

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

PLM Road Map™ & PDT Europe 2025
PLM's Integral Role in Digital Transformation From Strategy to Execution
Elevating PLM to an Enterprise Business Solution,
the PLM Professional's Road Map to Success
5 & 6 November **eurostep**

PLM's Integral Role in Digital Transformation
PLM Road Map™ & PDT Europe 2025

5 November 2025—Paris, FRANCE

Peter Bilello, President & CEO, p.bilello@CIMdata.com
+1.734.668.9922

www.CIMdata.com
Copyright © 2025

CIMdata Defining What Comes Next in Digital Transformation

Strategic management consulting for competitive advantage in global markets

The leading independent authority on PLM and its digital transformation. We provide research, education, and strategic consulting to clients around the world.

OUR MISSION:
Maximizing clients' ability to design, acquire, deliver, and support innovative products and services.

www.CIMdata.com
Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

CIMdata's Services

 Strategic advice & counsel through a comprehensive & integrated set of services



| | | |
|--|--|---|
| <ul style="list-style-type: none">• Research & analysis• Technology evaluations• Market-specific insights• Industry news & trends | <ul style="list-style-type: none">• Industry conferences• Seminars & webinars• Certificate programs• Best practices | <ul style="list-style-type: none">• Strategic guidance• Aligning solutions with needs• Program management advisement• Market positioning |
|--|--|---|

3 Copyright © 2025

CIMdata

Peter A. Bilello, President & CEO

 Professional background



- More than 37 years of experience in the development of IT solutions for research, engineering, and manufacturing organizations worldwide
- Led numerous projects in PLM analysis, selection, implementation & management, synchronous and lean manufacturing consulting & software engineering, as well as general data management & governance strategy development and support
- Authored many papers & research reports on PLM and related topics, as well as numerous articles, commentaries, and perspectives that have appeared in publications throughout the Americas, EMEA & Asia
- Holds a B.S. in Computer Science (minor in Physics) & M.S.E. in Manufacturing Systems Engineering


4 Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Key Take Aways

 PLM's Integral Role in Digital Transformation
(1 of 2)


- As PLM professionals, we must understand & promote that PLM is a strategic business approach powered by a consistent set of solutions
 - Solutions that support the collaborative creation, use, management, and dissemination of product-related intellectual assets
- Enabled & executed properly, a PLM strategy will maximize a company's ROI by ensuring right-to-market
- Digitalization of the entire product lifecycle—from concept through life—is at the core of an organization's digital transformation
 - Digitalization requires rethinking many org. structures & business processes

5

Copyright © 2025

CIMdata

Key Take Aways

 PLM's Integral Role in Digital Transformation
(2 of 2)

- PLM needs to be well understood & incorporated into the company's digital transformation initiative, because of its integral & central role
 - Success depends on it
- CIMdata's Critical Dozen trends & enablers of successful digital transformation & their required PLM enablement must be central to an organization's digital transformation initiative



6

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

Agenda

CIMdata

- What is Digital Transformation: A Reminder
- Where & How PLM Fits into a Digital Transformation Initiative
- Key Enabling Elements of Digital Transformation
- Concluding Remarks

7

Copyright © 2025

Defining Digitalization

CIMdata



Let's first get a few things straight (1 of 2)

- Fundamentally, digitalization is the logical next step in representing anything and everything in 1s and 0s—the next revolution
- Digitalization is rapidly moving from a fuzzy concept to the newest data-driven derailment of the status quo
- Digitalization is transforming products from physical goods and tangible services—in many cases data is the “product”
- Products and services are being bought and installed more often for the data they generate or collect
- New sources of info are speeding up innovation & product dvlpmnt.

8

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Defining Digitalization



Let's first get a few things straight (2 of 2)

- Today's PLM professionals were here first...the digital tools used to enable the product lifecycle were the beginnings of digitalization
 - Today, what PLM does and can do is integral, no in fact essential, to meeting broad-based digitalization objectives
- The emergence of the PLM-enabling product innovation platform enables the end-to-end digitalization required to be not only successful, but to **thrive**



9

Copyright © 2025

CIMdata

Digitization vs. Digitalization



There is a difference, and it matters

- **Digitalization**...the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business—Gartner



- **Digitization** is the process of changing from analog to digital form

Think "knowledge management" of the 1990s...

10

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Digitization Isn't Enough

 *A clear need to move from files to data is emerging*

- Scanning and digitizing paper documents into images is losing its value and its rationale
 - As containers for today's massive information flows, images already fall short of the enterprise's true needs
 - The mass movement from documents to data is underway



11 Copyright © 2025

CIMdata

A Simple Example...

 *The digitalization of music media and business models*

From analog to digital to enabling a new digital business model

Digitalization




12 Copyright © 2025

PLM's Integral Role in Digital Transformation


PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Digitalization's Powerful Implications

 Oil
Oil
Oil *Data management is key to digitalization*

- Digitalization has three powerful implications for product development and lifecycle management:
 1. A new push to ensure that all data is fully accessible in any required format
 2. The revision of info in hundreds of **file** formats back into data records
 - As today's business strategies become data centric, file formats can be stumbling blocks
 3. The arrival of Big Data in all its variety, velocity, and volume—the exabytes and yottabytes of 1s and 0s at the heart of digitalization



13 Copyright © 2025

CIMdata

Agenda

- What is Digital Transformation: A Reminder
- Where & How PLM Fits into a Digital Transformation Initiative
- Key Enabling Elements of Digital Transformation
- Concluding Remarks

14 Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

What's PLM: A Reminder

Digital transformation of the lifecycle—enabled by a product innovation platform

- An end-to-end strategic business approach
 - NOT just technologies
 - Consistent set of business solutions
- Collaborative creation, use, management & dissemination of product related **intellectual assets**
 - All product/plant definition information – the **virtual product**
 - AEC, MCAD, EDA, ALM, SE, requirements, simulations, analytics, portfolio, formulas...
 - All product/plant process definitions – the **virtual processes**
 - Processes that plan, design, produce, operate, support, decommission, recycle...
- An innovation platform that supports the extended enterprise

15 Copyright © 2025

Simplifying the Product Lifecycle

What is the basic formula?

They are the key to enabling Innovation

Collective ideas of the organization's employees

They provide the foundation for Innovation

Intellectual Assets → Transformation ... → **Deliverable Assets**

The organization's products and/or services

A company's product and services are, and have always been, a result of the transformation of its intellectual assets into deliverable assets


16 Copyright © 2025

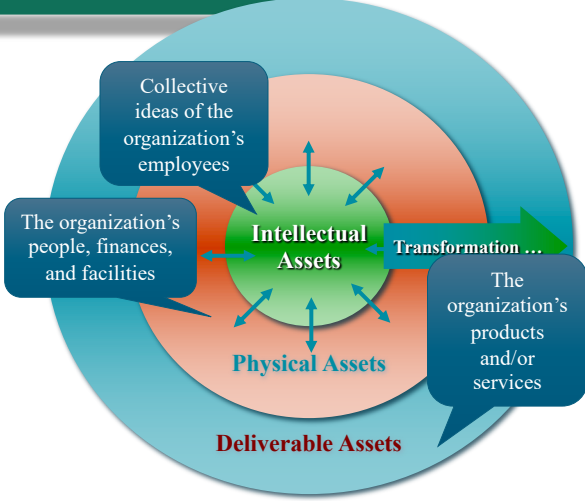
PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Intellectual Assets are at the Core


 *Money isn't at the core! Intellectual assets are and always have been at the core*



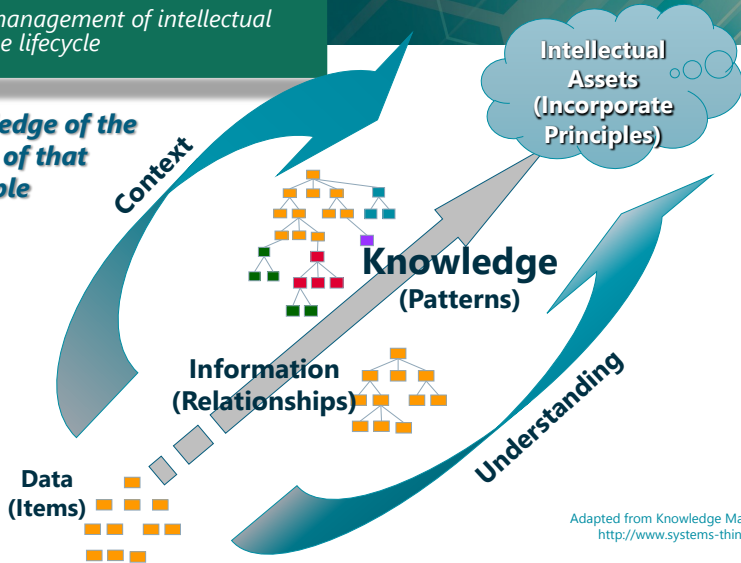
17 Copyright © 2025

CIMdata

Without Management, there are No Assets

 *It is the creation & management of intellectual assets that enable the lifecycle*

Traditionally, the knowledge of the organization is the sum of that which is held by its people



18 Adapted from Knowledge Management by Gene Bellinger
<http://www.systems-thinking.org/kmgmt/kmgmt.htm>
Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Defining Intellectual Assets

 Intellectual assets are key to innovation

Intellectual Assets are comprised of all the components of the enterprise's product and process definition


All mechanical, electronic, software, formulas, recipes, specifications, and documentation components; and

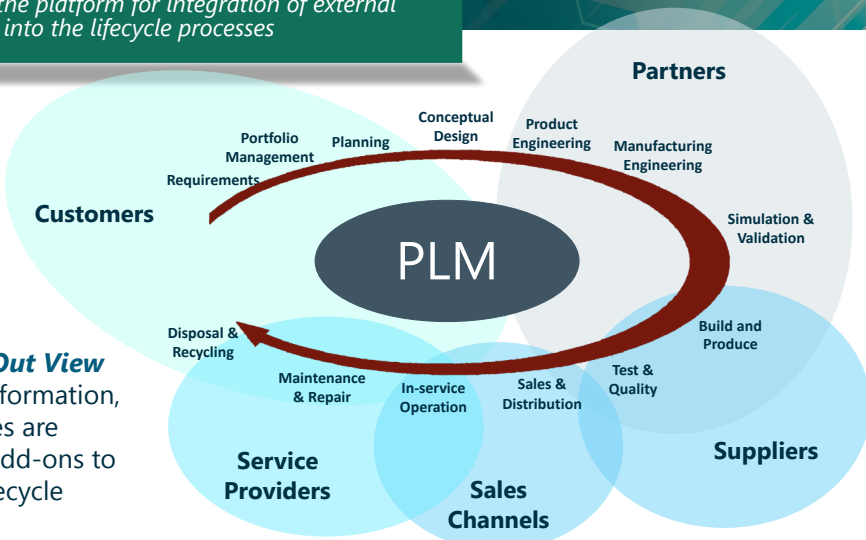
All business & manufacturing process definitions within the scope of the lifecycle

19 Copyright © 2025

CIMdata

PLM is at the Core of Digital

 PLM is the platform for integration of external entities into the lifecycle processes



In this **Inside Out View** of digital transformation, external entities are collaborative add-ons to the internal lifecycle process flow

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Agenda

- What is Digital Transformation: A Reminder
- Where & How PLM Fits into a Digital Transformation Initiative
- Key Enabling Elements of Digital Transformation
- Concluding Remarks

21

Copyright © 2025

CIMdata

CIMdata's Critical Dozen

01 End-to-end connectivity

02 Data & process management

03 Configuration management

04 Bills of information

05 Model-based structures

06 Digital thread/twin

CIMdata's Critical Dozen
The Top 12 Trends and Enablers of Digital Transformation

12 familiar, evolving trends & key enablers of digital transformation that you cannot, or should not, live without.


Digital thread/digital twin convergence—some from of a digital thread is required if you wish to have an up-to-date digital twin

22


Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025



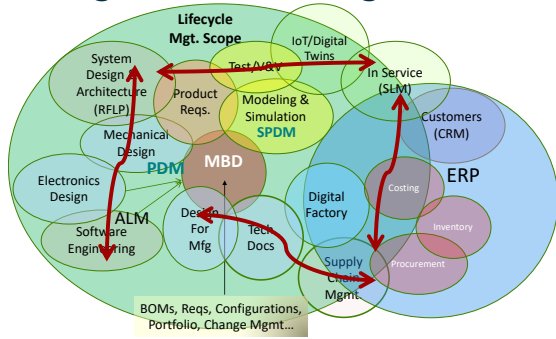
Digital Thread


CIMdata's preferred definition

06
Digital thread/twin


- A **communication framework** that allows a connected data flow & integrated view of an asset's data (i.e., its Digital Twin) throughout its lifecycle across traditionally siloed functional perspectives

Digital thread is enabled and supported by a robust end-to-end and connected systems model and MBSE processes




23 Extracted from: https://www.dodmantech.com/ManTechPrograms/Files/AirForce/Cleared_DT_for_Website.pdf
24 Also see: <http://www.manufacturing-operations-management.com/manufacturing/2016/04/what-is-the-digital-thread-and-digital-twin-definition.html>

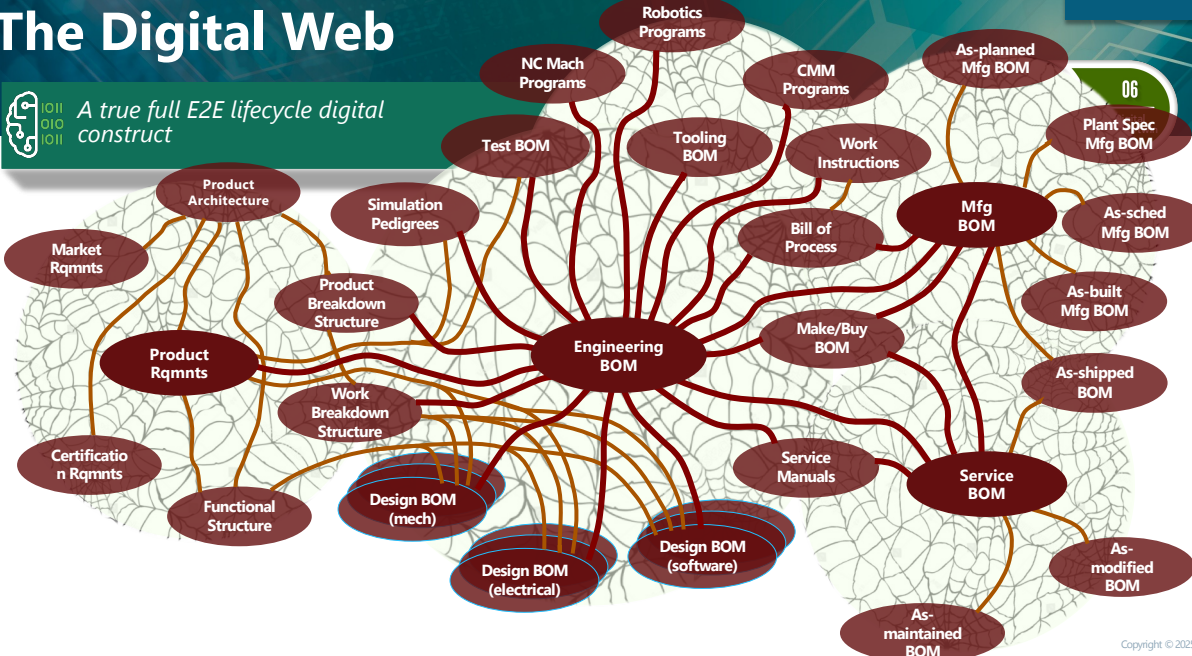
Copyright © 2025



The Digital Web


A true full E2E lifecycle digital construct

06

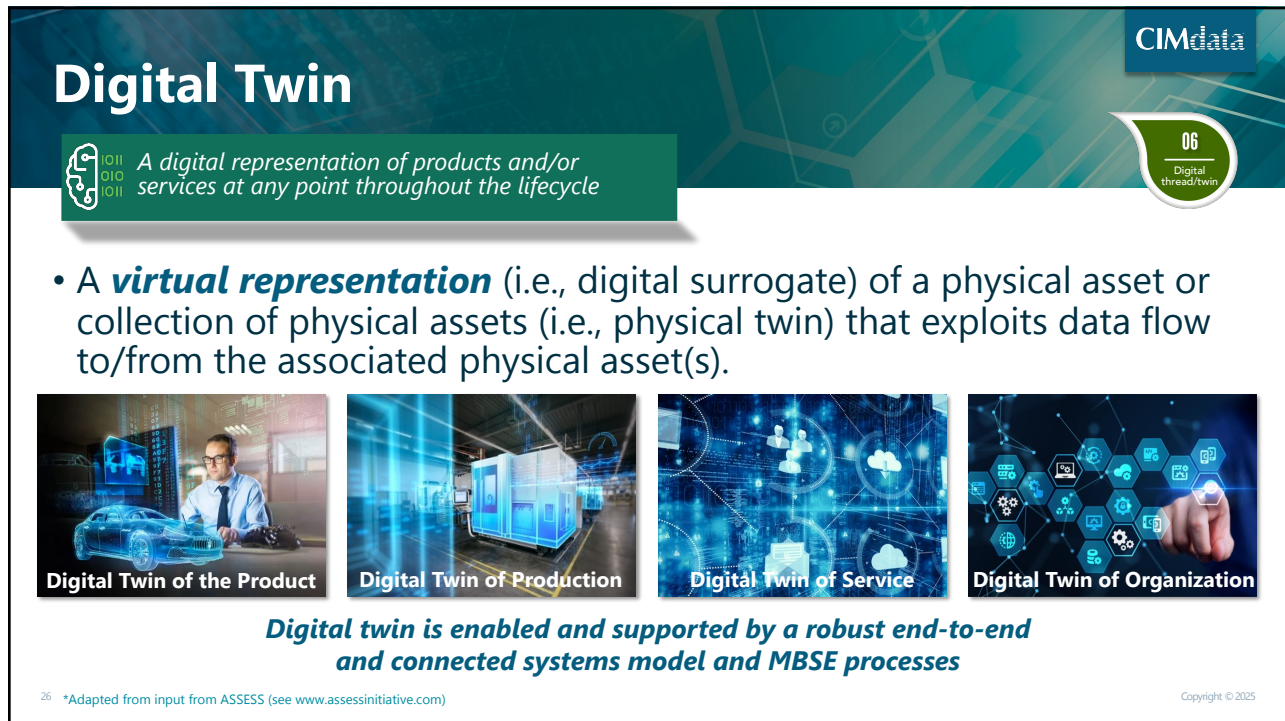
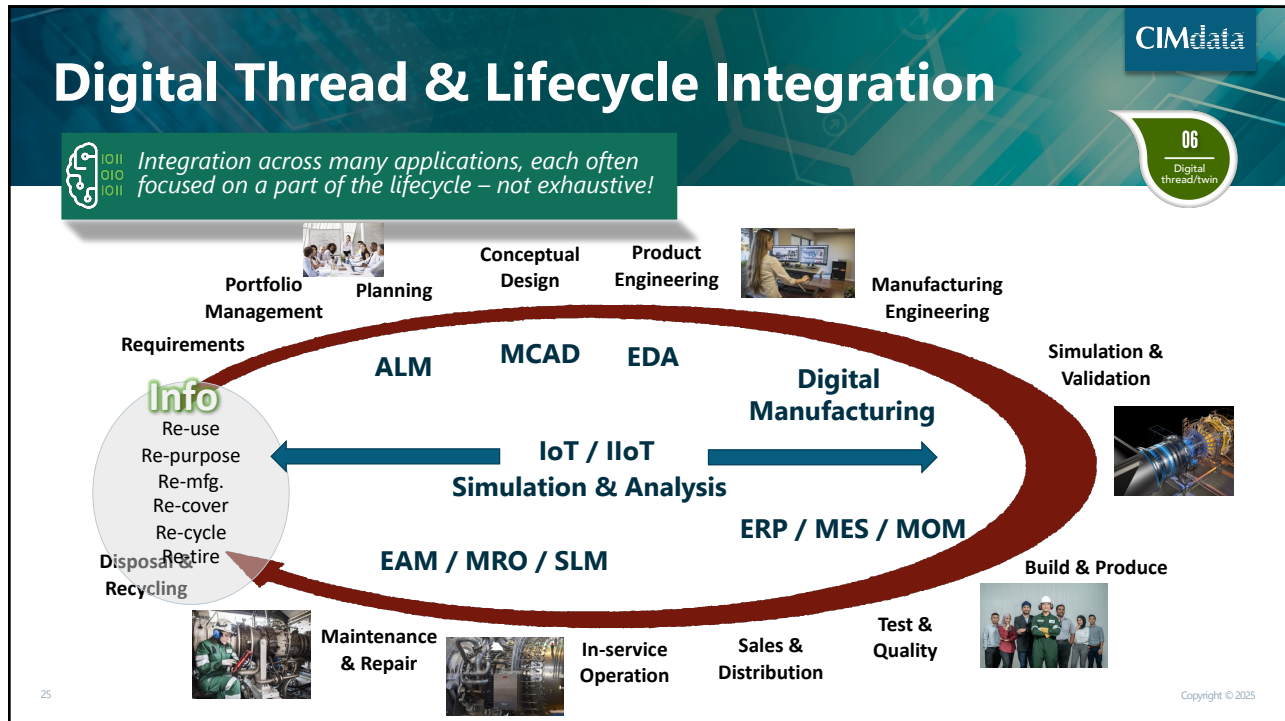


24

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025



PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata's Critical Dozen

01 End-to-end connectivity

02 Data & process management

03 Configuration management

04 Bills of information

05 Model-based structures

06 Digital thread/twin

07 IoT & PLM

08 Changing views of "product"

09 Big data & analytics

10 Augmented intelligence

CIMdata's Critical Dozen
The Top 12 Trends and Enablers of Digital Transformation

12 familiar, evolving trends & key enablers of digital transformation that you cannot, or should not, live without.

27

Copyright © 2025

Augmented Intelligence

AI is expected to augment, not replace, human ingenuity in engineering & design

- **Augmented Intelligence** or intelligence augmentation (IA) is not about replacing human intelligence but rather about amplifying or augmenting it by enabling humans to make use of the large volume of data we're generating by combining human and machine intelligence

"Over the next decade, AI won't replace managers, but managers who use AI will replace those who don't."

Erik Brynjolfsson and Andrew McAfee, HBR (2017)

Artificial

Augmented

Human


10 Augmented intelligence

28


Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025




AI Considerations

 *We appear to be at the tipping point*


10
Augmented intelligence

- The integration of artificial intelligence (AI) into the product lifecycle is poised to dramatically reshape engineering & design practices
- Humans need to assume the role of “curator” of AI generated content
- Professionals who embrace AI & adapt to the changing landscape will be well-positioned to thrive in the years to come
- Key areas of change include:
 - Automation & Optimization
 - Collaboration & Efficiency
 - Skills
 - Personalization & Customization

29 Copyright © 2025



Don't Forget AI Governance

 *AI governance is essential for ensuring that AI is developed & used responsibly*

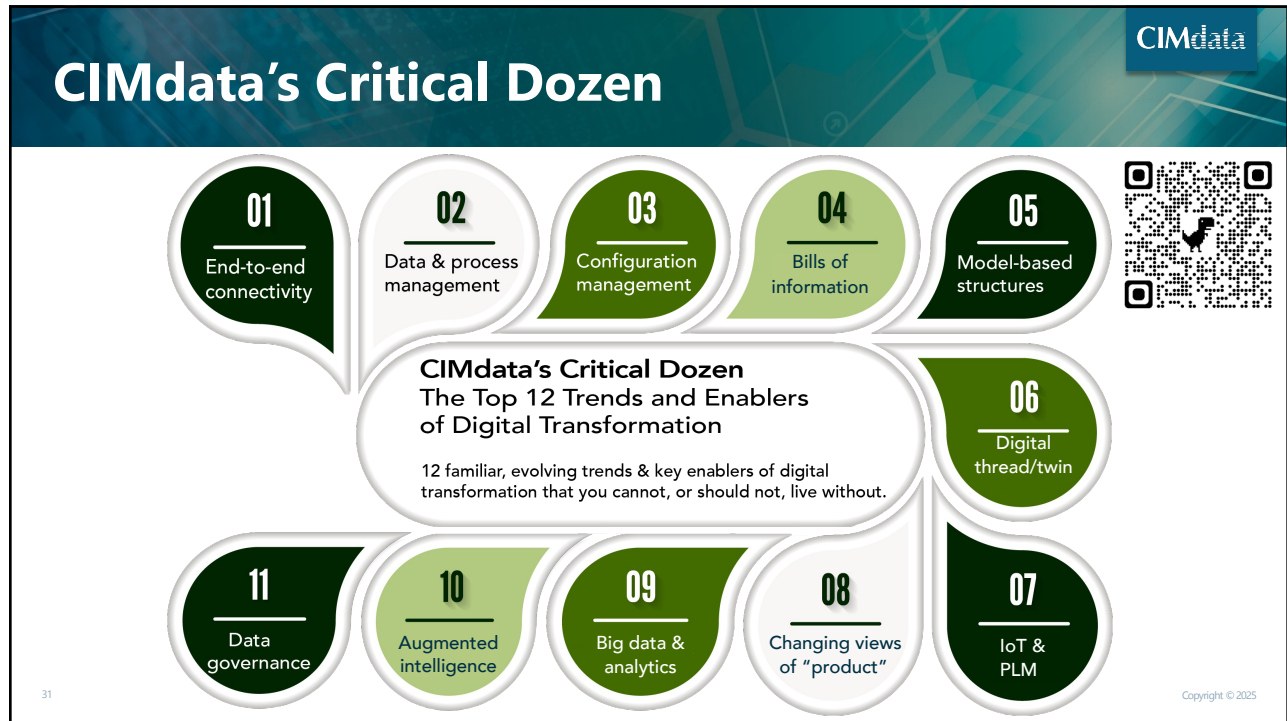
10
Augmented intelligence

- AI governance encompasses a set of principles, rules & practices that guide the development, deployment & use of AI enabled systems
- Here are some of the key reasons why it is important:
 - **Safety**—helps to ensure that AI systems are safe and do not pose a risk to people or the environment
 - **Ethics**—can help to ensure that AI systems are used ethically & fairly
 - **Transparency**—can help to ensure that AI systems are transparent
 - **Accountability**—can help to ensure that there is someone accountable for the development & use of AI systems
 - **Trust**—can help to build trust in AI systems

30 Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025



CIMdata's Critical Dozen

01 End-to-end connectivity

02 Data & process management

03 Configuration management

04 Bills of information

05 Model-based structures

06 Digital thread/twin

07 IoT & PLM

08 Changing views of "product"

09 Big data & analytics

10 Augmented intelligence

11 Data governance

CIMdata's Critical Dozen
The Top 12 Trends and Enablers of Digital Transformation

12 familiar, evolving trends & key enablers of digital transformation that you cannot, or should not, live without.

31 Copyright © 2025



Data Governance

CIMdata's definition

The definition, implementation, and management of policies, procedures, structures, roles, and responsibilities that outline and enforce rules of engagement, decision rights & accountabilities for the effective management of information assets.

11 Data governance

32 Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata's Critical Dozen

01 End-to-end connectivity

02 Data & process management

03 Configuration management

04 Bills of information

05 Model-based structures

06 Digital thread/twin

07 IoT & PLM

08 Changing views of "product"

09 Big data & analytics

10 Augmented intelligence

11 Data governance

12 Digital skills transformation

CIMdata's Critical Dozen
The Top 12 Trends and Enablers of Digital Transformation

12 familiar, evolving trends & key enablers of digital transformation that you cannot, or should not, live without.

33 Copyright © 2025

Digital Skills Transformation

Assessing, defining & enabling the workforce of the future—you can't transform without it (1 of 2)

12 Digital skills transformation

- A well-defined Digital Skills Transformation program is **multi-faceted**, and should include organizational, process, technology, content & delivery considerations
- An education & training framework, and related implementation & support structures cover **different organizational processes & supporting platforms**
- Different experience and skill levels need to be incorporated into **one repeatable standard**, applicable throughout an enterprise, no matter its size or complexity

34 Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata12
Digital skills transformation

Digital Skills Transformation

Assessing, defining & enabling the workforce of the future—you can't transform without it (2 of 2)

- With the appropriate structure in place, an enterprise is ***in a better position*** to proactively handle growth, reduce employee turnover, and successfully deal with the technological and process changes encountered



Copyright © 2025

35Copyright © 2025

CIMdata

Agenda

- What is Digital Transformation: A Reminder
- Where & How PLM Fits into a Digital Transformation Initiative
- Key Enabling Elements of Digital Transformation
- Concluding Remarks

36Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Concluding Remarks



PLM's Role in Digital Transformation (1 of 3)

- Companies need to think beyond digitizing data
 - Converting analog data to digital isn't enough
- Digitalization is the use of digital technologies to change a business model & provide new revenue and value-producing opportunities
 - It is the process of moving to a digital business
- Digitalization is at the core of an organization's digital transformation
- Digitalization concepts & associated technologies enable the next logical step in representing anything and everything in 1s and 0s

37

Copyright © 2025

CIMdata

Concluding Remarks



PLM's Role in Digital Transformation (2 of 3)

- Digital transformation requires rethinking many organizational structures and business processes, as well as what and to whom products & services are sold
- PLM is a strategic business approach that focuses on the collaborative creation, use, management, and dissemination of product related **intellectual assets—a company's core asset**
- PLM is the platform for integration of external entities into lifecycle processes—thereby enabling E2E connectivity & optimization of business functions & entities participating throughout the lifecycle

38

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata

Concluding Remarks



PLM's Role in Digital Transformation (3 of 3)

- Product data touches all phases of a product's life—these digital assets play a major/central role in an enterprise's digital transformation
- Don't forget, the data generated from your products and/or services often become more valuable than the products themselves
- Digital transformation will collapse without the implementation of the right set of data governance policies, procedures, structure, roles & responsibilities

PLM's role in a digital transformation journey is without a doubt—where do you want to go—what does your roadmap look like?

39

Copyright © 2025

CIMdata

Questions & Answers



What's on your mind?



40

Copyright © 2025

PLM's Integral Role in Digital Transformation

PLM Road Map™ & PDT Europe 2025—5 November 2025

CIMdata Defining What Comes Next in Digital Transformation



Strategic management consulting for
competitive advantage in global markets

Serving clients from offices in North America, Europe, and Asia-Pacific

World Headquarters

Ann Arbor, Michigan USA
Tel: +1.734.668.9922

EMEA Headquarters

Paris, FRANCE
Tel: +33 (0) 663.406.725

Asia-Pacific Headquarters

Tokyo, JAPAN
Tel: +81.47.361.5850

www.CIMdata.com

Copyright © 2025