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The Tipping Point for SaaS in Product Development

By Will Hastings

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Prior to the COVID-19 crisis the terms "collaboration" and "social distancing" might never have been uttered in the same sentence, but for organizations comprising desktop workers who now find themselves working remotely, the marriage of these two concepts is vital for sustaining business. It should be no surprise then that the current situation has led to an accelerated adoption of solutions associated with digital transformation, which, among other things, promise to tear down data silos and empower workers with information.

An interesting component of these developments, one that is often cited, but seldom backed by numbers, is the anticipated growth in SaaS solutions, which offer go-live agility, novel collaboration capabilities, and worker mobility. To shed light on this trend, specifically as it relates to product development organizations, PTC conducted a survey of 150 directors, VPs, and executives who lead the engineering design, manufacturing design, and product lifecycle management functions for their companies. The results paint a clear view of the product development market's perspective on SaaS, the tipping point is here.

Our key findings which are explored in more depth in this article include:

- **91 percent** of respondents have a positive or neutral attitude when considering SaaS for CAD
- **90 percent** of respondents have a positive or neutral attitude when considering SaaS for PLM
- **35 percent** of respondents express that the COVID-19 crisis has increased their interest in adopting SaaS CAD or PLM solutions
- **59 percent** of respondents perceive security as the greatest hurdle of adopting SaaS solutions
- SaaS solutions are perceived as more capable to deliver on **89 percent** of the business drivers identified in this survey.
- **23 percent** of respondents have no strategy in place to periodically review their CAD solution against the market.
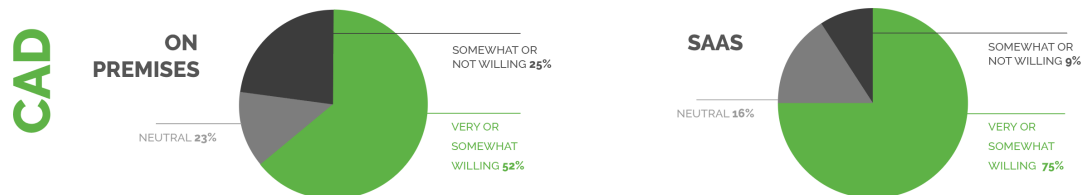
The Tipping Point is Here

When asked how willing or unwilling they were to explore SaaS options for CAD or PLM solutions the response was overwhelmingly positive: less than 10 percent of respondents expressed any level of unwillingness to evaluate SaaS-enable solutions for their next software purchase. Also remarkable is the comparison to on-premises software: 20 percent of respondents were less willing to explore on-premises PLM software and that number jumps to 25 percent for CAD software, suggesting that a large portion of the population is not just interested but intent on moving to cloud-based solutions.

In general, respondents are more willing to explore SaaS solutions compared to on-premises solutions when investigating their next CAD or PLM software. This is clear evidence that the early skepticism of SaaS, which may have slowed its adoption in product development in previous years, is no longer a significant factor in market behavior. On the contrary, product development organizations want to see more SaaS options brought to the market.

Figure A

WHAT IS YOUR WILLINGNESS TO EXPLORE SAAS WHEN EVALUATING NEW CAD SOLUTIONS?

CAD

ON PREMISES

SOMEWHAT OR NOT WILLING **25%**

NEUTRAL **23%**

VERY OR SOMEWHAT WILLING **52%**

SAAS

SOMEWHAT OR NOT WILLING **9%**

NEUTRAL **16%**

VERY OR SOMEWHAT WILLING **75%**

n = 150 product development leaders with sole or shared CAD, PLM, and PDM software purchasing power. Survey conducted April 17, 2020 - April 27, 2020.

Figure B

WHAT IS YOUR WILLINGNESS TO EXPLORE SAAS WHEN EVALUATING NEW PLM SOLUTIONS?

PLM

ON PREMISES

SOMEWHAT OR NOT WILLING **20%**

NEUTRAL **19%**

VERY OR SOMEWHAT WILLING **61%**

SAAS

SOMEWHAT OR NOT WILLING **10%**

NEUTRAL **19%**

VERY OR SOMEWHAT WILLING **71%**

n = 150 product development leaders with sole or shared CAD, PLM, and PDM software purchasing power. Survey conducted April 17, 2020 - April 27, 2020.

The Crisis is Accelerating SaaS Adoption

To validate the speculation that COVID-19 has encouraged companies to evaluate new technologies to cope with challenges of remote work and working-from-home we asked survey takers how the current crisis has affected their interest in SaaS-based solutions. Aligning with our expectation, we found that 35 percent of survey takers say that the COVID crisis has increased their interest in SaaS for CAD and PLM (Figure C).

What does this tell us? Adoption of SaaS based CAD and PLM is likely to accelerate. Although this might be a new trend for product development organizations, it is far from uncharted territory for broader IT organizations in general. We already know that in other areas of enterprise software SaaS is ubiquitous.   For example, Deloitte's most recent global CIO survey, conducted in 2018, found that 71 percent of participating organizations were already using or planning to use SaaS solutions. It appears then that product development organizations may be ready to take advantage of the SaaS benefits that their counterparts in other areas of the company are already enjoying.

Figure C

HAS THE COVID-19 CRISIS AFFECTED YOUR INTEREST IN ADOPTING SAAS?
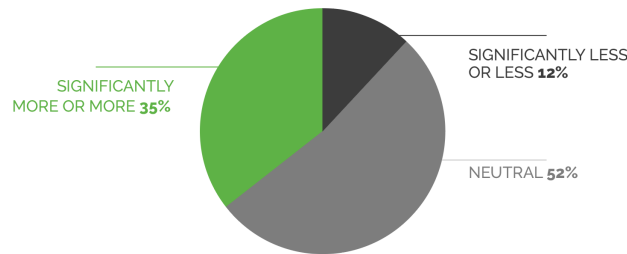
SIGNIFICANTLY MORE OR MORE **35%**

SIGNIFICANTLY LESS OR LESS **12%**

NEUTRAL **52%**

n - 150 product development leaders with sole or shared CAD, PLM, and PDM software purchasing power. Survey conducted April 17, 2020 - April 27, 2020.

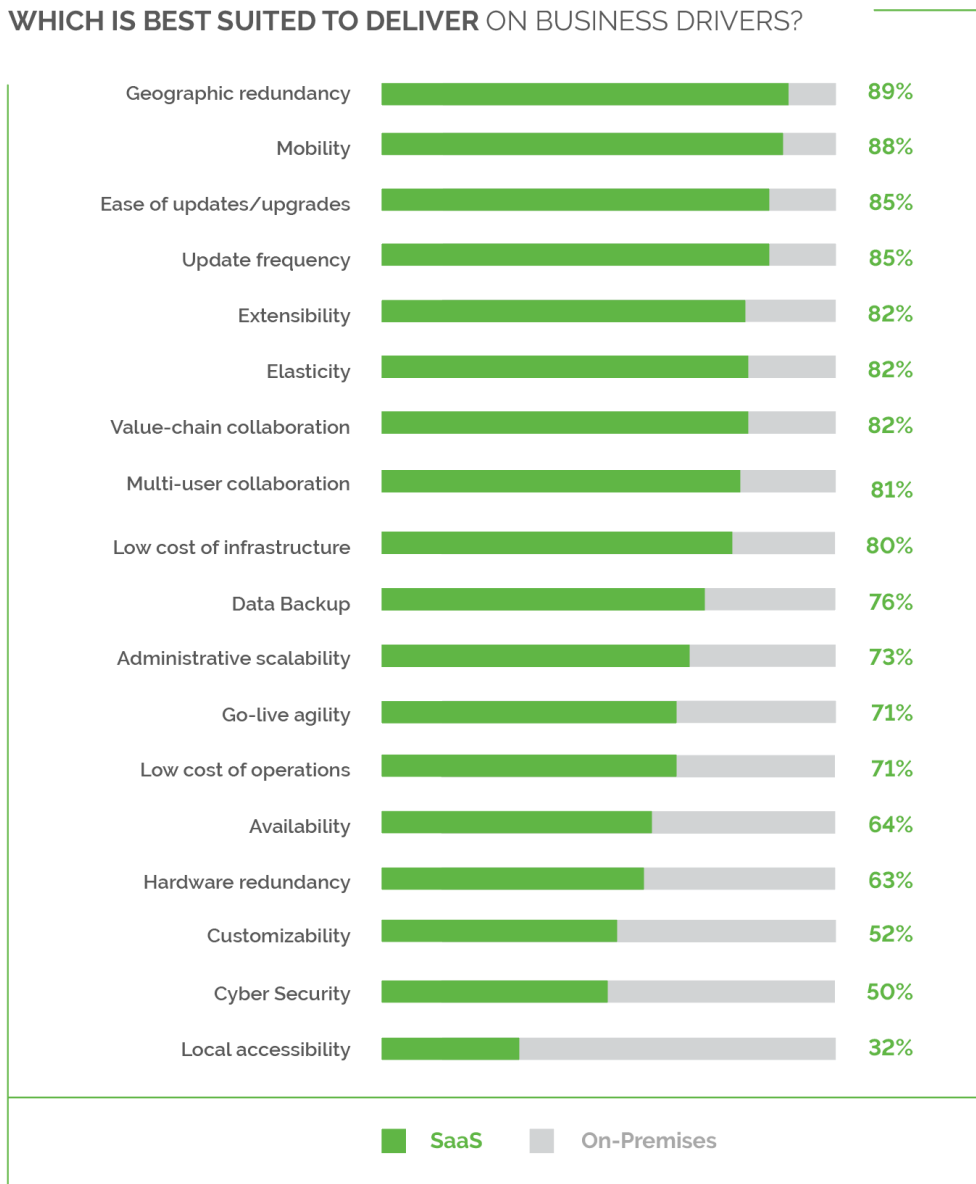## SaaS Ranks Higher on Nearly all Business Drivers

As part of this survey, participants were presented with eighteen business drivers and asked to determine if on-premises or SaaS-based solutions would be better suited to deliver on them. By design we examined business drivers that relate to deployment models and are not software specific. For instance, functionality such as: "Can I bind my own hotkeys?", "Does it have built in FEA?", or "Does it include change management tools?" are aspects of individual software offerings, independent of deployment, and therefore not included as part of the survey.

The results were soundly in favor of SaaS and the perceived major strengths of SaaS fell into four broad categories: Total cost of ownership, collaboration, scalability, and innovation velocity. For instance, as shown in Figure D, 71 and 80 percent of respondents believe SaaS is more capable of delivering lower cost of operations and lower cost of infrastructure respectively. 81 percent of respondents agreed that SaaS was the preferred deployment for multi-user collaboration and 85 percent acknowledge that SaaS enables easier updates and upgrades at higher frequencies.

While it makes sense that SaaS scored high marks across these drivers, as a deployment alone SaaS does not necessarily provide additional value in areas of cost, collaboration, and innovation velocity. Instead, SaaS enables new software architectures such as multi-tenancy and non-relational databases, see Sidebar 1 and 2. It is these architectures, which must be delivered through SaaS deployments, that provide the value commonly associated with SaaS in general.

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The data shows that the perception of SaaS is already better than on-premises across many business drivers and we expect the gap to widen as a greater portion of the market experiences SaaS CAD or PLM solutions for the first time. As many Onshape users can attest, it's hard to adequately describe the experience of multiuser collaboration in a 3D CAD authoring tool. Seeing it helps but doesn't quite do it justice. Sign up for a free trial and experience it yourself.

Figure D

WHICH IS BEST SUITED TO DELIVER ON BUSINESS DRIVERS?

Business Driver	SaaS %
Geographic redundancy	89%
Mobility	88%
Ease of updates/upgrades	85%
Update frequency	85%
Extensibility	82%
Elasticity	82%
Value-chain collaboration	82%
Multi-user collaboration	81%
Low cost of infrastructure	80%
Data Backup	76%
Administrative scalability	73%
Go-live agility	71%
Low cost of operations	71%
Availability	64%
Hardware redundancy	63%
Customizability	52%
Cyber Security	50%
Local accessibility	32%

■ SaaS   ☐ On-Premises

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What is Multi-Tenancy?

In simple terms, a multi-tenant architecture means that all SaaS customers use the same version of the software and share a common hardware infrastructure to execute their computing tasks. From the customer perspective this delivers significant benefits in two ways:

•   Reducing Total Cost of Ownership: By consolidating the costs of maintenance, hardware infrastructure, and IT overhead across all end-users, SaaS vendors can leverage vast economies of scale to deliver a better software experience at a lower total cost of ownership.

•   Increasing Innovation Velocity: With a multi-tenant architecture, updates, bug fixes, and upgrades can be deployed seamlessly without end users experiencing downtime. Furthermore, because all customers are on the same version of the software, SaaS vendors can focus engineering resources to increase the value and frequency of updates.

What is a Non-Relational Database?

A non-relational database is a data management system that does away with the old check-out/check-in files systems of traditional PDM or PLM solutions. Instead it is architected so that data can be manipulated directly, enabling real-time collaboration and simultaneous editing. The consequence of this shift is unparalleled collaborative capabilities. In the case of Onshape, this means that multiple users can view and update the same assembly, part, or sketch at the same time, and observe these updates as they occur. For a technical overview of the various forms of databases used in modern CAD systems click here. [RA1]

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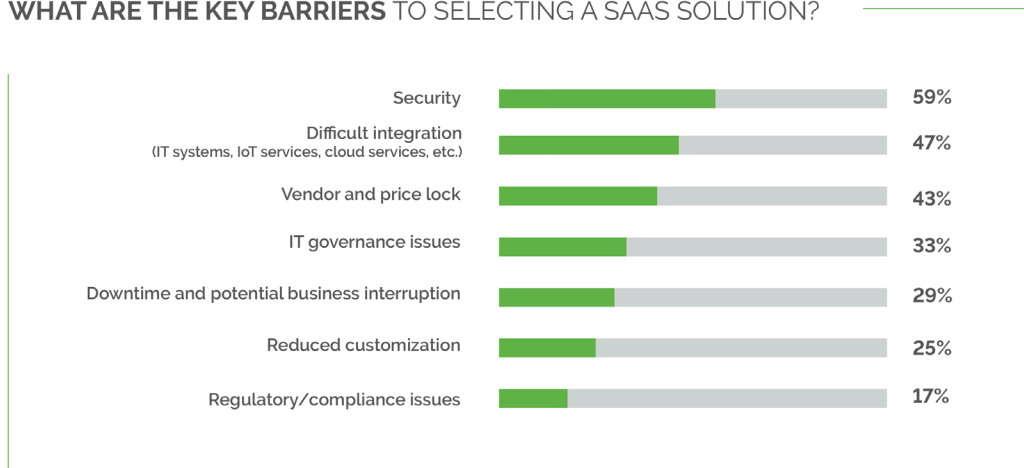
Some Challenges and Concerns Exist

In addition to gauging the market's general interest in SaaS, the survey was also used to identify potential inhibitors of SaaS adoption. Local accessibility and cyber security were the only two business drivers out of the eighteen evaluated where on-premises performed as well as or better than SaaS.

SaaS's poor comparative performance on local accessibility, defined as the ability to access some or all product functionality without need of an internet connection, comes as no surprise. After all, by definition SaaS is accessed through the internet. Although it is an undisputed limitation of SaaS, local accessibility may not be a significant barrier to adoption. Another question in the survey, meant to understand such barriers, found that the two hurdles related to local accessibility, "Downtime & potential business interruption" and "Regulatory or compliance issues", were among the three least significant barriers of SaaS adoption.

While SaaS scored evenly with on-premises in the cyber security category, we at PTC question whether this is a result of market perception, or a fair evaluation of SaaS security capabilities. For example, in a recent article that addresses this very topic, Gartner states that in nearly all cases of cloud data breaches, "it is the user, not the cloud provider, who fails to manage the controls used to protect an organization's data." Gartner further predicts that through 2025, 99 percent of all cloud security failures will be the customers fault. However, it's clear that cyber security concerns are a barrier to adoption: cyber security was listed as the top hurdle by a significant margin, with 59 percent of survey takers identifying it as a barrier. And although expert opinion may disagree with market perception, this data suggests that cyber security concerns may be slowing SaaS growth within the product development market.

Figure E

WHAT ARE THE KEY BARRIERS TO SELECTING A SAAS SOLUTION?

Barrier	%
Security	59%
Difficult integration (IT systems, IoT services, cloud services, etc.)	47%
Vendor and price lock	43%
IT governance issues	33%
Downtime and potential business interruption	29%
Reduced customization	25%
Regulatory/compliance issues	17%

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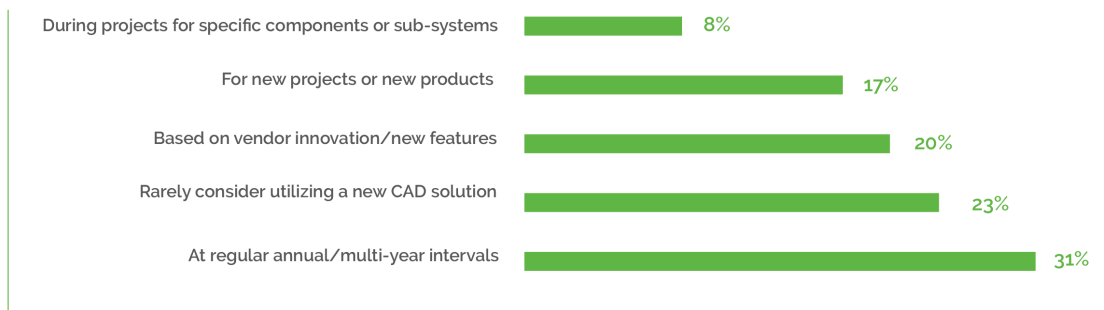
The Time to Evaluate Your Product Development Solutions is Now

While the previous findings help to understand if and why a company may choose to adopt SaaS product development solutions, they don't help to answer the question of under what circumstances a company might adopt said solutions. For that reason, the final portion of the survey examines the triggers that signal product development organizations to evaluate their current CAD authoring against the market.

The survey found that a plurality of respondents (45 percent) take an opportunistic approach to identify new CAD solutions. These organizations evaluate their CAD options on a project basis (25 percent), or when vendors release new updates and features (20 percent). This strategy enables organizations to quickly identify and adopt better tools for each project and in doing so establish cultures of innovation and flexibility. Traditionally, this has required more resources and time spent on tasks like researching, evaluating, and implementing software and can make it difficult to utilize legacy assets or data. The more conservative approach is to investigate CAD authoring tools at time-based intervals (31 percent). While this strategy requires less resources, it can potentially lead to missed opportunities and miss-evaluations of new functionality. The remaining group are those who have no formal strategy and rarely evaluate their CAD software against the market (23 percent). This approach is neither opportunistic nor conservative, but a strategic blind spot; with the recent wave of innovation across product development tools, not having a process in place to evaluate product innovation opportunities is a risk without reward.

Figure F

WHEN DO YOU CONSIDER ALTERNATIVE CAD SOLUTIONS?

Category	Percentage
During projects for specific components or sub-systems	8%
For new projects or new products	17%
Based on vendor innovation/new features	20%
Rarely consider utilizing a new CAD solution	23%
At regular annual/multi-year intervals	31%

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The go-live agility and scalability of SaaS solutions facilitate the opportunity to leverage new tools while reducing the resource intensiveness. On top of that, and distinct from deployment, there is a general renaissance in CAD an PLM with new innovations like real-time simulation and generative design. These new tools are driven by technologies like artificial intelligence, they enable new ways of manufacturing such as 3D printing, support augmented reality solutions, and align with new strategies like digital twins and digital threads. In short, CAD and PLM are no longer slow-evolving mature technology categories and companies need to make sure their evaluation strategy takes this into consideration.

Conclusion

By all measures the product development market appears ready to adopt SaaS. As shown by this survey product development leaders are expressly willing to adopt SaaS solutions, and they understand the value that SaaS can provide. This raises the question: why is the SaaS market share not already larger?

The product development market has been slow to adopt SaaS for two reasons. First, it's difficult to migrate to any new CAD or PDM software, regardless of the deployment. So, by their very nature, the CAD and PLM markets are traditionally slow to change. Second, the technical demands of developing a 3D CAD software that utilizes SaaS enable architectures like multi-tenancy and non-relational databases are far more challenging than building a SaaS human capital management (HCM) or relationship management (CRM) solution. As a result, until recently there just weren't SaaS tools for product development organizations that could compete at a functional level with established on-premises solutions.

If we look at other enterprise software such as HCM and CRM, SaaS is already the dominate model, accounting for over 70 and 80 percent of their respective markets. These market shares grew rapidly once SaaS was introduced. To give an example of the tremendous growth of SaaS, Gartner in 2010 estimated the total IT spend on all enterprise SaaS applications was $8.5 billion. Less than a decade later, in 2019, Gartner estimated that the total SaaS spend in just the CRM market was over $42 billion. Currently the SaaS market share in both CAD and PLM is below 5 percent. However, the key challenges have been addressed by products like Onshape and the tipping point for SaaS in product development has arrived.

About the Author:

Will Hastings is a research analyst manager at PTC providing thought leadership on technologies, trends, and industrial markets. Previously Will was a senior analyst for ARC Advisory Group, where he conducted PLM and Additive Manufacturing research. Prior to ARC Advisory Group, Will was a lead mechanical design engineer for product development programs at Sensata Technologies.