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Product Leaders Must Deliver Composable, Best-of-Breed Manufacturing Solutions

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Initiatives: Industry Product Planning and Strategy

Manufacturers seek solutions for end-to-end product-related value chains, but not necessarily from one vendor. Product leaders providing specialized capabilities must deliver solutions with composable architectures, proven capabilities and broad industry expertise to succeed in wider ecosystems.

Overview

Key Findings

- Manufacturing companies require integrated end-to-end processes and digital thread initiatives for their products' life cycles, from ideation to end of life.
- Even in end-to-end processes, manufacturing companies often need some differentiating capabilities, which are best supported by more nimble, specialized, best-of-breed solutions.
- Best-of-breed vendors offer individual technologies (like data visualization tools, collaboration tools, IoT and analytics solutions, point integrations), but sometimes lack the product architecture, the knowledge of broader industry needs and the internal organization to successfully support end-to-end processes.

Recommendations

Software product leaders undertaking industry product planning and strategy for best-of-breed manufacturing industry solutions must:

- Architect solutions to be modular within a "composable" system architecture. Such modular, composable solutions fill gaps in well-established incumbent environments, which will not all be replaced/modernized at the same time.

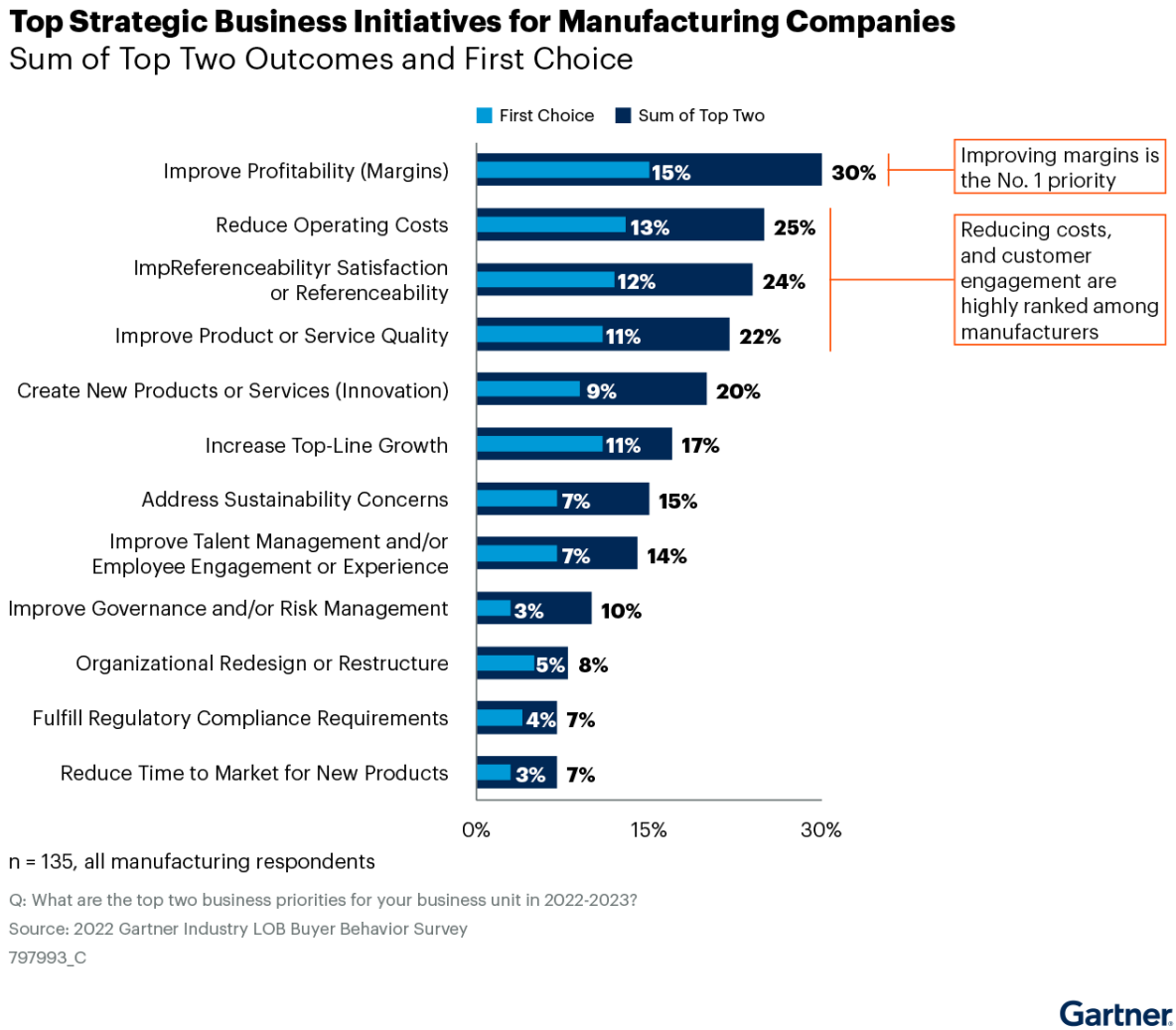
- Improve implementation speeds by providing reference material and proof of capability to assist customers with sharing key data (like BOMs) and ensuring the flow of information between core business applications (in particular, CAx, PDM, ERP and MES).
- Build joint process-and-outcome-driven industry solutions based on digital technologies, such as cloud, Internet of Things (IoT), analytics, machine learning, digital twins and digital threads, by partnering with other software vendors and systems integrators with broad product life cycle management (PLM) and manufacturing industry skills.

Analysis

Customers' expectations of physical products are constantly changing. Customers want to customize their individual products, industrial equipment needs to deliver all sorts of data in addition to its original outcome and even mundane products are becoming "smart." Quality and security requirements are growing to the extent that even consumer product goods need to provide detailed traceability data. At the same time, manufacturers are looking for digital business models built on data monetization and "product as a service" concepts (see How Product Leaders Can Advance Product Servitization Maturity for Manufacturers).

Figure 1 shows the top business priorities as listed by manufacturing companies in the 2022 Gartner Industry LOB Buyer Behavior Survey. [1]

Figure 1: Top Strategic Business Initiatives for Manufacturing Companies



n = 135, all manufacturing respondents

Q: What are the top two business priorities for your business unit in 2022-2023?

Source: 2022 Gartner Industry LOB Buyer Behavior Survey

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The survey shows that most of the initiatives require product or product-related data, as this data is essential for value-generating processes like PLM or supply chain management (SCM). The key initiatives are:

- Improve customer satisfaction (ranked No. 3)
- Improve product or service quality (ranked No. 4)
- Create new products or services (ranked No. 5)

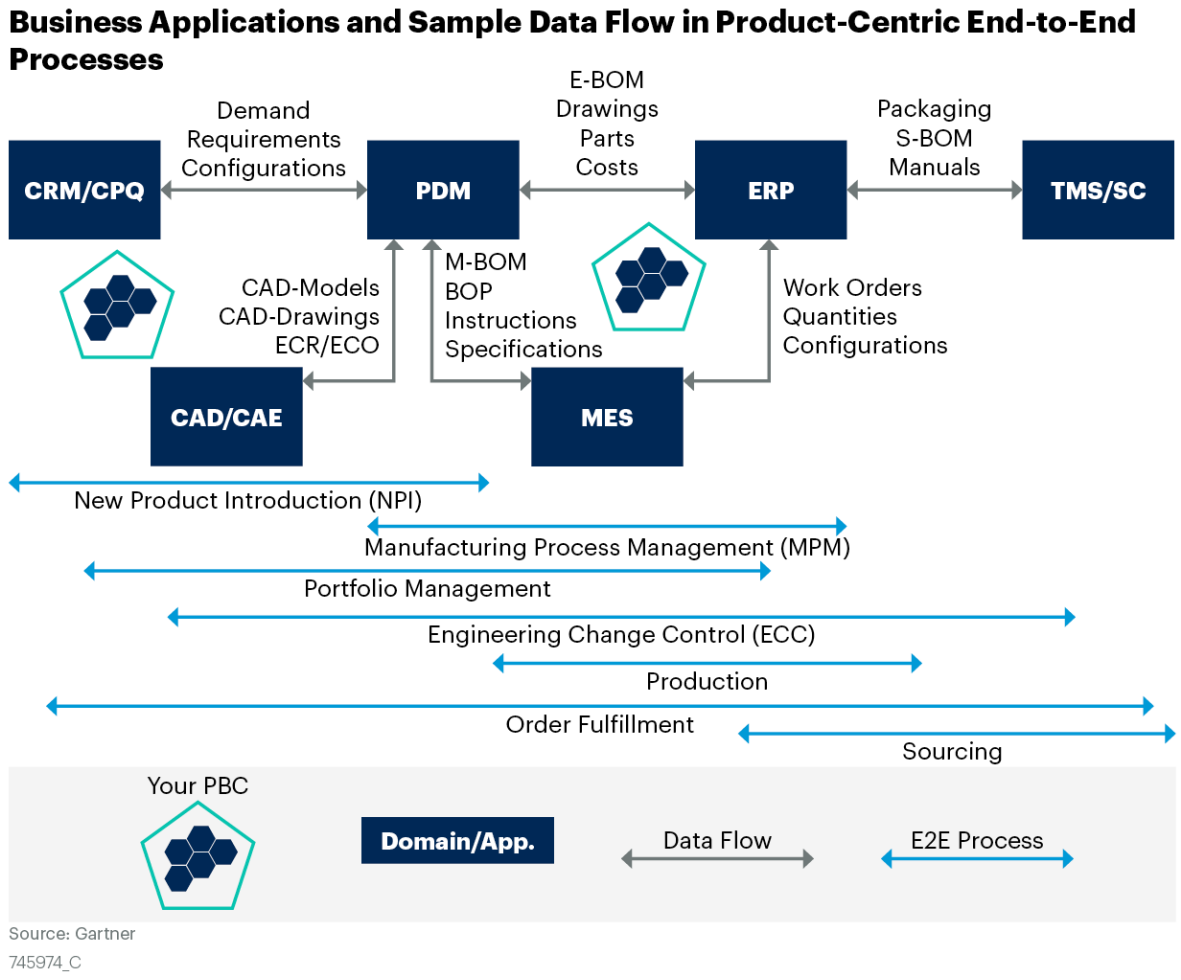
Manufacturing initiatives, such as improving product and service quality and creating new products or services, require data that is generated or enriched in the system network "CAx-PDM-CPQ-CRM-ERP-MES." This network often supports the framework called "digital thread," which enables the collection, organization and presentation of data for multiple factors. These factors influence products and processes in their current state and throughout their respective life cycles.

To meet the changing and increasing requirements, manufacturing companies use a number of business applications to support their product-related data and to streamline end-to-end processes, as illustrated in Figure 2. Some form of product data management and workflow often forms the core, but this core needs to exchange data and information with many other solutions, such as:

- CRM or CPQ for collecting customer requirements and orders
- CAx for engineering and design
- ERP and SCM for fulfillment
- PDM, ERP and MES for orchestrating changes in parts, materials and manufacturing workflows across a supply chain, with changes to designs

Deep integration of this ecosystem of applications will be necessary for the realization of a digital thread (see Product Leader Insight: Enable Digital Threads to Increase Revenue and Customer Loyalty).

Figure 2: Business Applications and Sample Data Flow in Product-Centric End-to-End Processes



A big portion of the business capabilities are standard and can be fulfilled by a well-selected and well-implemented end-to-end manufacturing solution, such as a broad PLM suite of records. But, some specific capabilities will often need a more specialized solution, which will not be available within the broad suite. These capabilities will need a more focused technology or service provider with a best-of-breed solution offering more specialized functionality.

Two types of vendors are used to source the necessary solutions:

- Some manufacturing solution providers offer broad, comprehensive suites aimed at supporting end-to-end processes, such as design-to-retire and others. The processes are symbolized as blue arrows in Figure 2.

- Many other manufacturing solution providers offer specialized best-of-breed software for a subset of requirements within an end-to-end process. Their solutions are represented by the small “PBC” pentagons in Figure 2.

This research intends to give product leaders of best-of-breed solutions the background, context and framework to deploy their products in broader digital thread initiatives by using composability as the guiding principle.

Background and Context

A variety of manufacturing solution providers offer solutions for specialized requirements. Some examples among the many are Medtronic for cyber-physical systems, aPriori for predictive product costing and OpenBOM for synchronized BOMs (see Hype Cycle for Advanced Technologies for Manufacturers, 2023).

Highly specialized manufacturing solution providers and their offerings show certain characteristics:

- They offer good, complementary, best-of-breed solutions, but often lack the expertise or the solution breadth to support entire end-to-end processes.
- They mainly target operations line-of-business buyers, but struggle to be recognized by more strategic buying personas at higher management levels.
- Their go-to-market is less visible, overshadowed by the marketing and messaging of large suite vendors.
- In order to win customers and deliver value, their solutions have to offer the entire technology stack necessary, from data management to the user experience. Hence, their solutions cannot be easily incorporated into broader platforms, as these enclosed architectures are not built to easily operate as components within a broader context.
- Their documentation material and support organizations are (and have to be) stand-alone and not prepared for reuse.

These characteristics are not a result of bad planning or wrong company setup. They are necessary for smaller, more-specialized, best-of-breed solution providers to win and support their customers. But taken together, these characteristics cause these companies to struggle to be successful in contexts that are too broad for their solutions. Delivering only a composable solution that plugs into wider, comprehensive, end-to-end manufacturing solutions will allow them to provide their expertise and scale their business.

The Impact

Product leaders of best-of-breed solutions who cannot illustrate the value contribution of their more-focused solution footprint in end-to-end scenarios will not be considered, especially not by more strategic buyers at higher management levels. They might be successful in selling to focused line-of-business buyers looking for a distinct solution, but will struggle to "land and expand" into other parts of the enterprise.

Customers, on the other side, cannot find and deploy the best mix of solutions to support their requirements. They have to live with severe limitations and compromises, which reduce the value their manufacturing solutions provide. They have to either adopt less-capable solutions for certain requirements from a broad-scale vendor, or they have to spend significant effort to integrate multiple specialized best-of-breed solutions.

Conclusion

Product leaders of manufacturing best-of-breed solutions need to transform their offerings and their go-to-market approach. Without losing their ability to exist as stand-alone solutions, they need to transform their respective solutions into composable packaged business capabilities. Additionally, they need to build sales, implementation and support processes that can coexist in bigger contexts.

To achieve this, product leaders responsible for product planning and strategy for specialized manufacturing industry solutions must:

- Adopt composability as part of their strategy by architecting their solutions to become packaged business capabilities within a “composable” system architecture. Their solutions need to be as composable as possible (see How to Design Enterprise Applications That Are Composable by Default). Their solutions must support the PBC pattern by offering modularity, autonomy, discovery and support for orchestration. The UX needs to be separable from the logic and data layer so solutions can be reused in an orchestration platform. This will enable their offerings to fill gaps in established incumbent environments, which will not all be replaced or modernized at the same time.

- Leverage digital technologies such as industry clouds, IIoT platforms, analytics applications and AI/ML frameworks, and templates for digital twins. Familiarity with and support of these technologies will help them be an essential and valuable component in a wider ecosystem.

- Be able to articulate their value contribution to a wider picture using different end-to-end scenarios. Best-of-breed vendors need to understand the end-to-end processes with overarching data flows spanning across multiple functions and need to position their offerings and services in that wider picture.

- Develop licensing models to fit into the price models of large partners. The value of their solutions shouldn’t be lost in the wider picture — or else their portion of the overall budget will be too small for them to stay viable. Understanding and articulating their value is essential to gaining sufficient revenue. Reference material and best practices need to show how their specific solution collaborates with the sharing of key data (like BOMs) and the flow of information between various core business applications (in particular, CAx, PDM, ERP and MES), as illustrated in Figure 1.

- Provide documentation, training and support material to allow third-party resources to implement and support their solutions. This includes presales scenarios, reference customer-success stories, process templates, integration setups, digital training material and knowledge bases. Training and support facilities for professional services resources of other vendors and systems integrators will significantly extend their solutions’ reach and presence beyond the ability of the original vendor.

- Enable their offering to be present in marketplaces of various vendors to complement these vendors’ offerings. Documentation needs to allow business technologists and fusion teams to identify and deploy the offering.

- Formalize partnerships with software vendors and systems integrators with broad PLM and manufacturing-industry skills to jointly build process-and-outcome-driven industry solutions.
- Become an active participant in the marketing efforts of such partners to create awareness and visibility of the specialized solution.
- Be prepared to address stakeholders across different business functions, including those from IT, operational technology (OT) and engineering technology (ET), in the acquisition, scoping and solution design stages of an implementation. This will require widening their expertise and sales and implementation activities beyond the more targeted focus of their specialized best-of-breed solutions, which will continue to be their central contribution.

Defining their role and offering better technical and commercial integration into broader portfolios will allow specialized vendors to expand their market and win customers that would otherwise be unreachable for them. It will improve their ”land and expand” strategy and make themselves, as well as their customers, more successful in their transformation efforts.

Acronym Key and Glossary Terms

BOM	bill of materials
CAD	computer-aided design
CAE	computer-aided engineering
CAM	computer-aided manufacturing
CAx	This is used to refer to any number of computer-aided industries, such as CAD, CAE or CAM
CPQ	configure, price and quote
CRM	customer relationship management
ERP	enterprise resource planning
ET	engineering technology
IIoT	industrial Internet of Things
IoT	Internet of Things
MES	manufacturing execution system
ML	machine learning
OT	operational technology
PBC	packaged business capability
PDM	product data management
PLM	product life cycle management
SCM	supply chain management

Evidence

While researching for the Magic Quadrant for Manufacturing Execution Systems, Gartner analysts found that only a minority of companies decided to use the vendor of their core MES solution for these types of domains:

- Quality management (QMS): 48%
- Production scheduling: 38%

- Maintenance management: 32%
- Logistics: 29%
- Warehouse management (WMS): 18%
- Supplier Management: 15%

[1] **2022 Gartner Industry LOB Buyer Behavior Survey:** This survey was conducted to understand how business leaders in each industry are shaping technology's role in their business initiatives and operational change, and how decision makers in core business areas are making these decisions. The research was conducted online from February 2022 through April 2022 among 711 respondents in North America (n = 325 in the U.Sand Canada), Western Europe (n = 245 in the U.K., France and Germany), and APAC (n = 141 in Australia and Singapore), of which 135 were in manufacturing industries. Qualified organizations had $50 million or more in revenue in fiscal-year 2022 across eight verticals— banking and financial services, energy and utilities, retail, manufacturing, insurance, healthcare, public sector, and telecommunications. Respondents were heads of line-of-business departments or within two reporting levels away. Moreover, they were involved in evaluating products or services for technology projects and should be aware of any exploration, purchase, replacement or renewal of technology products or services for their departments. *Disclaimer: The results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

Document Revision History

Best-of-Breed Manufacturing Solutions Must Become Composable to Contribute to End-to-End Value Chains - 17 November 2021

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