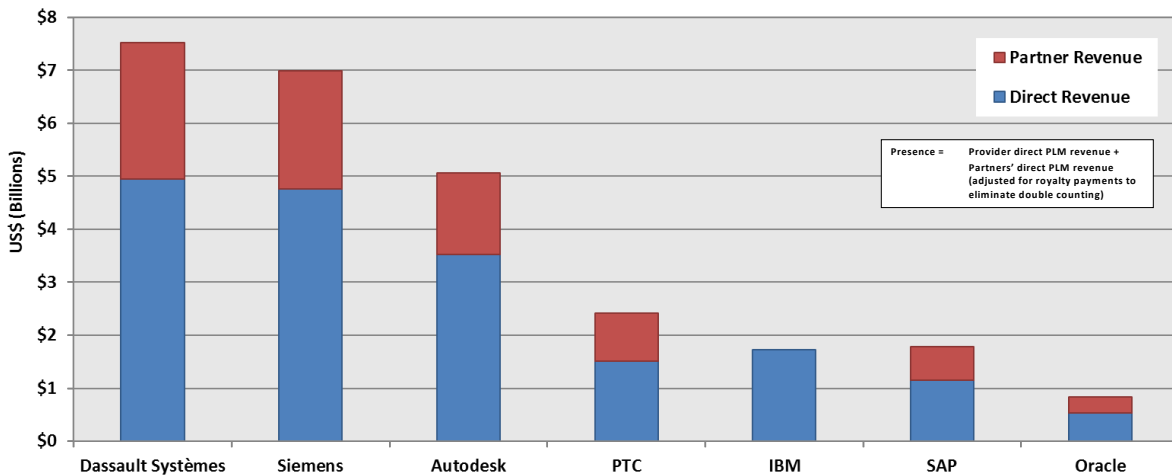


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### 2020 PLM Mindshare Leaders Presence

PLM leaders' footprints in industry—heavily leveraging partners



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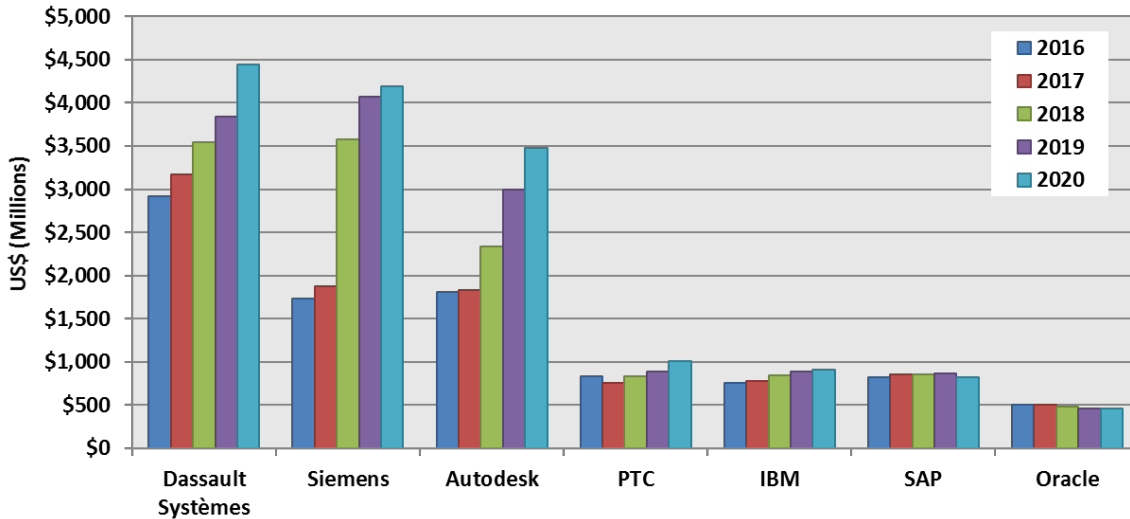
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### PLM Leaders Software History

Leaders' five-year PLM direct revenue trends – software only



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### Overall PLM Market Revenue Leaders

The market leaders are a diverse group

- Several are focused on specific technologies or industries
  - MDA, EDA, AEC, analysis, ...
- Some have multiple lines of business
- Some are partners of multiple other providers
- Many are not competitors
- Thirteen companies over \$1 billion in revenue
  - Two EDA
  - Five Comprehensive cPDM
  - Two SI/Reseller/VAR
  - Two S&A
  - One Focused cPDM
  - And Hexagon...

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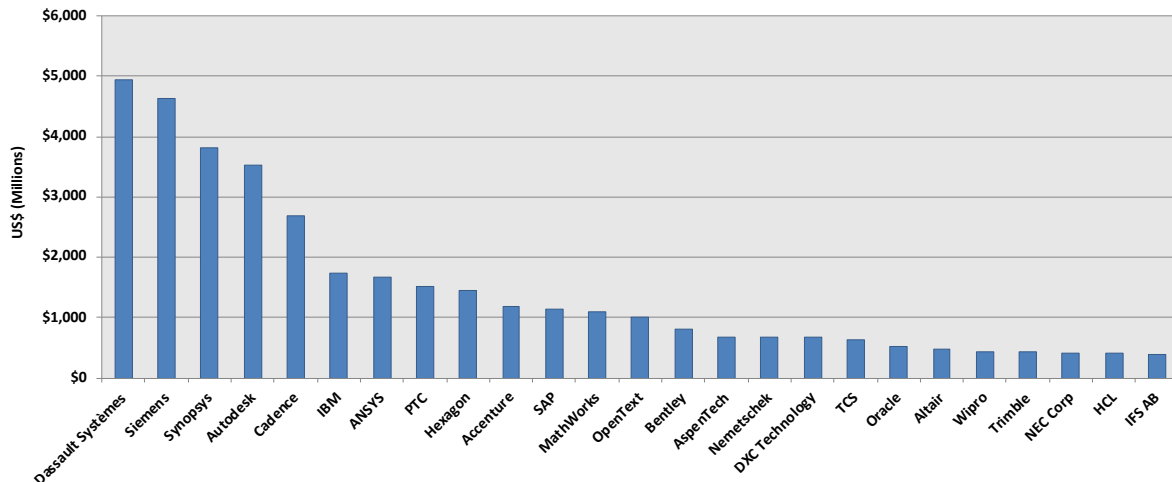
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### 2020 Overall PLM Revenue Leaders

*Many diverse companies generate PLM revenue*



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### Scope of Services Continues to Evolve

*As PLM solutions evolve, more and different services are needed—even more of a challenge now*

- PLM continues to interface, exchange information and processes with more and more business solutions
  - Expanding footprint, support for digital thread requires higher levels of integration
  - PLM expansion areas require deployment skills not normally available in-house – driving use of external expertise
  - Cloud – cloud-to-cloud, cloud to on-premise interconnection
  - IoT data will have to be analyzed, with results fed back to multiple systems
- Changes to software design, packaging, and delivery changing the types of services needed
  - Going beyond just implementation, IT integration
  - Helping customers to implement advanced topics/processes using a specific cPDM solution
  - Mobile access to multiple systems of record

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### Service Providers

*Services companies continue to increase PLM commitments*

- Systems integrators and consultancies continuing their PLM program expansion
  - Global firms
    - Accenture, Atos, Capgemini, IBM, T-Systems, CENIT, DXC Technology, Deloitte, Tata Technologies, TCS, HCL, Infosys, Wipro, Tech Mahindra,...
  - Regional/focused SIs continue expanding
    - NEC, Addnode, Samsung SDS,...
- These firms are developing solutions on top of solution provider technology
  - Adding their domain expertise
  - Industry and/or functional solutions
  - Selling through vendors or direct to industrial companies

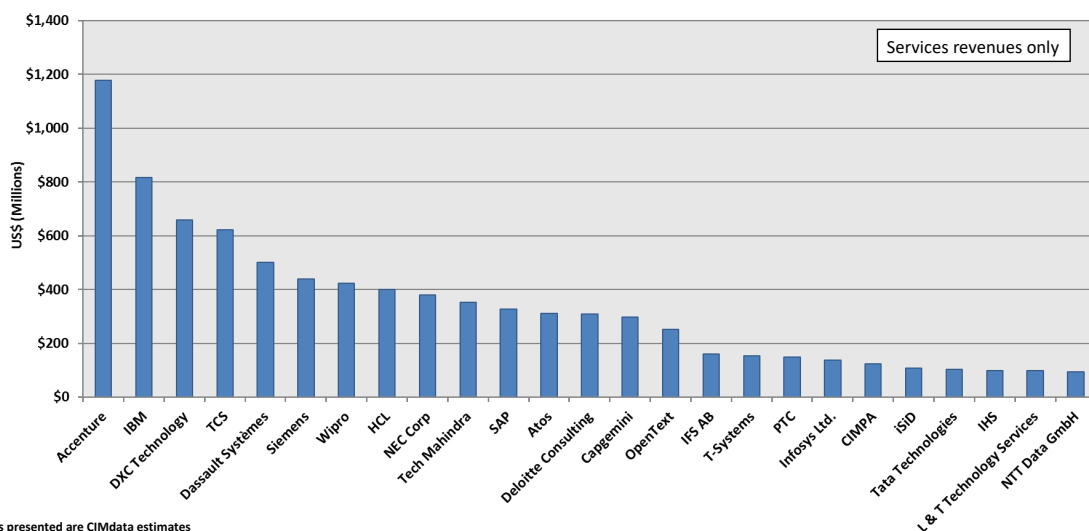


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### 2020 PLM Services Revenue Leaders

*Changes in the services organizations of leading PLM solution providers*



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### Focused Application Providers

*Expanding PLM through innovation*

- Focused providers help expand the PLM market
  - Target specific market segments
  - Create solutions that complement major providers' suites
  - Introduce new technology and working paradigms into the PLM environments
- Many create technologies and solutions that are acquired or embedded into the comprehensive providers' product suites
- Frequently become acquisition targets
  - E.g., Dassault Systèmes and Medidata, Honeywell and Sparta Systems
- Harder (or impossible) to continue to measure separately post-acquisition

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### cPDM Provider Analysis

*Review of cPDM provider revenue performance*

- cPDM sector had better than expected results
- Comprehensive segment dominated by “mindshare” leaders
  - Aras, Dassault Systèmes, Oracle, PTC, SAP, and Siemens PLM Software
- Other major providers
  - Autodesk, IBM, IFS, and Infor
  - NEC focused on Japan
- New providers continue to emerge
  - Continuing the expansion
  - Cloud-native (CassiniPLM, Ganister, OpenBOM, Upchain, etc.), some on cloud platforms (Propel PLM)
  - Local providers, i.e., China, Russia, etc.

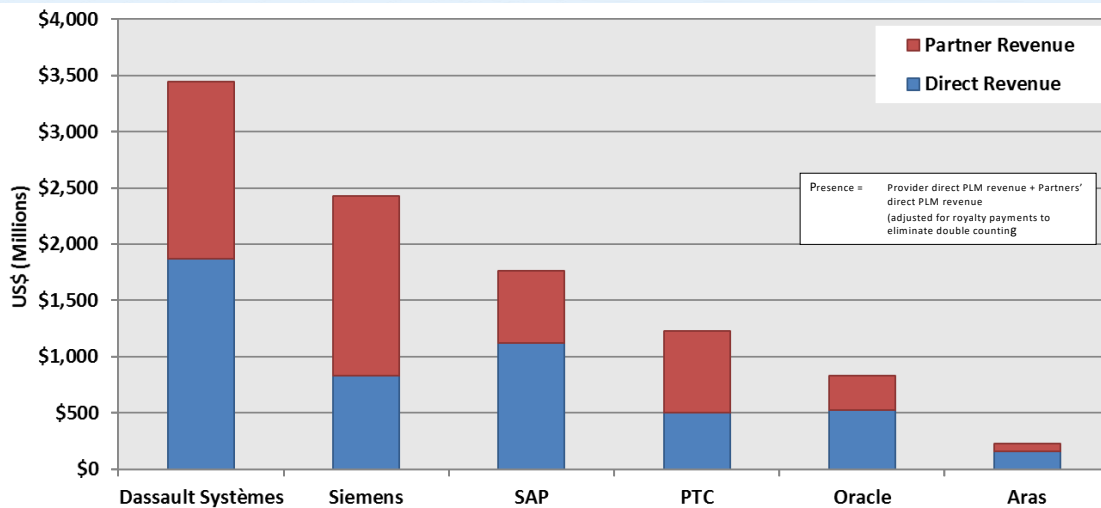
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### 2020 cPDM Leaders Market Presence

*Shows impact on cPDM market sector*



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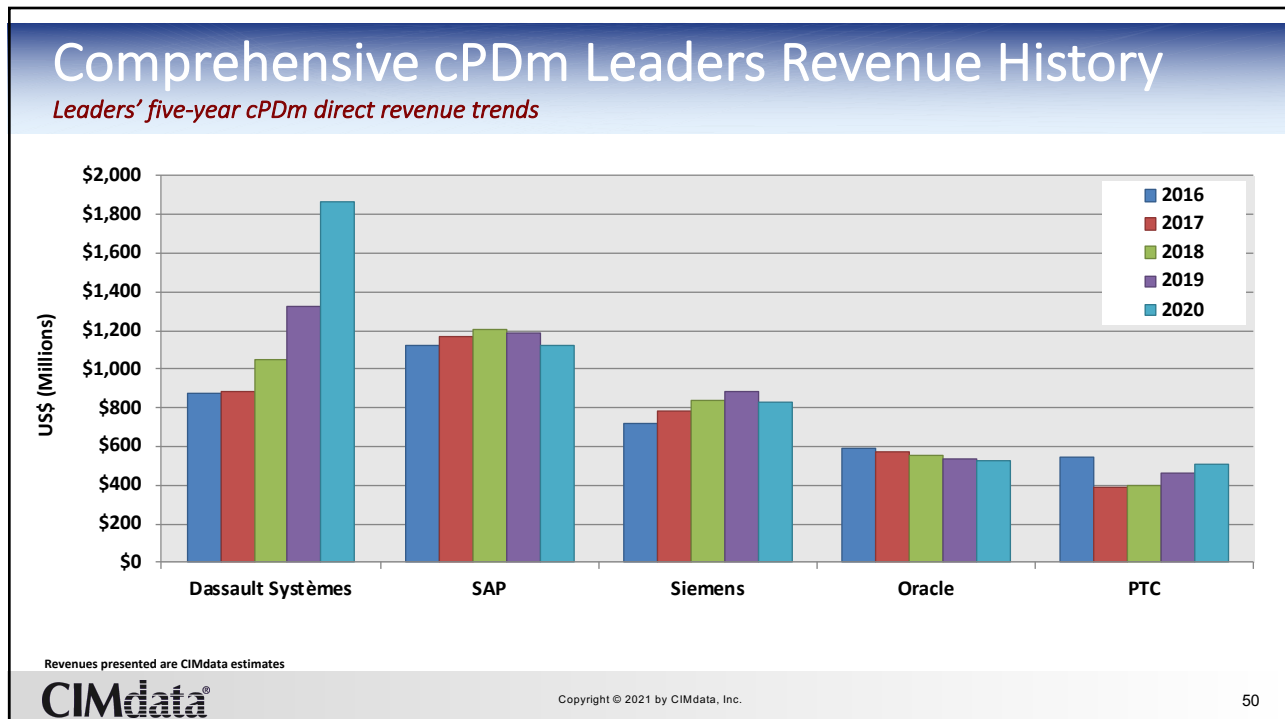
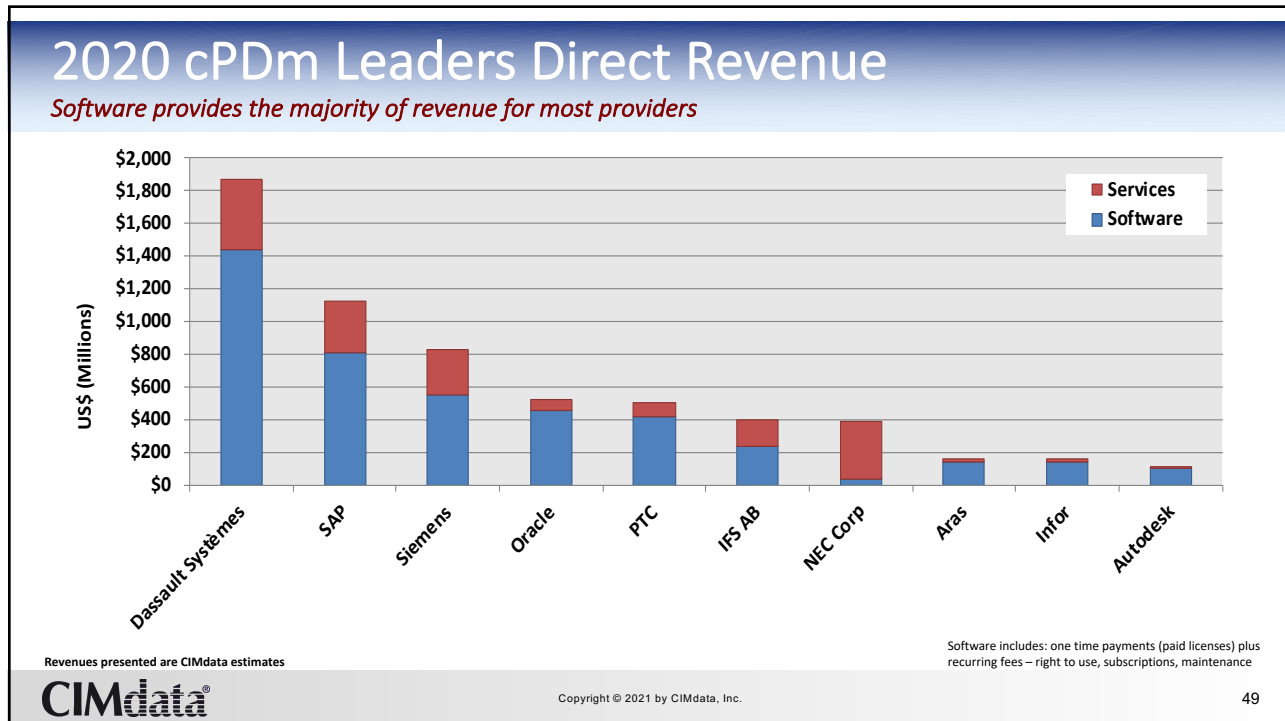
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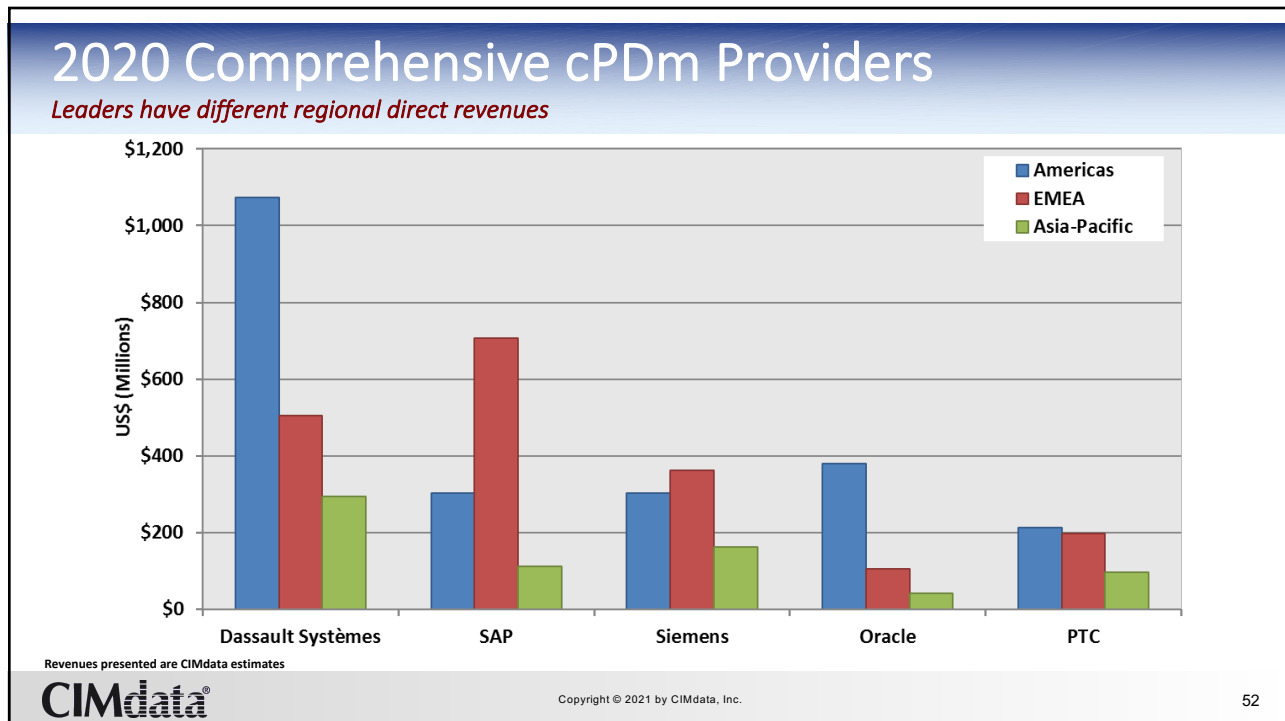
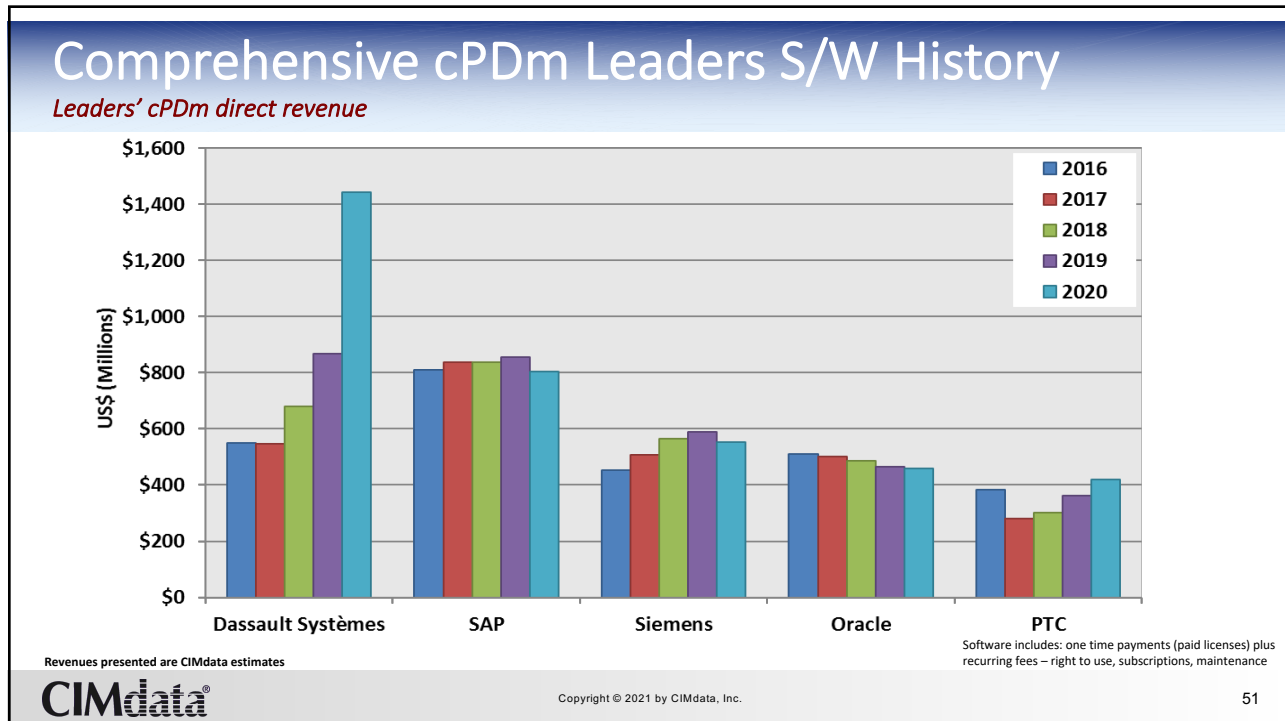
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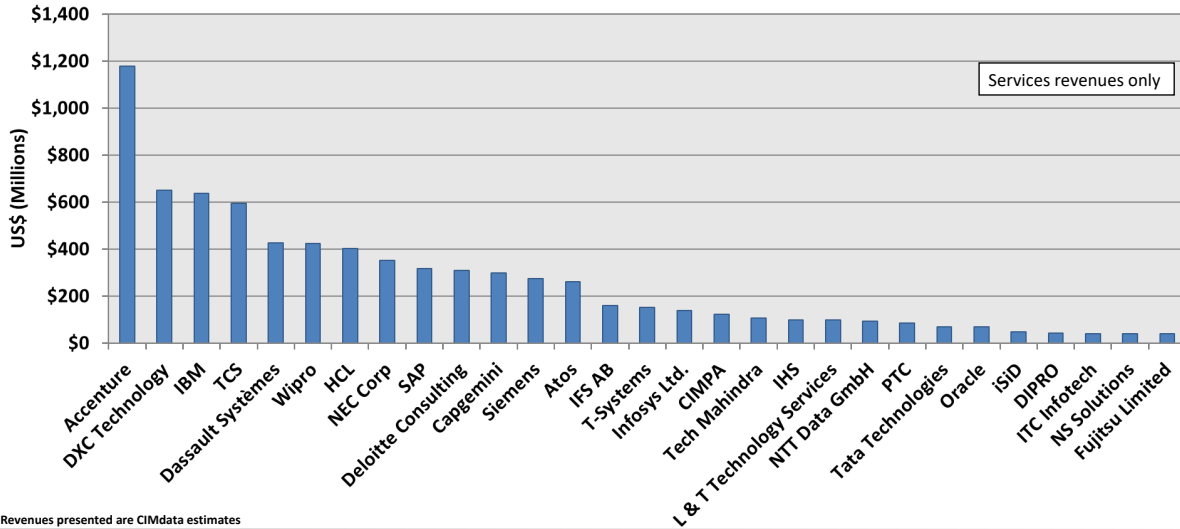


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### 2020 cPDM Overall Services Leaders

*Comprehensive providers have growing services organizations*



Revenues presented are CIMdata estimates

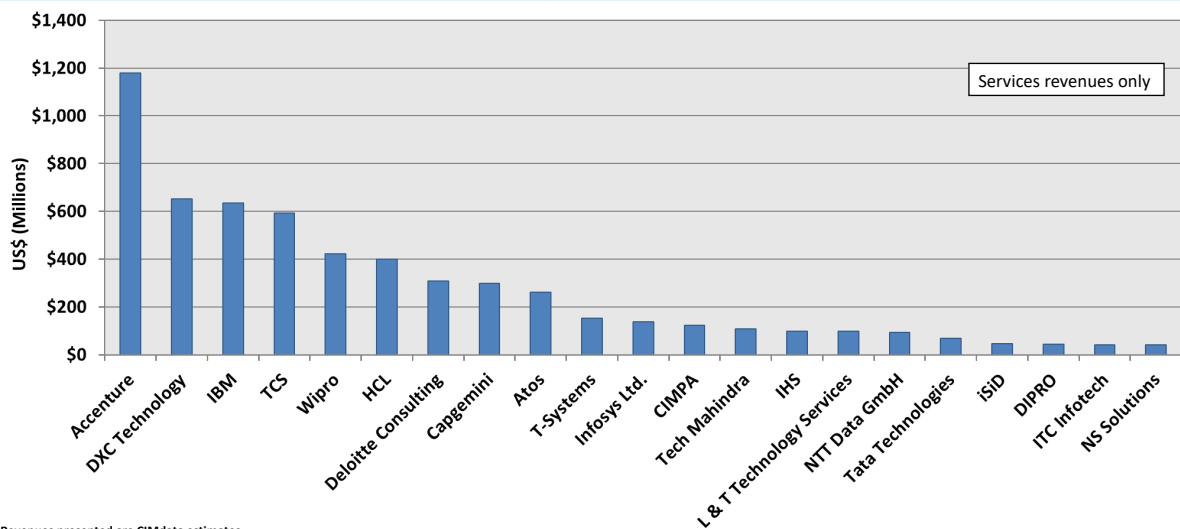


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### 2020 cPDM Independent Services Leaders

*cPDM independent services continue to grow*



Revenues presented are CIMdata estimates



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### Overall cPDm Providers

*Continuing evolution among the overall leaders*

- Leaders are from all cPDm segments
  - These providers do not always compete
  - Some partner on selected accounts
- Service providers continue to grow
  - Expect strong license growth in 2019 to lead to services growth in out years (eventually)
- Fourteen cPDm solution and service providers larger than \$400M in 2020, up one from 2019

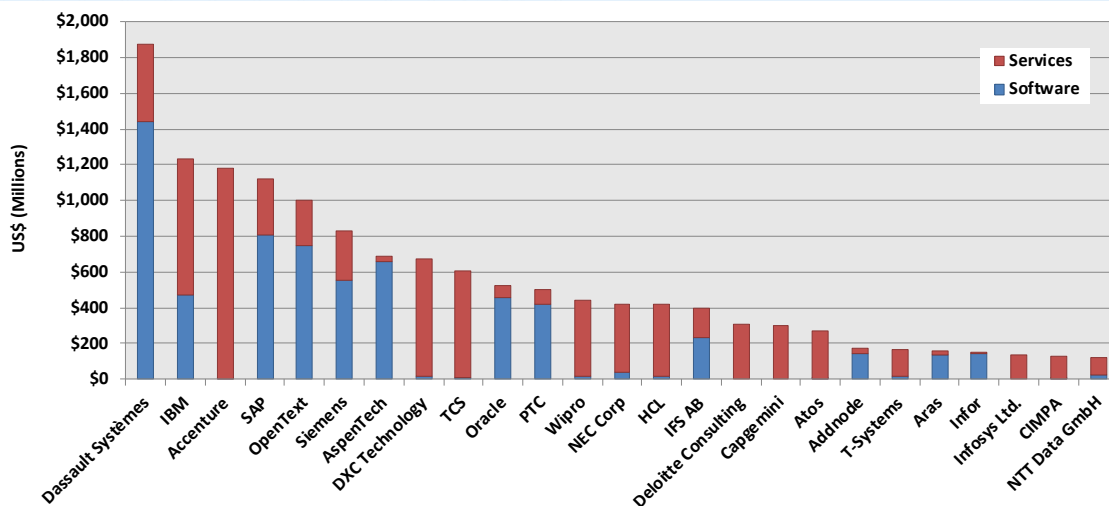


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### Overall 2020 cPDm Revenue Leaders

*Services are a major factor in overall revenue*



Revenues presented are CIMdata estimates

Software includes: one time payments (paid licenses) plus recurring fees – right to use, subscriptions, maintenance



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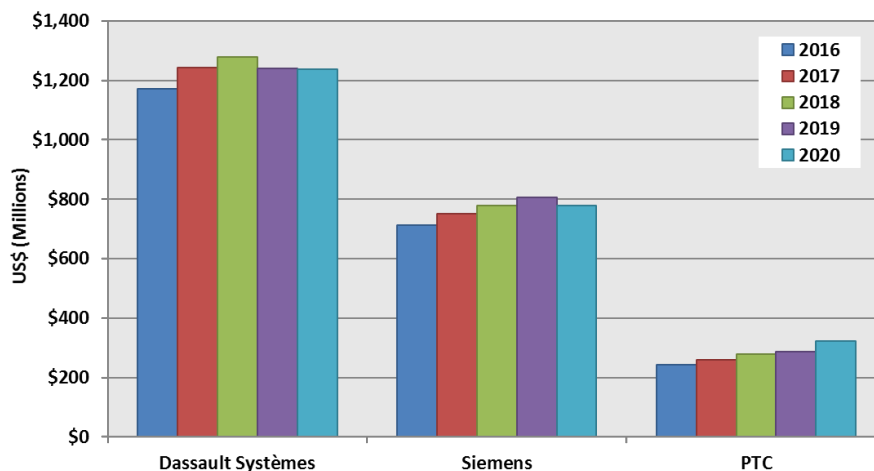
### Comments on Tool Segments

*Detailed charts will be included in the published deck*

Segment	Comments
MCAD-MD	Expect continued slow growth in this segment as auto and A&D hit hard by COVID-19 impacts
MCAD-DF	DF segment often affected by recession; results buoyed by Autodesk and PTC move to subscription; SOLIDWORKS a consistent performer absent a pandemic
CAM	Always hit by recession, will be slower to recover (e.g., machine tool sales down in 2018 and 2019)
S&A	Significant M&A activity in market leaders, trends driving growth will remain strong (smart connected product/Industry 4.0, need for more simulation on the left side of the Vee)
EDA	Only segment not to lower guidance after Q1 2020, strong year, same trends as S&A
AEC	Key to (re)defining the built world, expanding interest in discrete PLM issues; oil & gas affected by energy prices
Other Tools	Again, smart connected products driving investments; Atlassian up 39% in the middle of the pandemic

### MCAD Multi-Discipline

*Leaders revenue histories*



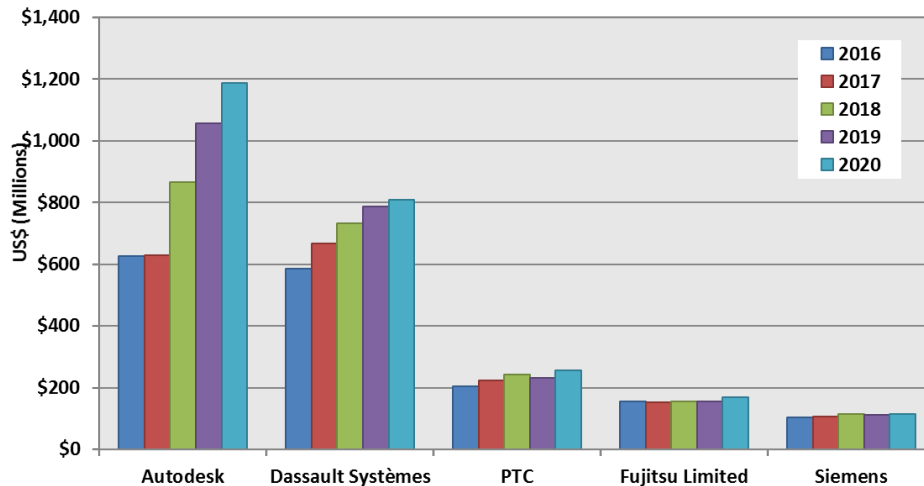
Revenues presented are CIMdata estimates

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### MCAD Design-Focused

*Leaders revenue histories*



Revenues presented are CIMdata estimates

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### Combining MCADs

*Does it make sense to separate MD and DF?*

- Since CIMdata began reporting “Tools” revenues in the MAR, we used two categories
  - Multi-Discipline (MD)
  - Design-Focused (DF)
- Made sense at the time
  - Different markets
  - Different capabilities
- Times have changed – is it time to change to reporting to MCAD?
  - DF solutions have expanded their capabilities
- Major providers said “it makes sense to combine them, but please report them both ways”

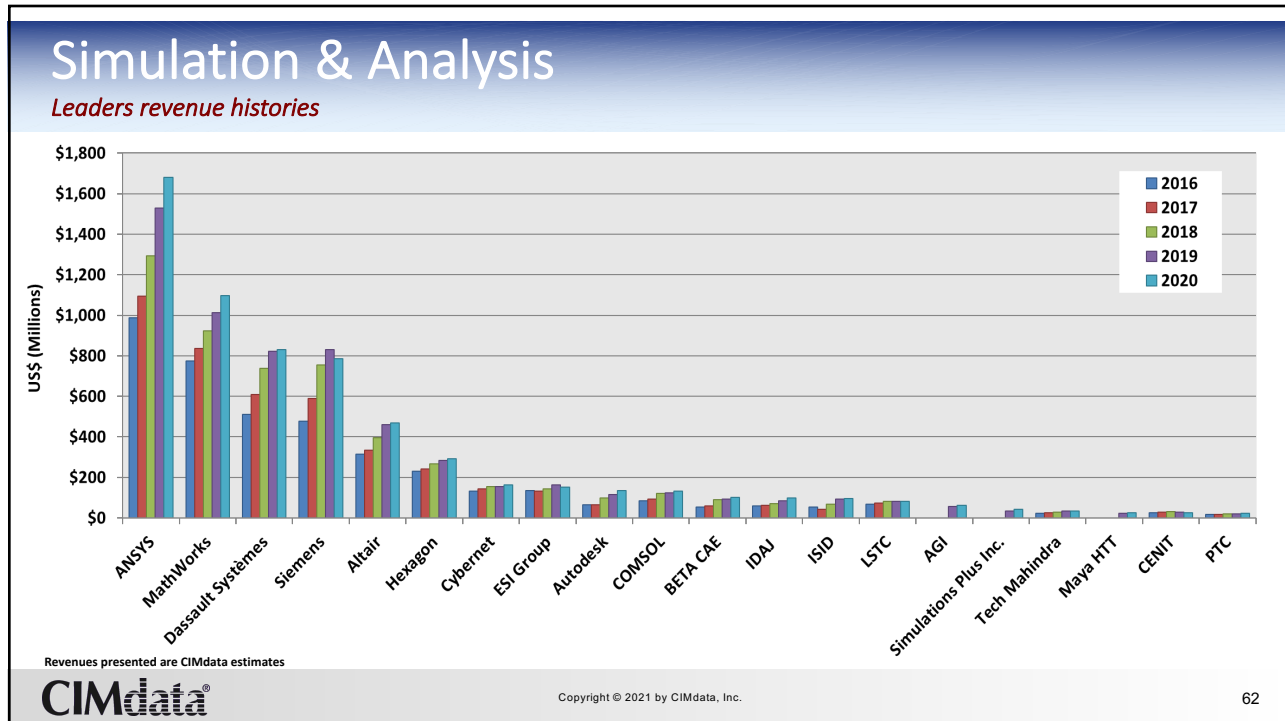
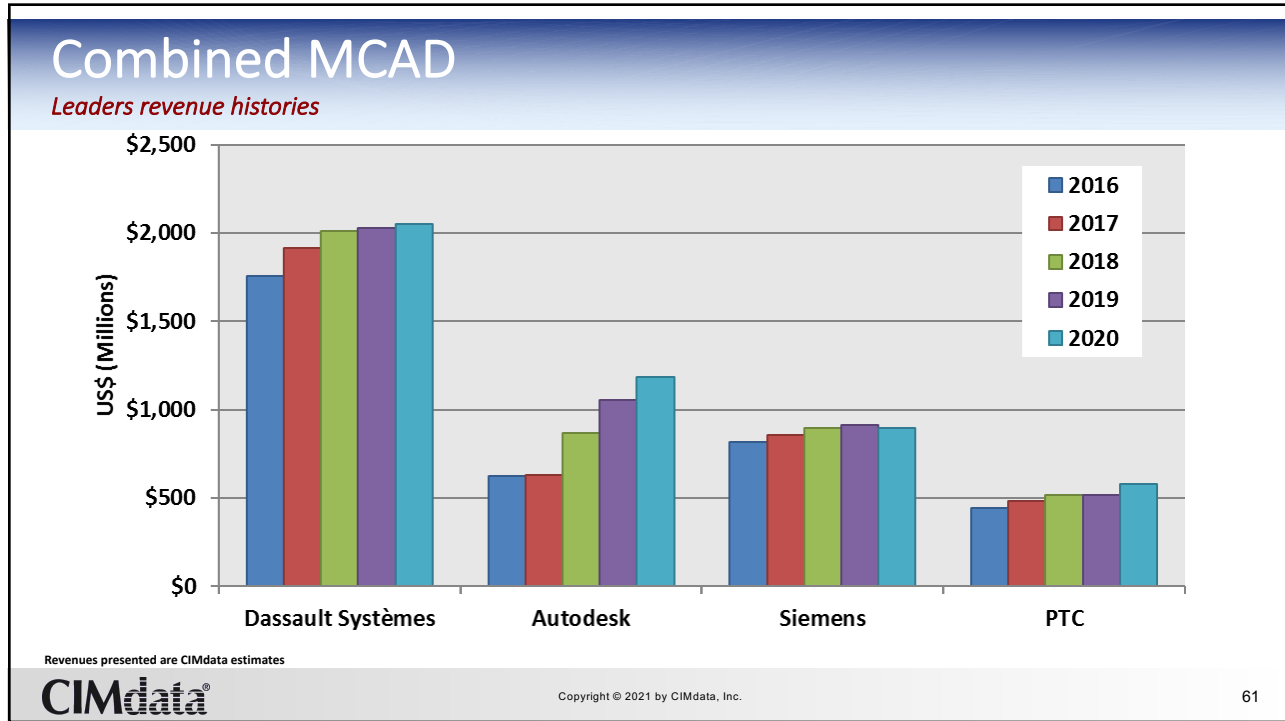
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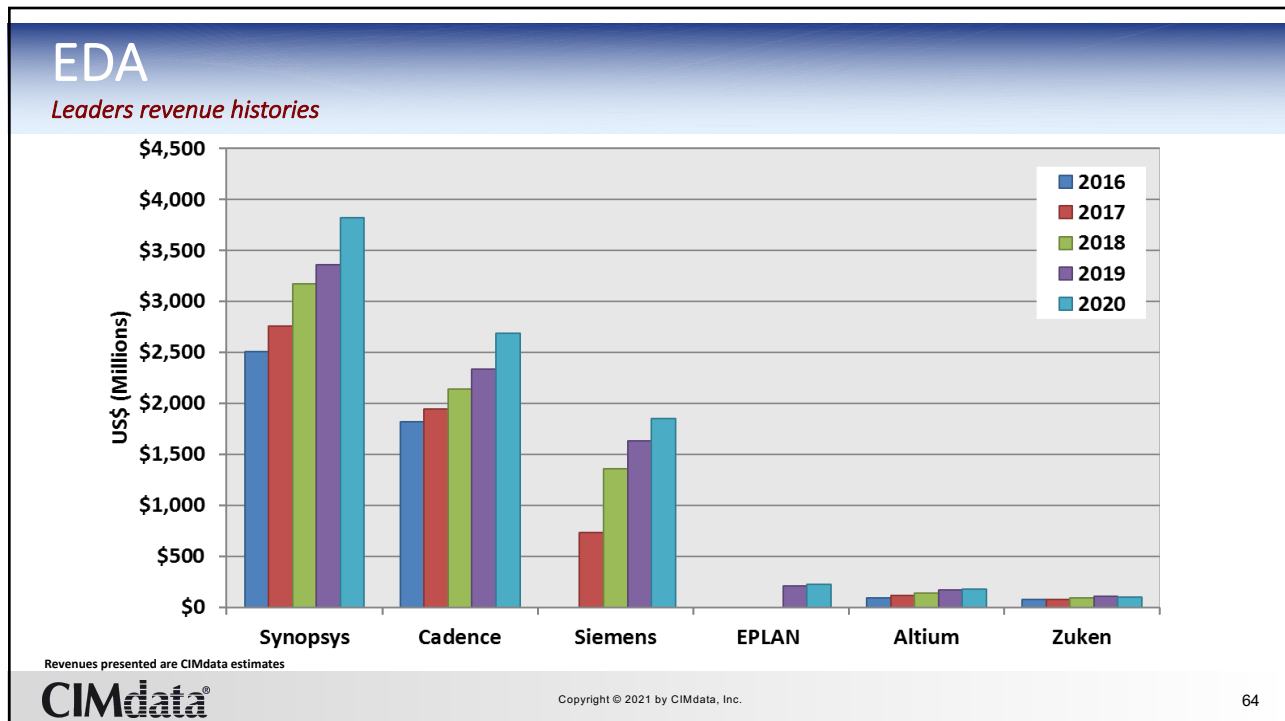
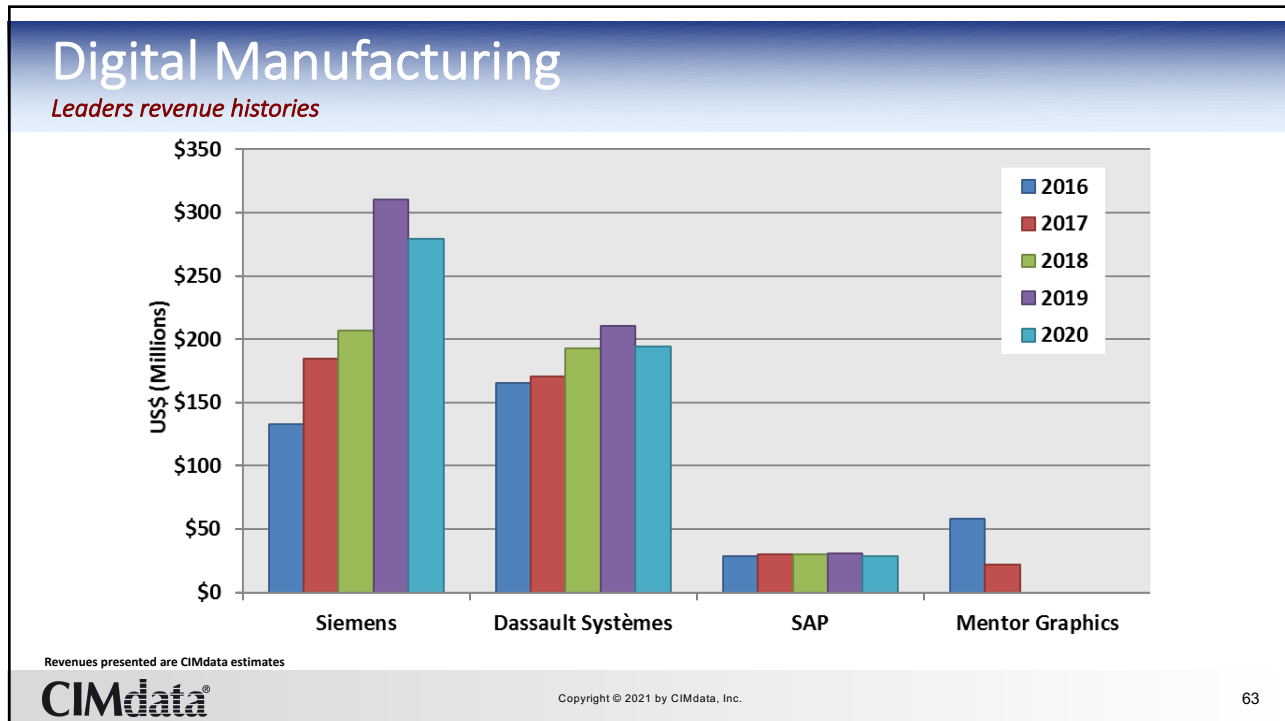
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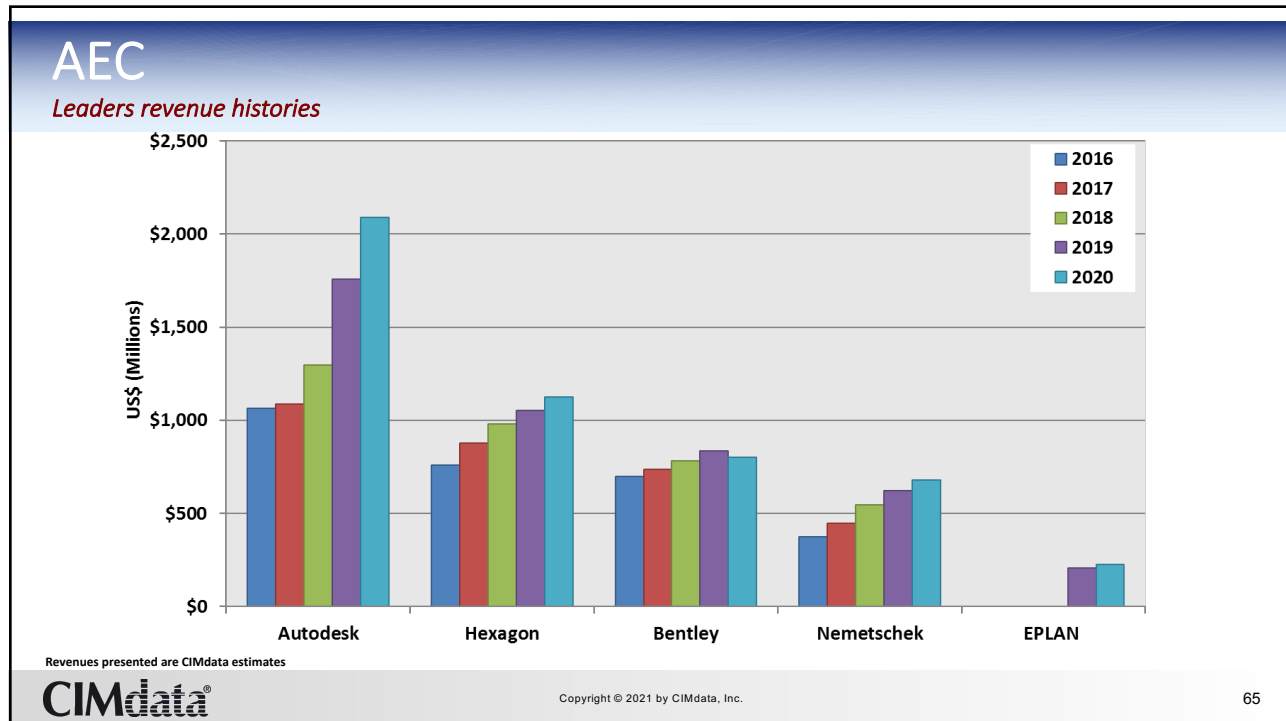
# 2021 Market Analysis Results

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### Agenda

2021 CIMdata PLM Market & Industry Forum

- PLM Market Analysis
- Overall cPDM Market Analysis
- PLM Provider Analysis
- Provider Sector Analysis
- Concluding Remarks

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# 2021 Market Analysis Results

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### Concluding Remarks

#### *Factors impacting the PLM Economy (1 of 2)*

- Higher than forecast, too pessimistic in the EDA and S&A segments
- COVID-19 impacted most segments, some in a big way
- Subscription can back stop declines, assuming no defections
- Simulation and systems engineering still key
- Mergers and acquisitions will continue to play a role
  - Providers look to fill out their portfolios
  - An important part of the platformization trend
  - A lot of activity in the SI/Reseller/VAR space

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### Concluding Remarks

#### *Factors impacting the PLM Economy (2 of 2)*

- Cloud interest and action increasing, at a tipping point?
- Services continued shrinking as a percentage of the cPDM market
  - Big impact of COVID-19 on services delivery
  - Packaged solutions changing services requirements
  - Cloud is contributing to the change
  - Changes in types of services needed
  - Digital thread and digital twin bring new requirements
  - More consolidation to come?
  - Seems to have created a new normal in service delivery
- PLM refresh programs will continue, as suggested in recent CIMdata research

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### The CIMdata PLM Market Analysis Report

*Major PLM Foresight deliverables, a growing MAR series*



- CIMdata PLM Market Analysis Report
  - CIMdata Executive PLM Market Report
  - CIMdata PLM Industry Review and Trends Report
  - CIMdata PLM Market and Solution Provider Analysis Report
  - CIMdata PLM Market Geographic Analysis Report
  - CIMdata PLM Market Industry Analysis Report
- Country reports for the Brazil, China, Germany, India, Japan, Russia, South Korea, Italy, United Kingdom, France, and the United States
- CAM MAR (29<sup>th</sup> year)
- Simulation & Analysis (S&A) MAR

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