PLM Upgrade Study

Deferred PLM Modernization Delays Time to Value

CIMdata® | Global Leaders in PLM Consulting
www.CIMdata.com

Courtesy of Aras

Takeaways

What you need to remember

Takeaway 1
CIMdata's experience gained over the years has identified that staying current on modern PLM-enabling technology is difficult but necessary to maximize return on investment.

Takeaway 2
Maintaining a current, modern, well-architected solution is critical to addressing unforeseen requirements long into the future. This happens when the platform (the Product Innovation Platform) is architected for flexibility and is kept current.

Takeaway 3
Customizations are often an inhibitor to upgrading PLM solutions.

Takeaway 4
Aras' PLM platform customers (i.e., those that participated in the survey) stated that they are able to upgrade significantly faster, more easily, and at less cost than survey respondents who had competitive PLM products.

The study reported in this eBook was sponsored by the Aras Corporation

CIMdata®

Introduction

Digitalization requires modern software solutions and strategy

Digital transformation is a popular topic, and CIMdata has written much about it. While many still wonder whether digital transformation is real or just the latest buzzword, many industrial companies are taking its promise very seriously.

While it is clear to all within the PLM community that PLM is foundational to a meaningful digitalization program (or digital transformation strategy), this truth is not always understood by senior leadership within companies. While CIMdata believes that the level of investment in digital transformation is appropriate, based on our research and experience we find that executive awareness of the dependency of digital transformation on PLM is lacking. This lack of understanding of its association to PLM-related investment, sustainability and impacts on business performance and benefits puts many digital transformation programs at risk of becoming yet another program of the month.

The survey results presented in this eBook illustrate how often and quickly PLM solutions owned and operated by the survey participants have been upgraded, what they believe slows upgrades, and their upgrade costs.

Digitalization: the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business—Gartner

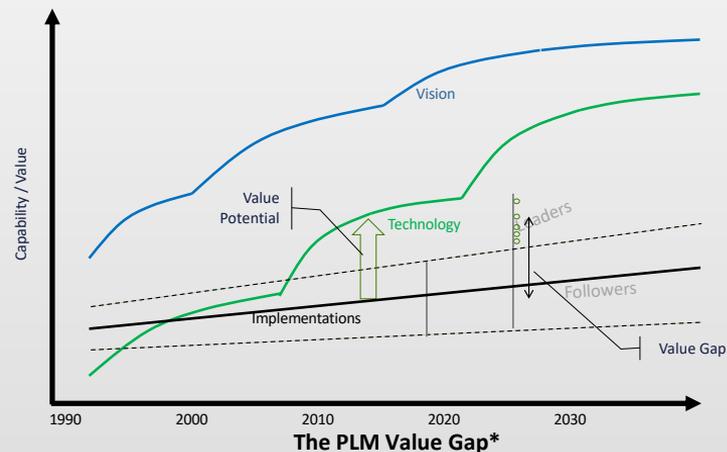**CIM**data®

The PLM Value Gap

Digital transformation is needed to close it

To close the value gap companies must transform their businesses to be more flexible and respond faster to changes in their markets and their customer's requirements—delivering sophisticated products and services in a more innovative manner. They must create and participate in flexible value networks with their trusted partners and suppliers—for both material and components, as well as development, production, and service technologies and applications. And they must be more efficient—using tools and processes that provide their staff and their organizations with more productivity and flexibility while removing non-value-added activities.

Achieving these goals requires a digital transformation—one that applies digital technologies in new ways. This is more than just digitizing documents and other information. It is a new method of working—leveraging digital technologies and applications to transform how the company operates and how it manages and leverages its product information. CIMdata's research has shown that a value gap exists between companies that are leading adopters of digital technology and solutions, e.g., Product Lifecycle Management (PLM), and driving digital transformation, versus those that are followers.

- **Leaders**—Companies that have broad visions of how information and digital technology can help their business. These companies put in place initiatives that continually review and expand their technology environments and solutions and update their processes—driving continuous improvement and the digital transformation needed for success.
- **Followers**—Companies that have narrow visions, i.e., don't take an enterprise view of what digital technologies can do for them. They are slower to adopt (or only adopt in selected departments and processes) and deploy these new technologies and solutions. They don't sustain their investment—gaining some benefits but not driving their overall business—and fail to keep up with ongoing technological evolution.

This difference in adoption scope and rate creates a value gap in technology use and capabilities between the leaders and the followers. Leaders aggressively digitally transform their businesses, on a continuous basis, to better create the products and services their customers demand, while the followers lose ground and try to catch up. Because of their strategy and commitment, Leaders continue to expand the value gap while Followers fall further behind—at some point they will have to invest significantly to close the value gap or continue to become less competitive.

The PLM Value Gap*

* Source: https://www.cimdata.com/en/resources/complimentary-reports-research/white-papers *(Note: scroll down to 2013)*
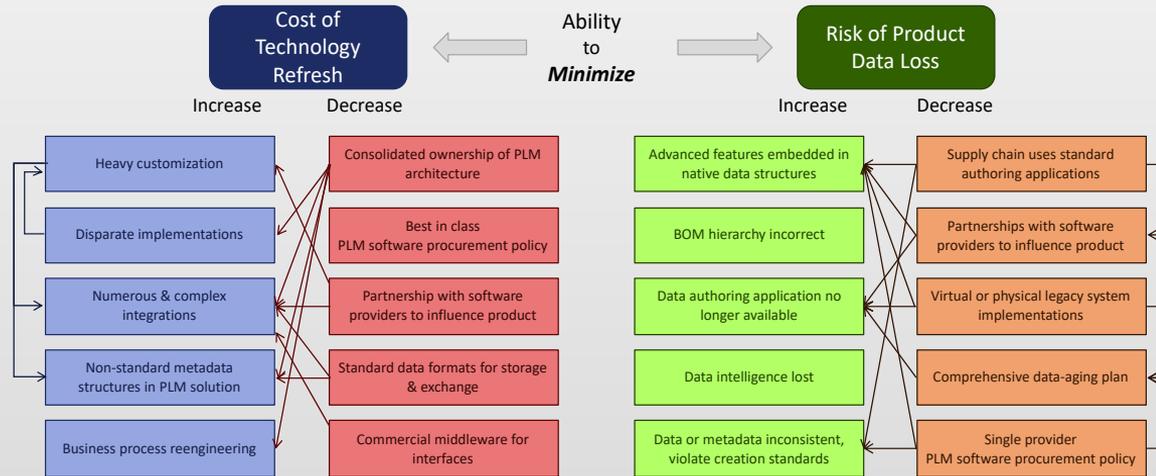
CIMdata®

PLM Obsolescence

Customization of PLM adds to technology refresh costs

The value gap research led to the formation of the CIMdata administered A&D PLM Action Group, which, among other things, performs research for its members. Several projects were executed on the topic PLM Obsolescence, which led to the model illustrated below.

This research on obsolescence identified areas that increased the cost of technology refresh and found that heavy customization was at the top of the list. This aligns with CIMdata's experience in the field and is why companies strive to be more out-of-the-box with their PLM implementations. CIMdata's

view is that customization can add significant value to a PLM implementation, but it needs to be either business or cost justified and deliver an appropriate return on investment over the long-term (i.e., even through subsequent solution upgrades).

CIMdata's Obsolescence Model

Cost of Technology Refresh		Ability to **Minimize**	Risk of Product Data Loss	
Increase	Decrease		Increase	Decrease
Heavy customization	Consolidated ownership of PLM architecture		Advanced features embedded in native data structures	Supply chain uses standard authoring applications
Disparate implementations	Best in class PLM software procurement policy		BOM hierarchy incorrect	Partnerships with software providers to influence product
Numerous & complex integrations	Partnership with software providers to influence product		Data authoring application no longer available	Virtual or physical legacy system implementations
Non-standard metadata structures in PLM solution	Standard data formats for storage & exchange		Data intelligence lost	Comprehensive data-aging plan
Business process reengineering	Commercial middleware for interfaces		Data or metadata inconsistent, violate creation standards	Single provider PLM software procurement policy

Courtesy of A&D PLM Action Group Research

CIMdata®

PLM Investment Sustainability

A multi-dimension problem

Related to the obsolescence research, CIMdata developed a PLM investment sustainability model that identifies 17 characteristics that can be used to measure PLM solution sustainability. A sustainable PLM solution (or platform) is one that can meet current and future business requirements with an acceptable return on investment (ROI) via incremental enhancements and upgrades. The dimensions of the model are shown in the figure.

The results of these research projects led CIMdata to this current study on upgrades, which was sponsored by Aras. Both CIMdata and Aras wanted to understand how often companies upgraded their PLM solutions, how long it took, what it cost, and what was inhibiting upgrades.

CIMdata's PLM Investment Sustainability Model

17 Dimensions of CIMdata's PLM Investment Sustainability Model

CIMdata®

Study Description

CIMdata's PLM Upgrade Study

There are myriad things that need to be done to support a digital transformation, both strategic and tactical. The value gap research showed that leaders upgraded more often than followers, so CIMdata and Aras were interested in quantifying how often companies upgraded and how customization affected the ability to upgrade. Since a PLM solution (or Product Innovation Platform) needs to underly a manufacturing organization's digital transformation, ensuring it stays current is critical. This project examined the upgrade frequency, cost, and issues that inhibit upgrades.

CIMdata conducted this survey on Deferred PLM Modernization in early 2021. We used our extensive global mailing list, a rented list, and promoted through our social channels including LinkedIn and Twitter. It resulted in 85 vetted responses, representing 120 unique PLM solution implementations. The responses were reviewed to ensure data quality. The result was a list of PLM implementations at small to large companies representing various industries, solutions, and geographic regions. Finally, for purposes of this study, we focused on the solution providers that had double digit responses; Aras, Dassault Systèmes, PTC, and Siemens Digital Industries Software (Siemens).

These PLM solution providers directly compete in the major industries that comprise discrete manufacturing including Aerospace & Defense, Automotive & Other Transportation, Machinery & Heavy Equipment, Medical Devices, and several others and are members of CIMdata's PLM Mindshare Leaders group.

CIMdata®

Response Demographics

Characterizing respondent companies

The respondents included engineers, managers, directors, vice-presidents, and C-level executives. Over 50% of the respondents were managers and directors. This represents a good mix of people who should know the answers to the questions posed in the survey.
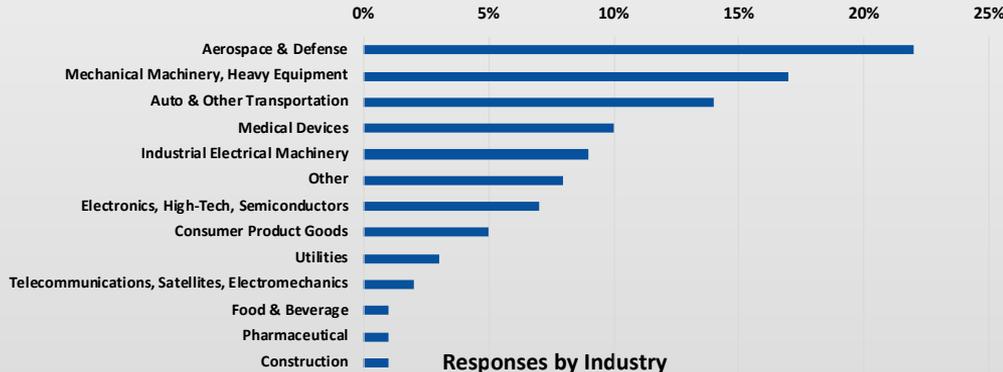
The headquarter locations of the respondents was skewed towards North America, when compared to the global PLM revenue splits reported by CIMdata of 40% Americas, 40% EMEA, and 20% A-P, but we don't believe that is especially relevant to the upgrade related questions.

We collected data on company annual revenue, with about 35% being under $1B per year, 22% between $1-5B, and just over 40% greater than $5B. This is a good mix of company sizes.
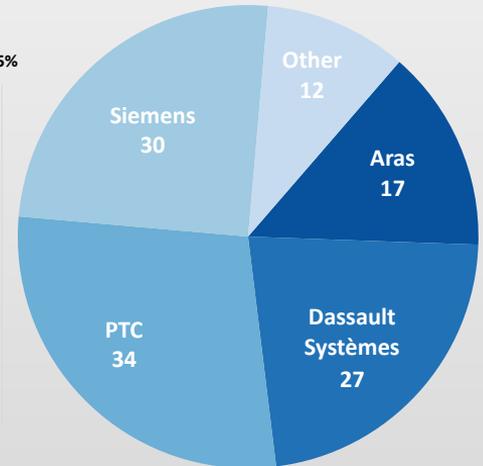
The survey was heavy on traditional PLM user industries: Aerospace and Defense, Mechanical Machinery & Heavy Equipment, Auto & Other Transportation, and Medical Devices.

As shown in the chart, a good mix of users of the mindshare leaders' products responded and some other solution providers were mentioned, but there were not enough to break out, so we

combined them into an "Other" category. Interestingly, we did have a handful of Cloud-only solutions. Overall, we received a solid number of complete responses for analysis purposes.

Number of Responses for Each PLM Solution Provider

Pie chart: Other 12, Aras 17, Dassault Systèmes 27, PTC 34, Siemens 30

Responses by Industry

Bar chart (0% to 25%):
- Aerospace & Defense
- Mechanical Machinery, Heavy Equipment
- Auto & Other Transportation
- Medical Devices
- Industrial Electrical Machinery
- Other
- Electronics, High-Tech, Semiconductors
- Consumer Product Goods
- Utilities
- Telecommunications, Satellites, Electromechanics
- Food & Beverage
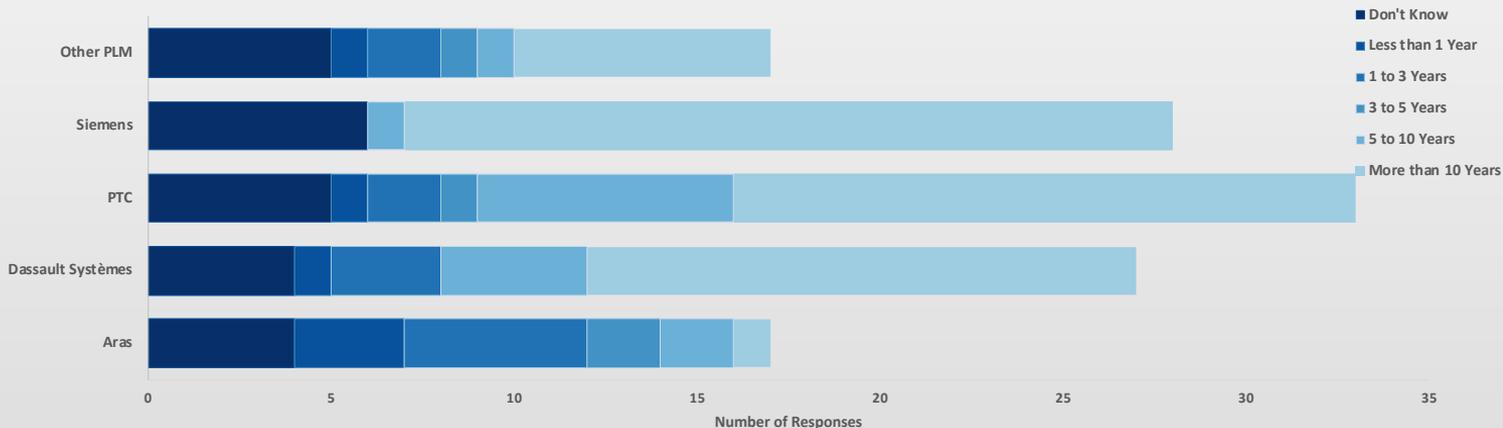- Pharmaceutical
- Construction

CIMdata®

PLM Solution Longevity

Length of time solutions have been in service

To round out the demographics, we asked how long the respondents have had their solutions in place. The majority of Aras solutions were in place 5 years or fewer while the other mindshare leaders, Dassault Systèmes, PTC, and Siemens had a lot of respondents with solutions in place for 10 years or more. It should be noted that those solution providers have been in the market longer than Aras and have larger market shares.

Years that A Current PLM Solution Has Been in Place

Legend:
- Don't Know
- Less than 1 Year
- 1 to 3 Years
- 3 to 5 Years
- 5 to 10 Years
- More than 10 Years

X-axis: Number of Responses (0, 5, 10, 15, 20, 25, 30, 35)

Categories: Other PLM, Siemens, PTC, Dassault Systèmes, Aras

CIMdata®

Timing of Last Upgrade

Large variations across respondents

While there was a large spread across the respondents, Aras respondents had upgraded more recently, and we found that 47% had upgraded within the last 6 months, and 71% within the last two years. This compares to an average of 10% within 6 months and 32% in 2 years for the other mindshare leader survey respondents. What was somewhat surprising is the number of implementations that had not been upgraded in the last 10 years. While CIMdata sees this lack of upgrading anecdotally within our consulting business, it was still surprising to see it quantified across the survey sample. For example,

one-third of the Siemens respondents had not upgraded in more than 15 years, and 23% of PTC respondents had not upgraded in more than 15 years. Half of the Dassault Systèmes respondents had not upgraded in at least 10 years. One possible reason for this lack of upgrades is that many might be early adopters who did extensive customization and have a solution that works for the scope it covers. Often, this type of implementation is a subset of a larger PLM implementation where another solution suite supports additional PLM capability.

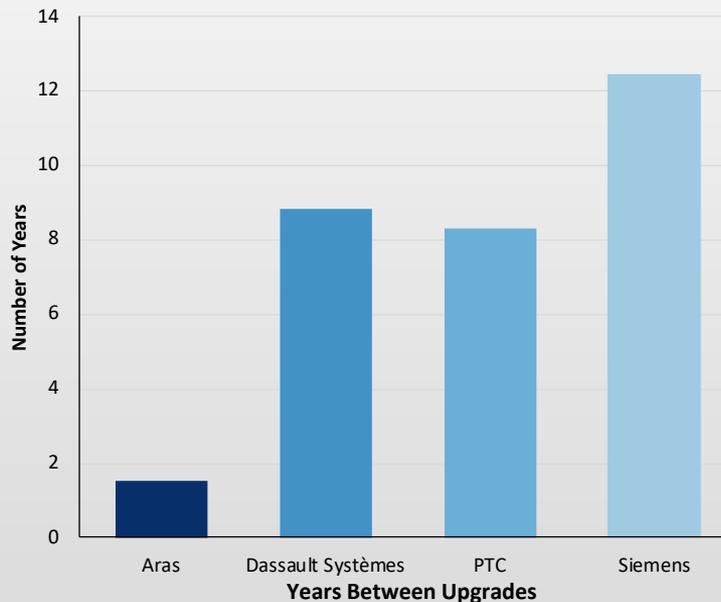| How long since you last upgraded your solution?	Aras Users	Other PLM Users (Average)
Response: Within the last 6 months?	47%	10%
Response: Within the last 2 years?	71%	32%
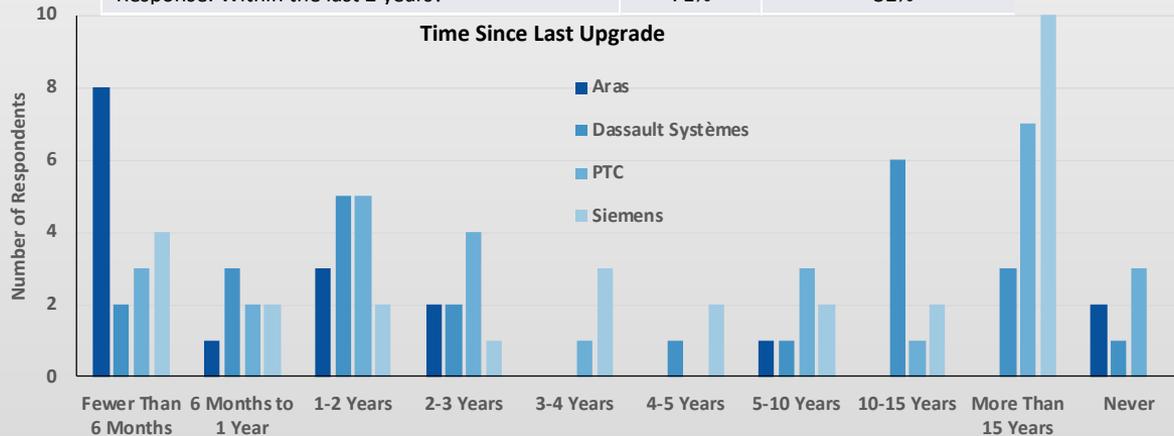
Time Since Last Upgrade

CIMdata®

Frequency of Upgrades

Average years between upgrades

A calculation of the average time between upgrades shows that Aras' respondents have upgraded more often than respondents with the other mindshare leaders' solutions. Aras' respondents indicated that their time between upgrades is less than every two years, Dassault Systèmes' and PTCs' respondents were more than eight years between upgrades, and Siemens' respondents were just over twelve years. The difference is dramatic and CIMdata would like to investigate this area in more depth to better quantify the differences.

What makes this more interesting is that Aras positions itself as supporting the ability to be heavily customized. In CIMdata's terminology, Aras is extremely configurable, meaning that the customizations survive an upgrade with little or no change. From CIMdata's experience and past research, Aras is known as a very flexible, configurable solution and able to achieve most customer customization requirements using low-code configuration techniques. While Aras can be customized, Aras says no customers have modified Aras' source code.

PLM solution configurations typically survive an upgrade with little or no extra effort. Customization often involves modifying PLM solutions using program interfaces and even direct modification of source code in high level languages, such as Java or C++, that need to be migrated to a new version and often modified, perhaps even rewritten, during solution upgrades.
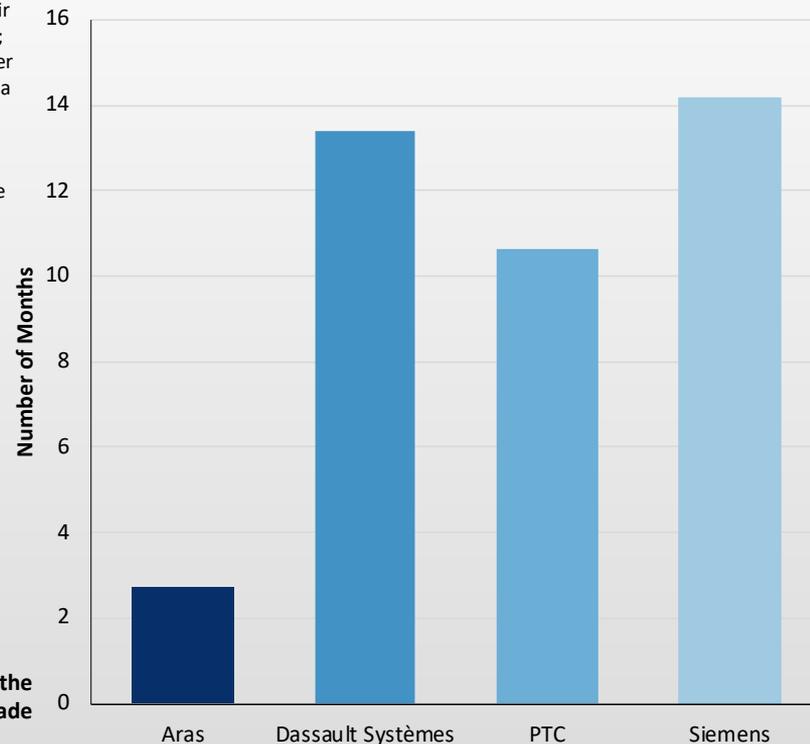

Years Between Upgrades

CIMdata®

Average Time Elapsed Executing the Last Upgrade

Short upgrade durations mean faster time to value

We asked the survey participants what the elapsed time was to execute their last upgrade. Upgrading Aras was much quicker than for the other solutions; on average Aras took 3 months elapsed time vs 11 to 14 months for the other solutions. According to Aras, when a customer wants to upgrade, they send a copy of their database to Aras, Aras and the customer collaborate on converting and testing it. Aras reports that within a few hours they send a converted copy of the database back. The customer is then responsible for validation and user acceptance testing and providing feedback to Aras. Once the customer approves the upgrade, a final pass is executed to ensure the latest data is incorporated and downtime is minimized.

Average Elapsed Time to Execute the Most Recent PLM Solution Upgrade

Number of Months (y-axis): 0, 2, 4, 6, 8, 10, 12, 14, 16

Aras: ~2.7
Dassault Systèmes: ~13.4
PTC: ~10.6
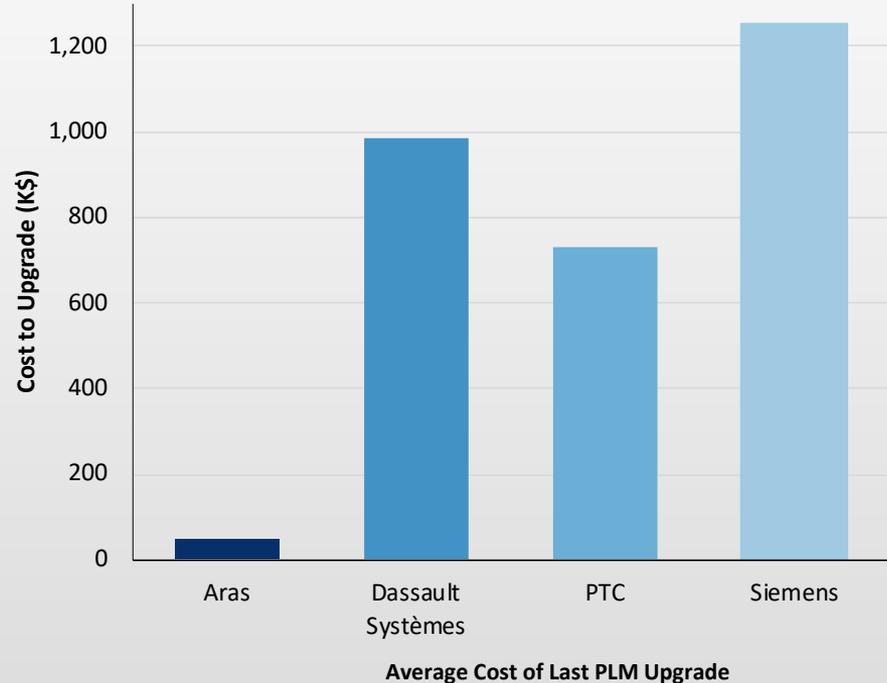Siemens: ~14.1

CIMdata

Average Cost of the Last PLM Upgrade

The higher the cost, the longer the ROI

We asked what the total cost of executing the last upgrade was. For Aras customers the cost was significantly less. The upgrade to the new version of the Aras PLM platform and migration of data are included in the subscription cost. We assume that the reason Aras is not zero on this chart is that some respondents included the cost for validation, verification, training, and other activities that are required when upgrading any technology solution.

The average upgrade costs for respondents from Dassault Systèmes, PTC, and Siemens were just under $1M, just over $700K, and just over $1.2M respectively.

Upgrades are complex, especially for solutions with many customizations. More analysis could be done to quantify differences in cost based on company size, the size of the user base, and customizations done, this difference in cost is still quite significant and will affect the return on investment.

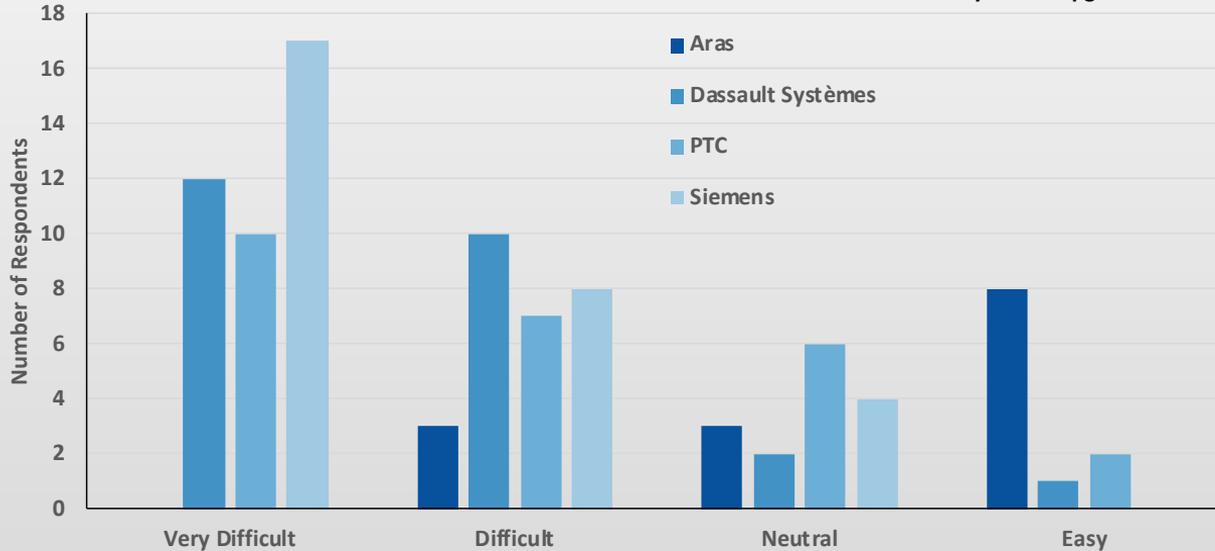Average Cost of Last PLM Upgrade

CIMdata®

Upgrade Complexity

Complicated upgrades are higher risk

When asked how complicated the upgrade process was, the majority of the survey respondents who had mindshare leader solutions other than Aras responded with "very difficult" and "difficult." This aligns with CIMdata's experience, especially when older implementations are included. Early adopters of PLM often had to customize to meet their requirements, and they have carried that technical debt forward making upgrades more complex. The majority of Aras' clients responded with "easy," and no one noted upgrading as being "very difficult."

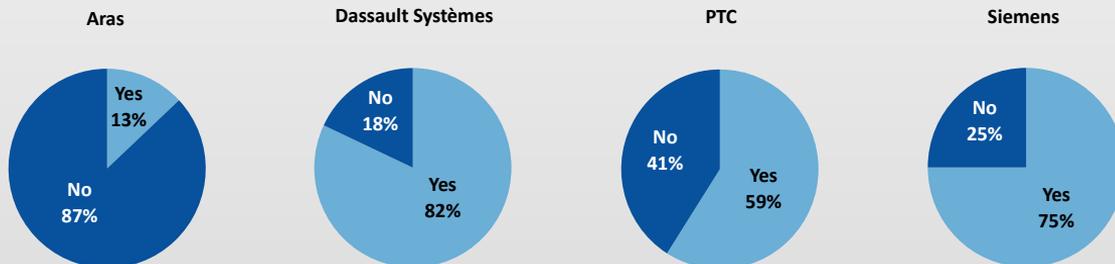**Difficulty of the Upgrade Process**

Customizations Inhibit Upgrades

Customization value has to offset costs to provide benefits

As noted in the obsolescence management study cited earlier, customizations are often an inhibitor to upgrading. This occurs because the code changes that need to be made to update a customized solution often require complex programming changes and extensive testing. CIMdata has written about customizing and upgrading Aras in the past, discussing how Aras is able to achieve their customizability and upgradeability. The bottom line is that Aras has architected its solution to be easy to change and update.

The current survey shows that Aras customers generally have fewer customization related upgrade issues, validating what Aras has been promoting, as well as what CIMdata has observed in the field.

Are Customizations Inhibiting Upgrades?	Aras users	Other PLM Users (average)
Response: "Yes"	13%	72%
Response "No"	87%	28%

Aras   Dassault Systèmes   PTC   Siemens

Aras — Yes 13%, No 87%
Dassault Systèmes — No 18%, Yes 82%
PTC — No 41%, Yes 59%
Siemens — No 25%, Yes 75%

Customizations Adversely Impact Upgrades

CIMdata®

Concluding Remarks

What you should remember

Digital Transformation is a critical improvement strategy being executed across many companies and industries. Companies are taking on these programs because of the potential returns on investment and to meet ever growing pressures on their businesses. PLM is a critical component for fulfilling companies' digitalization strategies. Companies want to move forward but can be held back by old, highly customized PLM environments that are difficult and/or costly to upgrade.

A company's Product Innovation Platform needs to be up-to-date and used to enable a resilient and sustainable digitalization program, one that allows the company to meet known and unknown requirements long into the future and at a reasonable cost. When PLM solutions provide strong support for the Product Innovation Platform's sustainability characteristics as identified by CIMdata, they should be able to provide continuously improving business value to their customers. The bottom line is, to be successful, companies need to have the right tools to support digitalization (i.e., PLM) and those tools need to be up-to-date to take advantage of the latest capabilities.

According to the survey's respondents, Aras' PLM platform is easier to keep current than its competitors. Aras users upgrade more often, over a shorter duration, and at less cost than their competitors. Customizations, a critical area inhibiting upgrades, are a significantly smaller problem for Aras customers than for those of their competitors. Companies pursuing a digital transformation should consider these issues.

CIMdata® | Global Leaders in PLM Consulting
www.CIMdata.com

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design, deliver, and support innovative products and services through the identification and implementation of appropriate digital initiatives. To learn more, see: www.CIMdata.com.