Deloitte.

PRODUCT LIFECYCLE MANAGEMENT
(PLM) transformation

When business leaders across industries are asked what it takes to stay ahead of the competition, they often say that stronger, more effective, cohesive management across specific areas, such as product development, manufacturing, finance, and technology is necessary. However, many manufacturers whose products date back several years are unable to keep up with new processes and technological advancements. Often, their product development processes and information are managed within silos. As a result, their processes and systems are likely strained and struggle to meet goals. They often lack the engineering efficiency, speed, and flexibility that could make an impact on improving their bottom line.

To innovate, structure, and manage product development information more effectively, many organizations are exploring the use of PLM technologies. However, some organizations are hesitant to undertake this transformation because of the complexity, the pitfalls, the unknowns, and the cost involved. The initiative presents the challenge of committing resources and stretching them to yet another long-term project, while still trying to keep the business humming along.

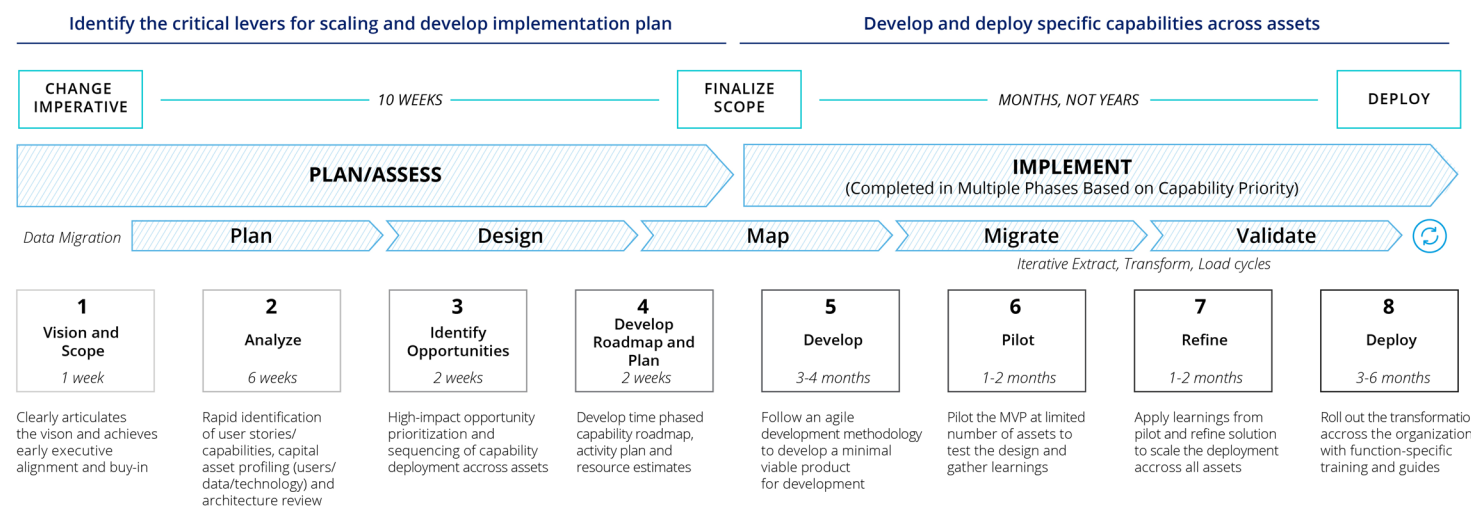To remedy this, Deloitte has constructed an alternative approach. We offer Deloitte Product

Lifecycle Management (DPLM), a pre-configured solution that can help companies accelerate their PLM transformations.

Another element of uncertainty is the daunting task of migrating all the structured and unstructured data in legacy systems to the new PLM platform. Our Data Migration Accelerator is a framework and has enabled clients to take on this challenge and helped ensure that data migration development starts early and does not become a bottleneck.

Deloitte's PLM transformation approach

Deloitte has a multi-phased approach to enable a client's PLM transformation: Assessment and implementation. In the assessment phase, we help the client define and scope their vision, assess the organization's current state capabilities, identify improvement opportunities, and define the future state supported by a phased, multi-year PLM roadmap and business case. The business case drives executive buy-in on implementation and lays the foundation for deployment. We have created strategic tools for the assessment phase and developed DPLM that is used for a cost-effective and efficient implementation phase.

DPLM transformation approach

Identify the critical levers for scaling and develop implementation plan | Develop and deploy specific capabilities across assets

| CHANGE IMPERATIVE | 10 WEEKS | FINALIZE SCOPE | MONTHS, NOT YEARS | DEPLOY |

| PLAN/ASSESS | IMPLEMENT (Completed in Multiple Phases Based on Capability Priority) |

Data Migration: Plan > Design > Map > Migrate > Validate
Iterative Extract, Transform, Load cycles

1 Vision and Scope	2 Analyze	3 Identify Opportunities	4 Develop Roadmap and Plan	5 Develop	6 Pilot	7 Refine	8 Deploy
1 week	*6 weeks*	*2 weeks*	*2 weeks*	*3-4 months*	*1-2 months*	*1-2 months*	*3-6 months*
Clearly articulates the vison and achieves early executive alignment and buy-in	Rapid identification of user stories/ capabilities, capital asset profiling (users/ data/technology) and architecture review	High-impact opportunity prioritization and sequencing of capability deployment across assets	Develop time phased capability roadmap, activity plan and resource estimates	Follow an agile development methodology to develop a minimal viable product for development	Pilot the MVP at limited number of assets to test the design and gather learnings	Apply learnings from pilot and refine solution to scale the deployment across all assets	Roll out the transformation across the organization with function-specific training and guides

Potential Benefits of DPLM

Rather than gathering requirements from all stakeholders and spending months in a waterfall methodology to develop a custom solution from a software toolkit, we start with our pre-configured, industry-tested PLM platform (DPLM) of processes and applications to manage "gaps" (requirements truly needed by the company) against a proposed solution. This offers an agile approach to deploy, test, and validate updated configurations and design decisions made throughout the process design phase; enabling the program to identify and close gaps in an iterative fashion.

Along with functional evolution, we have a similar approach for data migration. We have established frameworks for migrating data from any structured or structured data source to DPLM. Our Data Migration Accelerator provides the structure to map any legacy data (structured or unstructured) to DPLM, migrate it with rapid transform logic development, and have the business validate the data to successfully incorporate multiple ETL (extract, transform, load) cycles prior to go-live.

Implementing DPLM can provide the following potential benefits to your organization:

15-30%
average **reduction in implementation timeline** (increased reduction based on further complexity reduction of processes and configuration)

25-50%
savings in data migrations effort and final cutover time

30-50%
savings in implementation costs

10-20%
improvement in engineering efficiency

Other potential benefits:

Improved engineering effectiveness and quality of the end product

Increased adoption of leading practice-enriched process design

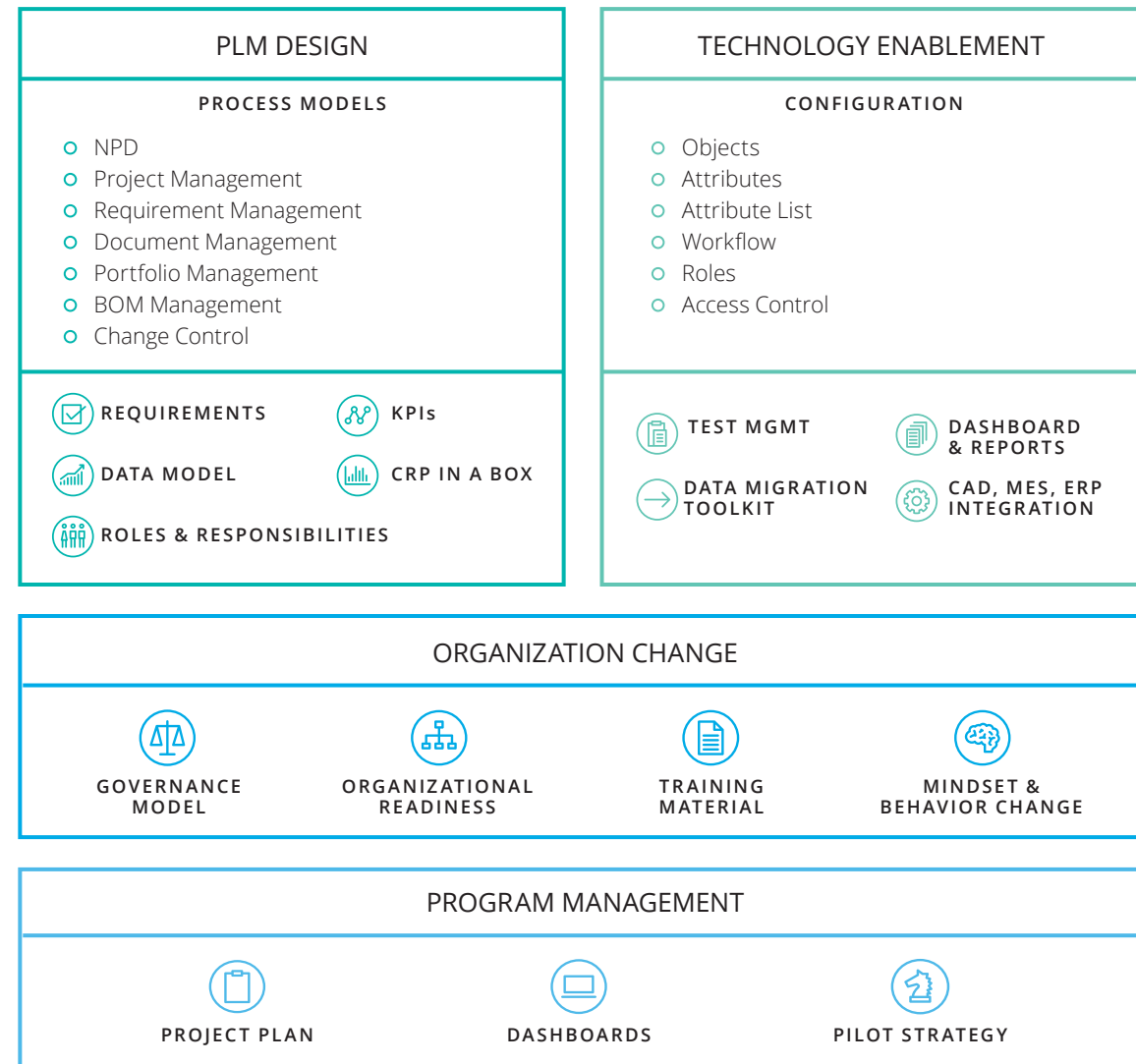Enforce process standardization across the organization

Provide efficient information flow across the value chain starting with single source of truth

Improve ability to focus on continuous improvement by monitoring performance metrics

DPLM pre-configured solution

DPLM is an "out-of-the-box" pre-configured software solution that leverages Deloitte's deep experience in lean engineering-focused process design, technology enablement, organizational change, and program management.

PLM DESIGN

PROCESS MODELS
- NPD
- Project Management
- Requirement Management
- Document Management
- Portfolio Management
- BOM Management
- Change Control

- REQUIREMENTS
- KPIs
- DATA MODEL
- CRP IN A BOX
- ROLES & RESPONSIBILITIES

TECHNOLOGY ENABLEMENT

CONFIGURATION
- Objects
- Attributes
- Attribute List
- Workflow
- Roles
- Access Control

- TEST MGMT
- DASHBOARD & REPORTS
- DATA MIGRATION TOOLKIT
- CAD, MES, ERP INTEGRATION

ORGANIZATION CHANGE

- GOVERNANCE MODEL
- ORGANIZATIONAL READINESS
- TRAINING MATERIAL
- MINDSET & BEHAVIOR CHANGE

PROGRAM MANAGEMENT

- PROJECT PLAN
- DASHBOARDS
- PILOT STRATEGY

Specific elements of DPLM include:

- Capability Maturity Model
- Integrated pre-defined processes: new product introduction, project management, requirements management, change control, bill of material (BOM), design for X, and document management
- Business and functional requirements
- Test cases and scripts
- Use cases, roles, and responsibilities
- Conference room pilot (CRP) material
- Key performance indicators (KPIs)
- Pre-configured data model—objects and attributes
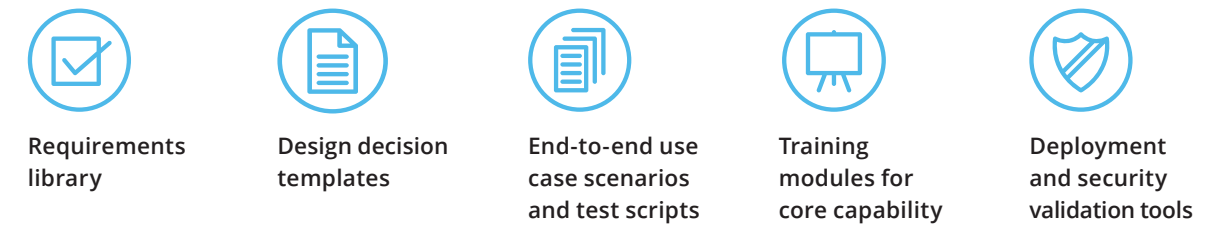- Pre-configured process maps for each capability area

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- Enterprise resource planning (ERP) integration
- Integration to leading MCAD, ECAD and analysis and simulation solutions
- Integration to manufacturing execution system (MES)
- Integration to technical publication tools
- Data migration accelerators for PLM
- Reporting and analytics available for each capability area
- Organizational readiness template
- High-level project plan
- Automated security validation tools

DPLM: Critical success enablers for transformation

DPLM process models incorporate Deloitte's lean engineering leading practices and include major PLM processes to accelerate blueprinting. Our approach starts with out-of-the-box processes and configuration and modifications (approximately 20 percent) where necessary to meet client specific needs. The processes are identified based on the initial assessment and depending on the product mix, we bring together process maps from multiple industries to create the initial set of base processes. We then start aligning to meet the client-specific requirements. These processes have requirements, roles, and security definition, and the use case is tightly linked to provide a detailed requirement for the configuration.
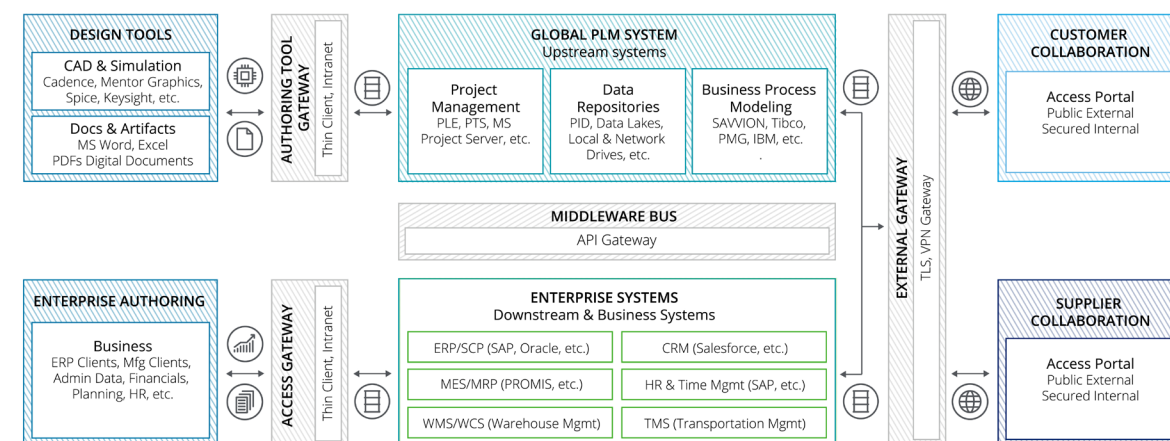
Transformation toolkit

Based on experience with large transformations, we've developed a library of templates and tools that can accelerate the process to mature and deploy the base DPLM solution as per client need. Artifacts that are part of the toolkit include:

- Requirements library
- Design decision templates
- End-to-end use case scenarios and test scripts
- Training modules for core capability
- Deployment and security validation tools

DPLM integration

DPLM pre-configures integration with most ECAD, MCAD, ERP, and MES solutions. The process implementation for all capabilities are done to enable the users to visualize how the integrated processes span across these applications and how the data from these tools assimilates. Users can execute the process end-to-end from CAD-PLM-ERP-MES and see how the new process capability addresses the functional requirement.
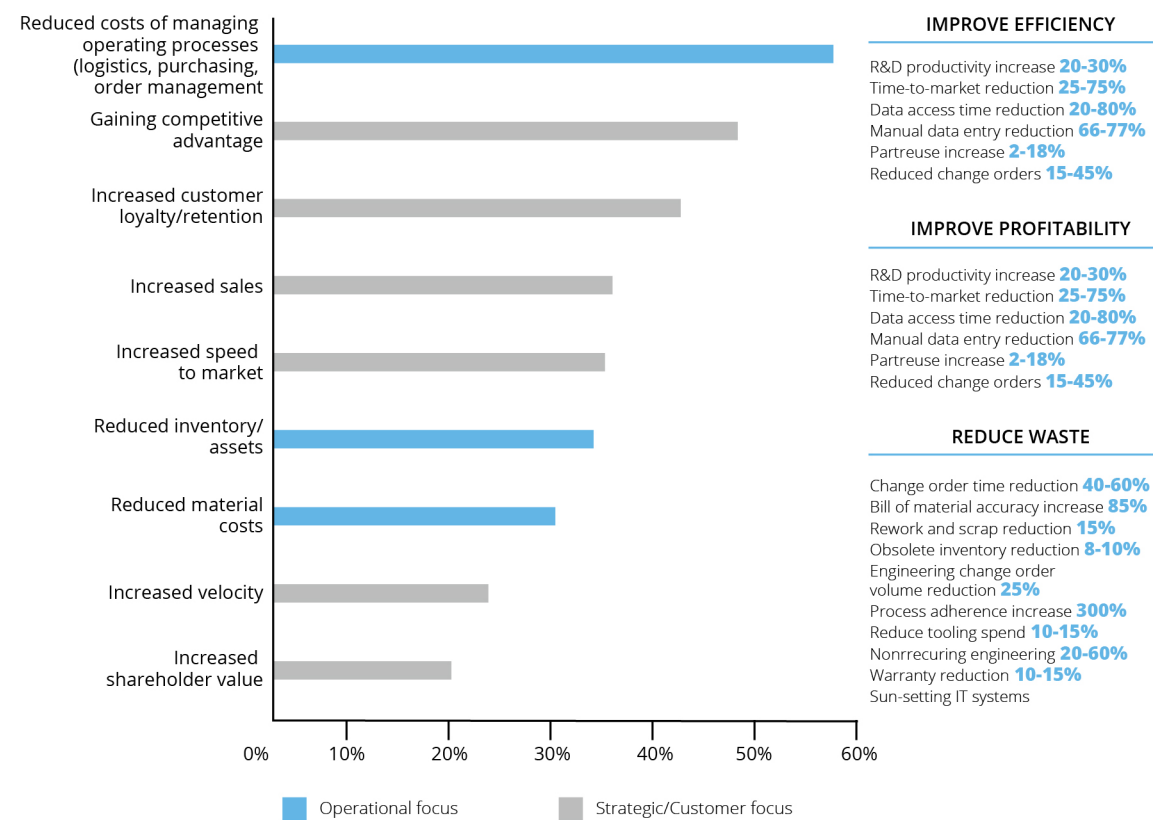
DESIGN TOOLS
CAD & Simulation
Cadence, Mentor Graphics, Spice, Keysight, etc.

Docs & Artifacts
MS Word, Excel
PDFs Digital Documents

AUTHORING TOOL GATEWAY
Thin Client, Intranet

GLOBAL PLM SYSTEM
Upstream systems

Project Management
PLE, PTS, MS
Project Server, etc.

Data Repositories
PID, Data Lakes,
Local & Network
Drives, etc.

Business Process Modeling
SAVVION, Tibco,
PMG, IBM, etc.

MIDDLEWARE BUS
API Gateway

ENTERPRISE AUTHORING
Business
ERP Clients, Mfg Clients,
Admin Data, Financials,
Planning, HR, etc.

ACCESS GATEWAY
Thin Client, Intranet

ENTERPRISE SYSTEMS
Downstream & Business Systems

ERP/SCP (SAP, Oracle, etc.)	CRM (Salesforce, etc.)
MES/MRP (PROMIS, etc.)	HR & Time Mgmt (SAP, etc.)
WMS/WCS (Warehouse Mgmt)	TMS (Transportation Mgmt)

EXTERNAL GATEWAY
TLS, VPN Gateway

CUSTOMER COLLABORATION
Access Portal
Public External
Secured Internal

SUPPLIER COLLABORATION
Access Portal
Public External
Secured Internal

Data Migration Accelerator (DMA)

Typical PLM data migration for a PLM transformation comes with many challenges and risks. It's also often an underestimated high-risk factor in delaying the implementation, thus increasing overall costs. Pure traditional approaches are too costly to address all migration risks and challenges. DMA process and technical templates help mitigate unknown risks and bring efficiencies, innovation, and productivity improvements to enable cost and time savings. DMA provides tools and methods to move data into and from PLM systems in a highly efficient manner (1M objects per second) and support visualization, searching, analytics, and collaboration.

Getting more from PLM

PLM business transformation is a major commitment regardless of how small or large a change you are making. Here are a few things we have learned that can help:

Focus on catalysts. Approaches like DPLM can be tailored to specific business processes and designed to have the capacity to accelerate performance.

Get leaner and smarter. Take the time to look at how you can better streamline your processes to achieve effective and efficient worker performance and improve productivity.

Stay on target. DPLM can help reduce implementation time and costs and help drive value for your business.

Invest in an out-of-the-box solution. DPLM can be adapted to fit your company's requirements, potentially saving you time and money in the long term.

Potential Benefits

Deloitte has helped enable its client to realize the tangible benefits from PLM by improving efficiency, reducing waste, and improving profitability.

IMPROVE EFFICIENCY

R&D productivity increase **20-30%**
Time-to-market reduction **25-75%**
Data access time reduction **20-80%**
Manual data entry reduction **66-77%**
Partreuse increase **2-18%**
Reduced change orders **15-45%**

IMPROVE PROFITABILITY

R&D productivity increase **20-30%**
Time-to-market reduction **25-75%**
Data access time reduction **20-80%**
Manual data entry reduction **66-77%**
Partreuse increase **2-18%**
Reduced change orders **15-45%**

REDUCE WASTE

Change order time reduction **40-60%**
Bill of material accuracy increase **85%**
Rework and scrap reduction **15%**
Obsolete inventory reduction **8-10%**
Engineering change order volume reduction **25%**
Process adherence increase **300%**
Reduce tooling spend **10-15%**
Nonrrecuring engineering **20-60%**
Warranty reduction **10-15%**
Sun-setting IT systems

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