PTC®

2015 Global IoT PLM
Technology Leadership Award

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Background and Company Performance

Industry Challenges

Products are changing; they are getting smarter not only on the mechanical side but also on the electrical and the software side, as well as getting connected. This change extends further from products to systems and then to a system of systems. What it means for Product Lifecycle Management (PLM) is that when designing these products, designers now have to keep track of not just a couple of pieces of information like mechanical and electrical but also of the complete product definition. Product definition is now very complex because of the disciplines that go into mechanical, electrical, and software areas. In addition, there are different organizations consuming this information, such as engineering, manufacturing, services, and there is the 4th dimension of information, which is data/information from products in the field. The challenge, therefore, lies in - roping in all of that.

In other words, the traditional systems engineering view on product development, certainly one that PLM set out to address, has now changed. It has changed from Standard Systems Engineering "V" to Extended Systems Engineering "V", which is also not adequate when designing products. With the availability of more information that are all interconnected, in today's smart, connected products, a "Closed-Loop Lifecycle Management" is what is required.

Technology Leverage and Business Impact

Commitment to Innovation

PTC's commitment to PLM technology innovation is exceptional and is demonstrated by its continued focus to take the view of traditional systems engineering on product development to the next level. PTC has proposed and successfully closed this loop by bringing the beginning and the end of systems engineering together so that all information goes through the entire product lifecycle. With its Windchill PLM, PTC has made the closed loop lifecycle vision a reality.

With Windchill PLM, PTC has now created a "Closed-Loop Lifecycle Management" for smart, connected products by bringing in different missing elements, such as Connected Operations, Connected Services and Connected Manufacturing, and most significantly, the integration of the Internet of Things (IoT) platform into it. By incorporating Connected Operations, Connected Services and Connected Manufacturing functionalities on par with the PLM industry requirements and technological advancements, PTC's overall value proposition and commitment to innovation in the IoT and the PLM space remains supremely enhanced. Windchill, with its robust, high-performing architecture, manages all product content and business processes throughout the product and the service lifecycles, from conception to service. Its PLM solutions work together with the IoT

platform, enabling the PLM solutions to be more connected than was earlier possible. Windchill is the only PLM solution in the market, which has been designed to work in an Internet-based, distributed design environment.

With Windchill, its customers can create smart, connected products and improve the product development process by leveraging IoT data. For instance, PTC is working with GE to use its IoT technology and enable the brilliant factories concept and connected manufacturing. The information that is being created in the design area, continuously keeps passing on to become a part of the manufacturing environment, such as shop floor wherein a user can get a better view of the product information. This helps the customer acquire a better understanding of the virtual product and the physical product in a simultaneous manner, which translates into improved decision making.

An important aspect that has, undoubtedly, helped the company attain a greater height of customer appreciation is that Windchill is available in the cloud; its PLM cloud offering is a Software as a Service (SaaS) offering. PTC has a very strong cloud services team that hosts its product platforms for its IoT, Service Lifecycle Management (SLM), PLM/ Supply chain management (SCM)/ Application lifecycle management (ALM) customers. In early 2015, PTC offered a PLM cloud offering to its channel partners and to host the environment, PTC chose Amazon as its network host provider. PTC has 3 cloud offerings. Its standard offering is for small business with a couple of users looking for ways to manage some of their design data in a simplified manner. This standard offering is a multi-tenant offering. In addition, it also offers premium and enterprise offerings that allow for the customized use of Windchill by customers and gives them greater configuration flexibility. The enterprise offering allows for integration with some enterprise systems at the back end of a customer's environment, such as that of their Enterprise Resource Planning (ERP) system.

Commitment to Creativity

PTC'S entire portfolio of solutions—it is deep and wide—is considered to be the best in the industry and was developed with the help of its organic and inorganic (numerous acquisitions) growth strategies. CAD is its legacy, and upon this foundation, PTC expanded its portfolio that now includes PLM solutions. Incorporated in PLM are its application lifecycle management, a very robust service lifecycle management business, and most importantly, IoT platform.

PTC has two strong areas of business—Technology Platforms and Enterprise Applications. Technology Platforms include IoT Application Enablement and Integration, Big Data Analytics, as well as Augmented Reality and Digital Twin. The ThingWorx technology gives it the platform to build applications for smart connected products and also to connect, gather, and consume data from smart connected products. As the world continues to evolve with smart connected products, the amount of data that is going to be created is going to be huge. In an effort to keep pace with the enormous volume of data that is

generated due to smart and connected products, PTC acquired a company called COLDLIGHT in 2015. COLDLIGHT has strong competencies in analytics and some patented technologies in pattern recognition. Augmented Reality is an area where PTC sees an opportunity to take the information that is being developed back in the 'create and design' area and continue to pass it on to areas, such as service. For instance, a technician can go to the construction equipment again and hold up an iPad and view the information about the product components inside the equipment itself without having to disassemble it to get information; in addition, he would be able to loop said data to the information from PLM, such as part number and other product details.

Enterprise Applications are the core areas of PTC solutions, which include PTC Creo (a strong CAD solution to help people create the 3D design in their product development environment), PTC Windchill (its core PLM), PTC Integrity (its Application lifecycle management products), and PTC Servigistics (another suite of products that go toward service lifecycle management).

Therefore, PTC has two strong areas; that of technology platforms and enterprise applications, which PTC has creatively brought together to ensure PTC is leveraging both sides to build robust solutions.

Customer Acquisition

PTC's strategy to accurately analyze customer requirements and fabricate PLM solutions that can best address industry requirements can be largely attributed to the successful deployment of its IoT PLM across various industries. The company prides itself on its extensive customer list as its customers hail from diverse backgrounds such as complex demand environments and large-scale manufacturing. A holistic PLM solution enabling advanced IoT platform that can be deployed across multifarious industry verticals, PTC's Windchill offering has been highly successful not only in promoting technology leadership but also in drawing the attention of leaders from a wide range of industries. Boasting over 500 unique customers and maintaining over 1000 unique instances, PTC operates across a diverse range of industry verticals and has a customer base, which includes prominent leaders among its customers. These include Bombardier, U.S. Army, Hyundai Motor Company, Kia Motors Corporation, Volvo Group, Cummins, American Standard, Philips, Shaw Development, Carter Fuel Systems, Vitamix, CONMED, COVIDIEN, Life Fitness and Baxter International among others. In other words, numerous companies focusing on discrete manufacturing space, primarily with sub-segments, including aerospace and defense, automotive, electronics, high-tech, industrial equipment, retail, and medical devices have reaped huge benefits by creating smart, connected products and by leveraging IoT data to improve product development. Windchill has helped to not only consolidate multiple existing systems into a single platform to manage critical product data but also help these companies implement their next-generation product development systems. For example, in the area of automotive, PTC supports its customers' growth plans by facilitating their global product development environments/processes and

supporting the rapidly changing requirements for their vehicle programs. PTC's growing strength and superiority in this industry is illustrated by the fact that numerous global automotive OEMs have used PTC's PLM products and achieved significant improvements in their vehicle development processes. With an already robust portfolio of customers which the company continuously expands, PTC is expected to further strengthen its position in the PLM market.

Application Diversity

By meeting product development needs, ensuring process improvements, and through strategic acquisitions that play to its own manufacturing strength, PTC has been able to aggressively pursue diverse applications and market segments. These include Augmented Reality (AR), Extended Product Lifecycle Management (ePLM), Application Lifecycle Management (ALM), Service Lifecycle Management (SLM), Computer-Aided Design (CAD) and Brilliant Factories. Its solutions help customers transform the way they create, operate, and service products for a smart connected world. PTC helps its customers realize 'product and service advantage' such as accurate decisions, timely product releases, improved product quality, reduced IT cost, accessibility through cloud, on-premise, and fully-hosted SAAS models. Improving several directly measurable KPIs for customers and providing them with unique value-additions clearly strengthens PTC's potential to further expand the scope of applications for its IoT PLM solution.

Financial Performance

PTC is one of the Massachusetts' success stories. With 6,000 employees around the world and 28,000 active customers, PTC is a 25-year old company with $1.35 billion in annual revenue (2014) derived from software and services. From a geographic standpoint, revenues generated from America, Asia and Europe were equal, with approximately 33% each in 2014. PTC has been growing aggressively over the last 3 years (2012–2015) with increasing revenues of $1.2, $1.3 billion in 2012 and 2013 respectively. From the heightened satisfaction that PTC renders to its customers, it is easy to conclude that the company has a huge potential for growth in this market.

Conclusion

With IoT platform integration and a "Closed-Loop Lifecycle Management", PTC has built cutting-edge, industry-leading technologies to cater to the PLM needs of its customers. Windchill's robust range of Connected Services, Connected Operations, and Connected Manufacturing, has visibly enhanced the capabilities of its PLM technology and improved the value proposition by enabling its clients to create smart, connected products and leverage IoT data to improve the product development processes. With its strong overall performance, PTC has earned Frost & Sullivan's 2015 Technology Leadership Award.

Significance of Technology Leadership

Technology-rich companies with strong commercialization strategies benefit from the increased demand for high-quality, technologically innovative products. Those products help shape the brand, leading to a strong differentiated market position.

- Acquire competitors' customers
- Generate awareness
- Increase market penetration
- Build a larger customer base
- Balance pricing with profitability

- Establish a strong brand identity
- Align the brand to the company's vision
- Inspire customers
- Push the envelope
- Build a reputation for innovation

DEMAND

BRAND

Technology Leadership

COMPETITIVE POSITIONING

- Establish a clear value proposition
- Deliver superior value to customers
- Be a leader in innovation
- Be a leader in technology development
- Stake out a clear market position

Understanding Technology Leadership

Technology Leadership recognizes companies that lead the development and successful introduction of high-tech solutions to customers' most pressing needs, altering the industry or business landscape in the process. These companies shape the future of technology and its uses. Ultimately, success is measured by the degree to which a technology is leveraged, and the impact that technology has on growing the business.

Key Benchmarking Criteria

For the Technology Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Leverage and Business Impact—according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Technology Incubation
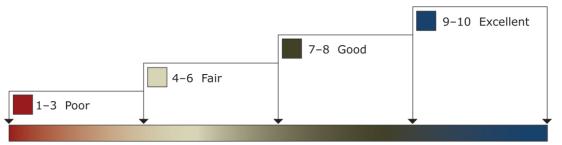Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Business Impact

Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Operational Efficiency
Criterion 4: Growth Potential
Criterion 5: Human Capital

Best Practice Award Analysis for PTC

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.

RATINGS GUIDELINES

9–10 Excellent
7–8 Good
4–6 Fair
1–3 Poor

The Decision Support Scorecard is organized by Technology Leverage and Business Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players as Competitor 2 and Competitor 3.

DECISION SUPPORT SCORECARD FOR TECHNOLOGY LEADERSHIP AWARD

Measurement of 1–10 (1 = poor; 10 = excellent)			
Technology Leadership	Technology Leverage	Business Impact	**Average Rating**
PTC	**9.5**	**9.5**	**9.5**
Competitor 2	8.0	8.0	8.0
Competitor 3	7.5	7..5	7.5

Technology Leverage

Criterion 1: Commitment to Innovation
Requirement: Conscious, ongoing development of an organization culture that supports the pursuit of groundbreaking ideas through the leverage of technology

Criterion 2: Commitment to Creativity
Requirement: Employees rewarded for pushing the limits of form and function, by integrating the latest technologies to enhance products

Criterion 3: Technology Incubation
Requirement: A structured process with adequate investment to incubate new technologies developed internally or through strategic partnerships

Criterion 4: Commercialization Success
Requirement: A proven track record of successfully commercializing new technologies, by enabling new products and/or through licensing strategies

Criterion 5: Application Diversity
Requirement: The development of technologies that serve multiple products, multiple applications, and multiple user environments

Business Impact

Criterion 1: Financial Performance
Requirement: Strong overall financial performance in terms of revenues, revenue growth, operating margin and other key financial metrics

Criterion 2: Customer Acquisition
Requirement: Overall technology strength enables acquisition of new customers, even as it enhances retention of current customers

Criterion 3: Operational Efficiency
Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard

Criterion 4: Growth Potential
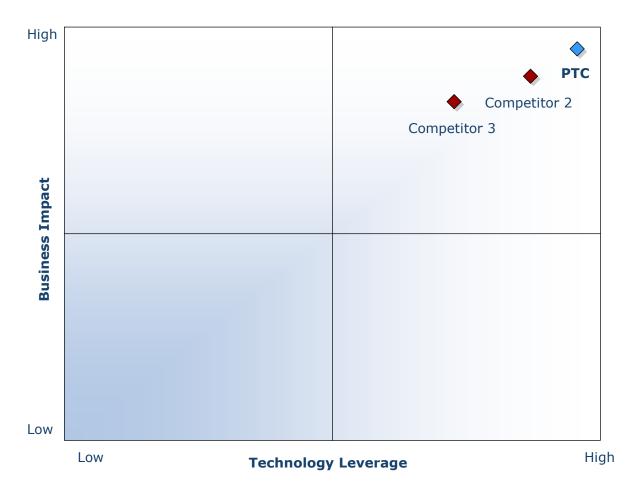Requirements: Technology focus strengthens brand, reinforces customer loyalty and enhances growth potential

Criterion 5: Human Capital
Requirement: Company culture is characterized by a strong commitment to customer impact through technology leverage, which in turn enhances employee morale and retention

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts can then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.

DECISION SUPPORT MATRIX FOR TECHNOLOGY LEADERSHIP AWARD

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

	STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	**Monitor, target, and screen**	Identify award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized award candidates
6	**Conduct global industry review**	Build consensus on award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best-practice award recipient	• Review analysis with panel • Build consensus • Select winner	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform award recipient of award recognition	• Present award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of award and plan for how recipient can use the award to enhance the brand
10	**Take strategic action**	Once Licensed, company may share award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess award's role in future strategic planning	Widespread awareness of recipient's award status among investors, media personnel, and employees

"We Accelerate Growth"

About Frost & Sullivan

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