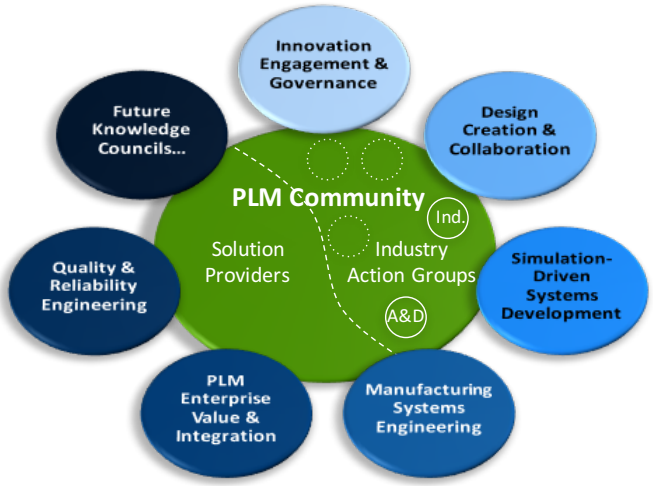
Manufacturing Systems Engineering Knowledge Council

Strategies to Support Manufacturing Systems Development & Execution

Individual Membership

CIMdata's Product Lifecycle Management (PLM) Knowledge Councils conduct in-depth research for both industrial organizations and PLM solution providers. They emphasize strategic as well as practical, tactical options for companies to follow as they further adopt PLM. The research defines best practices for topics of interest to industrial companies who use PLM to support their ongoing product development business strategies and for PLM solution providers interested in understanding and defining their PLM strategies and directions.



CIMdata currently offers six PLM Knowledge Councils, as shown in the figure above. Council topics are developed from CIMdata's PLM Community as technology evolves and industry requirements dictate. Additional information related to CIMdata's PLM Community is located at www.CIMdata.com.

Manufacturing Systems Engineering Knowledge Council

Manufacturing systems engineering embodies the processes and tools used to plan, simulate, and execute product production processes. The manufacturing systems engineering approach seeks to integrate all the disciplines and specialty groups involved in a system's design into a team effort forming a structured production process. Manufacturing systems engineering considers both the business and the technical needs of manufacturing, with the goal of providing a high quality product that meets the users' needs, and provides it in an optimal manner that maximizes an organization's return on investment.

The Manufacturing Systems Engineering Knowledge Council (MSE Council) gathers and benchmarks best practices for integrating data, processes, tools, and people across the production environment. The program identifies and prioritizes requirements and capabilities for manufacturing systems engineering strategies, best practices, and enabling solutions.

Council members include manufacturing companies and commercial solution providers. The active participation of these members enables strategic alignment between industry needs and currently available and future solutions.

MSE Knowledge Council Member Deliverables

Manufacturing Systems Maturity Model

The manufacturing systems maturity model will seek to establish a framework of common terminology for integration and optimization of the diverse activities that fragment manufacturing production design and execution. The model will cover a number of high level categories, each with specific criteria. These will be assessed during detailed discussions with manufacturing companies, to ensure a solid understanding of capabilities and utilization of digital manufacturing processes and technologies.

The manufacturing systems maturity model will identify critical issues related to the integration of products into the production environment—be that a machine tool, cell of tools, or a complete production line and its supporting execution systems. The maturity model will evaluate the maturity level of participating companies by leveraging a multi-level ranking approach applied to each of the model's criteria. The maturity model investigates a set of criteria, which are established collaboratively by members of the MSE Council and will evolve over time through active discussions and research. Measuring an organization's maturity is not only a way of ranking its current capabilities, but also provides actionable recommendations that will help the organization to improve its

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maturity. The manufacturing systems maturity model's results will reinforce the critical need for companies to better plan their product production environments.

A ranking of maturity classifies company performance with a multi-level rating for each criterion. The low end rating represents little capability, often supported by ad-hoc initial actions. The high end captures organizational management attuned to targeted optimization of activity, and continuous improvement.

Overall, this model will capture the maturity levels for manufacturing systems across companies and industries. It will identify gaps in early planning and upfront manufacturing system design. By implementing the best practices documented in this analysis, companies can transform their business by reducing costs and offering greater product variety.

The high-level topics covered in the maturity model include:

- Defining the manufacturing engineering and production execution problem domain
- Collaboration and integration between people and processes
- Manufacturing engineering systems and solution processes
- Supporting tools and technologies

CAM Market Analysis

An important part of the manufacturing systems engineering world is the role of NC machines and Computer-Aided Manufacturing (CAM) software. CIMdata has researched this important area for more than thirty years and has developed and publishes reports on CAM software, CAM solution providers, and how these technologies are used to improve product quality and productivity.

Materials from this research will be made available to the MSE Council's members.

MES Market Analysis

Another important part of the manufacturing systems engineering world is the role of manufacturing execution systems (MES). CIMdata has performed researched on this important area for many years and is in the process of developing industry leading reports on MES software, MES solution providers, and how these technologies are used to improve product quality and productivity by closing the loop with design.

Materials from this research will be made available to the MSE Council's members.

MSE Workshops

CIMdata offers workshops and conferences to encourage and enable leading industrial companies and solution providers to discuss the major issues in manufacturing systems engineering. With solution providers actively engaged, these workshops provide an opportunity for the solution providers to identify critical technology gaps that limit the benefits of their manufacturing engineering solutions.

The MSE Council currently supports a digital manufacturing framework—an integrated environment that provides tools to manage access to applications, data, and computing resources. The framework manages the complexity of digital manufacturing solutions within the larger PLM environment.

Knowledge capture, requirements management, process automation, and data management are necessary elements to support manufacturing systems engineering, quality control, and production collaboration as a foundation for product optimization and production execution. The low level of PLM maturity at many companies presents a significant problem in defining, deploying, and integrating a comprehensive manufacturing systems engineering framework.

The MSE Council focuses on requirements-driven design and validation of production systems. A detailed maturity model on requirements management assesses end-user needs and best practices, analyzing data from users within leading-edge industrial companies. A strategic, high-level review and maturity model of the offerings by leading manufacturing solution providers is also continuously updated. Case studies provide guidance on strategies for the utilization of manufacturing systems engineering concepts in the product production process, and for successful deployment to overcome organizational resistance to change. The MSE Council also provides highly regarded forums for face-to-face discussions between industrial companies and solution providers.

The MSE Council is open to both solution providers and industrial companies through enterprise or individual memberships.

Under the guidance of collaborative members, the Manufacturing Systems Engineering Knowledge Council develops and executes a research agenda. Some past research topics included:

- ***Progress made and critical priorities for digital manufacturing:*** A detailed maturity model on industrial companies' capabilities, requirements, and benefits, updated with participation from leading companies in different industry segments. The critical requirements for users need to be clearly identified, prioritized, monitored, and continuously updated. Leading global industrial companies participate in CIMdata surveys to better understand the current context and priorities for collaborative, in-depth product design and production that help to shape decisions more effectively. The approach concentrates on those priorities that can be achieved in six to twelve months. The results are to be published in reports available to members of the MSE Council.
- ***Digital manufacturing framework capabilities:*** A strategic, high level review and maturity model of the

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offerings by leading solution providers in digital manufacturing measures integration with other functional silos: PDM and CAD, simulation and analysis, test, and ERP. The results are applied in tracking the progress of the major product offerings from the leading solution providers.

- ***High-level requirements for digital manufacturing systems process management:*** Each provider has a specific approach to digital manufacturing data and process management, and different categories of providers are currently extending their offerings in this domain. The MSE Council analyzes these approaches and highlight key benefits for the users.

Knowledge Council Offerings[1]

2016 Events

- PLM Road Maps™ 2016
- US Workshop

Publications

- Publications and reports related to the MSE Council, including archived reports
- Any maturity models developed from the research of the MSE Council

PLM Presentations and Audio from PLM Road Map

All presentations from PLM Road Map events are provided.

Membership Levels

Corporations who sponsor the Knowledge Council include both industrial companies and solution providers. Two levels of membership are offered: Enterprise and Individual.

Individual Membership

Individual members receive the following benefits:

- ***Knowledge Council Participation***—participation in Council surveys and discussions that help drive and shape the critical issues that are researched.
- ***Knowledge Council Registrations***—one free registration to CIMdata-organized Council events (e.g., Council workshops, webinars, briefings, and teleconferences). Additional registrations for the Council Workshops are available at a discount.
- ***One Named User***—the Named User is the designated contact who receives direct mailing of the Late-Breaking News and other publications, and who is authorized to contact the Knowledge Council leader. One named user receives all Council deliverables. Additional Named Users may be added for a fee.
- ***Corporate Use License***—members receive a worldwide license to distribute CIMdata-provided news and authorized publications throughout their organization for internal use. Named Users may forward or post these to colleagues within their company. This license does not imply nor include any right to perform language translations of CIMdata copyrighted materials as any translation must be performed, approved, and released by CIMdata.
- ***PLM Road Map™ Conference***—members are entitled to one registration to one CIMdata PLM Road Map conference held within the membership year. Currently, CIMdata is holding three such conferences (one A&D focused, one automotive, and one high-tech electronic). This registration is limited and may not be used by sales and marketing personnel. Additional registrations are available at a discount.
- ***PLM Late-Breaking News***—a daily newsletter that provides breaking news on PLM market activity, product announcements, industry events, financial investments, solution providers, and industrial users, along with CIMdata's latest commentaries providing insight and analysis.
- ***PLM Industry Summary***—a weekly compilation of news that is the most comprehensive and longest running digest focused exclusively on the PLM industry. Extensive archives of industry news and product announcements are maintained online at CIMdata.com.
- ***Market Update Webcasts***—quarterly members-only broadcasts provide CIMdata's insights on notable developments in the many technology market segments within PLM, along with updates on CIMdata research and member support resources.
- ***PLM Certificate Program Discounts***—members enjoy special rates of 10% off list price in addition to volume discounts for multiple participants in PLM Certificate Programs. The CIMdata PLM Certificate program is an assessment-based PLM training class for industrial companies, software providers, consulting services firms, value added resellers, and system integrators.
- ***Presentation at a CIMdata Event***—members may nominate a speaker or panelist in a CIMdata event or conference during the membership term, including CIMdata's PLM Road Map conferences and Knowledge Council workshops.
- ***Publications Discount***—members receive 15% off the list price when purchasing CIMdata research reports and publications not included in the Council membership.

[1] Selected presentations and audio from all of CIMdata's PLM Knowledge Council activities are available to MSE Council members for download.

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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) solutions. Since its founding over thirty years ago, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM-enabling technologies.

CIMdata works with both industrial organizations and solution providers of technologies and services seeking competitive advantage in the global economy. CIMdata helps industrial organizations establish effective PLM strategies, assists in the identification of requirements and selection of PLM technologies, helps organizations optimize their operational structure and processes to implement solutions, and assists in the deployment of these solutions.

For PLM solution providers, CIMdata helps define business and market strategies, delivers worldwide market information and analyses, provides education and support for internal sales and marketing teams, as well as overall support at all stages of business and product programs to make them optimally effective in their markets.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certificate programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific.

To learn more about CIMdata's services, visit our website at 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.

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