

Building a Bridge to a Smart, Connected Future

CIMdata Commentary

Key takeaways:

- *In the twenty years since the phrase was coined, product lifecycle management (PLM) strategies and enabling technologies have been widely adopted by a range of industries.*
- *New technologies like social, mobile, analytics, cloud, and Internet of Things (IoT) are transforming society and creating new opportunities and challenges as firms scramble to expand their PLM strategy to support the introduction of smart, connected products.*
- *Persistent Systems, a Dassault Systèmes value-added reseller (VAR), brings significant skills and experience in systems engineering, the Industrial Internet of Things (IIoT), artificial intelligence (AI), and cloud to help industrial clients expand their PLM strategies to leverage these powerful capabilities.*
- *Persistent Systems is also a leader in application lifecycle management (ALM), a key enabling solution for effectively developing smart, connected products.*

Introduction

Over the last twenty years, CIMdata has witnessed the continued growth and expansion of the global PLM market to support the development, production, and maintenance of complex products and/or services by increasingly global value chains. At the same time, the phenomenon of “the consumerization of information technology” has made consumer technologies like social and mobile important to the PLM market. Additionally, the Internet of Things has exploded on the consumer and industrial markets, turning almost every product into smart and connected. Social, mobile, and the IoT have also created an explosion in data to be mined for insights using traditional analytics and more advanced technologies like AI and machine learning (ML). These rapid changes in PLM requirements have challenged most product companies to keep up.

Persistent Systems has just the skill set to help. They are the global development partner for IBM’s ALM portfolio, as well as their go-to-market partner in key European markets. As a company, they have significant experience in ALM, data & analytics, AI/ML, systems engineering, and cloud that they can bring to bear for their VAR clients.

Research for this commentary was partially supported by Persistent Systems.

A Smart, Connected Future

Over our 35-year history, CIMdata has witnessed the emergence of Industry 3.0, the application of digital computing to the product lifecycle, and the on-going evolution toward Industry 4.0. In fact, we owe our existence to interest in CIM—computer-integrated manufacturing—and its market potential. During that time, digital tools emerged to support many aspects of the product lifecycle, from ideation to design, manufacturing to operations, and finally to end of life or through-life support. Companies need to manage the information created by these varied tools across the product lifecycle, and data and process management solutions emerged to help manage the information.

About twenty years ago, the phrase product lifecycle management (PLM) emerged to include the data, processes, and technologies that evolved to support products from idea through life.

CIMdata defines PLM as a strategic business approach enabled by technology and a consistent set of business solutions that focuses on the collaborative creation, use, management, and dissemination of product-related intellectual assets across the lifecycle. The tools used and the nature of the assets depend on what is being created. For example, discrete manufacturing industries care a lot about mechanical computer-aided design (MCAD) to engineer the products, computer-aided manufacturing (CAM) solutions to use that 3D information to instruct machines to manufacture it, and simulation & analysis (S&A) tools to understand how a design might perform in the real-world. Contrast this with companies making toothpaste that care a lot about its formulation and how it might scale up for a manufacturing plant in some far-flung location, the artwork and labeling that might vary by country, and plans for how these consumer items are packed in boxes, crates, and pallets for shipping. All of this information must be managed across the product lifecycle from ideation through life. Companies in a range of industries employ PLM strategies and enabling technologies, from airlines to fashion to insurance. As part of its mission, CIMdata conducts market research on the global PLM market for software and services. In calendar year 2018, CIMdata estimated the global PLM market at nearly \$47.8 billion, up 9.4% over 2017. The market is projected to grow 8.6% in 2019, with a five year compound annual growth rate (CAGR) of 8.3% to \$72.4 billion in 2023.

Just like other application domains, PLM must evolve with the times and as its enabling technologies change and improve. For example, the MCAD market rode Moore's Law from mainframes to workstations to PCs. The Internet and, more specifically the World Wide Web (WWW), took digital capabilities from the province of professionals into the lives of most citizens of the world. People are used to using technology in their daily lives, creating usability expectations for their business systems. The response, often termed the consumerization of IT, has led to some usability improvements.

Social platforms like Twitter and Facebook have connected people around the world in unique ways. The youngest professionals expect their tools to work their way, and their predominant experience has been social. Many of today's leading software providers offer social capabilities, like chat or integrations to popular collaboration solutions like Slack. Mobile technologies have evolved and supplanted personal computers as the way most people interact using the Internet. PLM solution providers have tried to adapt by making more and more functions accessible on mobile devices. Social and mobile also generate huge volumes of data that companies are using for things like sentiment analysis and traffic flow analysis to site new retail, housing, or public infrastructure.

Another overriding trend is toward smart, connected products. The IoT and the IIoT help make most products smart and connected, as well as greatly expanding the types and volumes of data generated throughout a product's lifecycle. For example, GE aircraft engines put out about 25 megabytes of data per flight hour per engine.¹ They also make products systems of systems, with autonomous vehicles needing to understand the built environment (existing streets, buildings, etc.), the possible actions of pedestrians and other obstacles, and the potential behaviors of other vehicles on the road. Industrial companies have struggled to adapt to these changes and desperately need a wide range of new skills in topics like IoT and IIoT, software development, AI/ML, systems engineering, and cloud to survive and thrive in this ever increasingly smart, connected world.

¹ "Big Data Takes Off But Flight is Just Beginning," <https://www.avm-mag.com/big-data-takes-off-flight-just-beginning/>

In its nearly 30-year history, Persistent Systems has built skills and solutions that can help industrial companies effectively leverage these new capabilities.

Persistent Systems Limited

Headquartered in Pune, India, Persistent Systems (BSE & NSE: PERSISTENT) is a global solutions company that seeks to deliver digital business acceleration and enterprise modernization for its global clientele and independent software vendor (SV) partners. Persistent has a global reach with subsidiaries in 11 countries and over 10,000 employees. They reported nearly \$481 million in fiscal year 2019 revenues earned by working with their 350+ customers.

The company works in a variety of business and technology segments: Industrial; Banking, Financial Services, and Insurance; Healthcare and Life Sciences; AI, ML, and Data; Cloud Services; Identity, Access, and Security; and Software Product Engineering. Persistent Industrial Solutions group boasts over 100 customers and 1,000 experts in a wide range of technologies, as highlighted in Figure 1. As a company, Persistent has deep integration expertise, partly because of their role as an ISV development partner for so many data-focused solutions. The company claims that “building data products is our DNA.” Based on their actions, this is much more than talk with development work on database kernels, Hadoop, drivers, connectors, and business intelligence (BI) tools—all important sources and users of data. While their PLM business is housed in their Industrial Solutions segment, Persistent is organized to leverage their other centers of expertise for the benefit of their PLM clients.

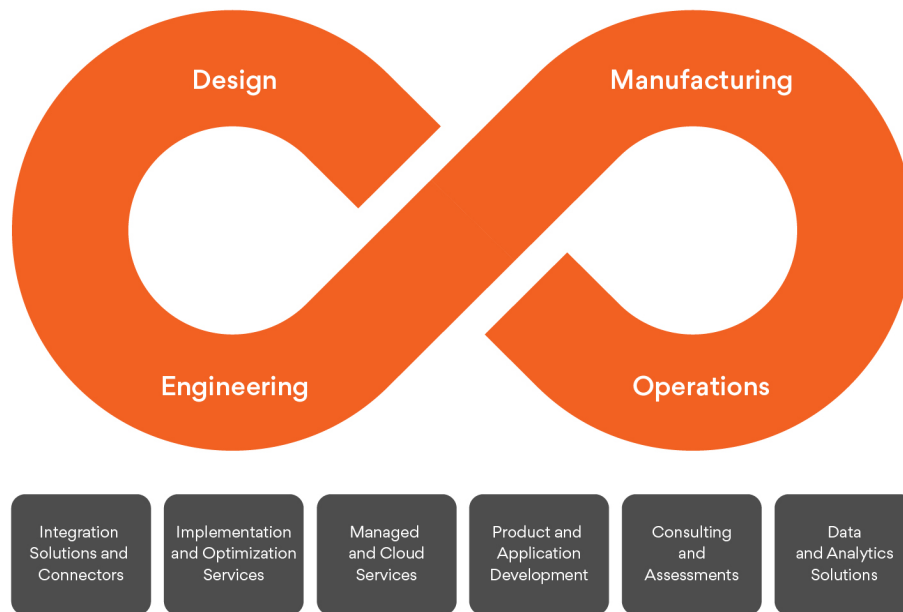


Figure 1—Persistent Systems Industrial Solutions Capabilities
(Courtesy of Persistent Systems)

Persistent entered the Dassault Systèmes channel business with their acquisition of NovaQuest in 2013, an integral part of their Industrial Solutions business unit. Persistent brings some especially important experience into the Dassault Systèmes partner ecosystem. Most notably, Persistent has a very deep relationship with IBM. Persistent took over development of the IBM application lifecycle management (ALM) portfolio in 2015 and is IBM’s primary go-to-market partner in selected geographies, with over a hundred ALM customers. The company

has leveraged this expertise to create a set of Integration solutions that link the IBM Engineering Lifecycle Management portfolio (previously Rational, including Rational DOORS), the world's most widely used requirements management tool, with other ALM and PLM solutions. They currently offer integrations between IBM ELM and Jira from Atlassian and the open source version control system Git. ALM is a key enabler of smart, connected product development, one that Persistent can bring to its industrial clients. This deep level of expertise differentiates them from other potential partners in the market.

Persistent is also a major IBM partner around IBM Watson IoT, the main strategic focus for IBM's global business. Persistent launched specialized engineering services around that platform in 2016.² This is important because the rate IoT adoption is increasing. In CIMdata's 2019 research on digitalization and digital transformation, 96% of our industrial respondents said in that in 3 years smart, connected products will be "important" or "very important" (72%) to their business. This will generate a lot of data that needs to be captured, managed, and analyzed. Persistent can help here too, bringing their experience in implementing industrial data lakes both on-premise and in the public cloud to address this need. To ingest and interpret this data, Persistent has in-house expertise, technology, and customer experience in industrial connectivity as well as AI and ML upon which to draw.

Persistent has significant experience in the leading industrial sectors in terms of PLM investment, including aerospace, automotive, and industrial equipment. Many of these industries need help with their IIoT strategies and implementations, often as part of an Industry 4.0 initiative. Persistent's IIoT expertise and market relationships will help them serve their customers well in applying IoT and IIoT to improve their products, manufacturing, and operations.

In addition, Persistent is investing to expand their work with Dassault Systèmes to more of the Dassault Systèmes' portfolio. For example, with encouragement from Dassault Systèmes, Persistent is expanding their work in the manufacturing execution systems (MES) segment, a vital growth area for Dassault Systèmes. Their initial focus will be on Apriso and Ortems, recent Dassault Systèmes acquisitions.³ MES is a key part of the digital thread from ideation through life and an accurate as-built bill of materials is essential for effective service lifecycle management. CIMdata thinks this is a good but challenging move for Persistent.

Conclusion

If current trends hold, it will indeed be an increasingly smart connected world. From our appliances to our smartphones, from our factories to our parking lots, to where all of our products we buy and use will be smart and connected. Over the last 20 years, the notion of PLM has expanded to support the development of smart—the addition of electronics and software—and now connected products by adding communications and sensors. Product companies designing and manufacturing these products need to quickly ramp up on the tools, technologies, and processes they need to innovate across the mechanical, electrical/electronic, and software elements of their smart connected offerings.

Persistent has deep skills in most of these areas. In some ways, Persistent is the best kept secret in the global PLM Economy because it is their integrations and work with multiple ISVs that has positioned them so well in the PLM market. Industrial companies that rely on Dassault

² <https://www.persistent.com/media/press-releases/persistent-systems-launches-specialized-engineering-services-for-ibm-watson-iot-platform/>

³ <https://www.3ds.com/press-releases/single/dassault-systemes-to-acquire-aprison/> and <https://www.3ds.com/press-releases/single/dassault-systemes-extends-the-3dexperience-platform-to-supply-chain-planning-and-operations/>

Systèmes' solutions need to expand their PLM implementations to include ALM and the IIoT. Persistent can bring the deep skills necessary to quickly ramp up these companies to maximize the benefits possible from their adoption to support the product lifecycle. Expanding into the MES business will be a challenge as many players are chasing the same MES experts to build their capabilities. But if their growth over their nearly 30 year history is any indication, Persistent Systems will determine the best path forward to continue their market success.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.