



INTEGWARE

How PLM Can Cut Manufacturing Costs



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How Can PLM Cut Manufacturing Costs?



Often Product Lifecycle Management (PLM) Return on Investment (ROI) analyses are built on softer savings such as efficiency gains and time-to-market improvements. While incredibly impactful and transformational, they are harder to measure and be less meaningful for some CFOs who are looking for something a bit more tangible.

PLM has delivered manufacturing cost savings in multiple ways. Industry benchmarks are often cited by PLM vendors and industry analysts. Mileage will vary, but the opportunities are tangible and measurable.

What variables affect this mileage?

- Level of current reliance on paper systems. The heavier the reliance, the greater the opportunity to improve through automation.
- Reliance on point systems vs. integrated systems
- The level of complexity of products. More complex products tend to have more expensive parts and manufacturing processes and therefore the greater room for scrap or waste.
- The quality of the ERP (Enterprise Resource Planning) solution and MES (Manufacturing Execution Systems)
- How the Supply Chain is involved in the process. For example, if there is a heavy reliance on complex custom parts that are outsourced.
- Level of litigation and regulatory exposure faced by the company. How sensitive are client products to recalls or similar based on manufacturing mistakes?
- The culture of the Client. How much reliance is there on tribal knowledge and rock star performers?

Disclaimer: This white paper captures researched metrics from various industry sources and a discussion on how PLM can have an impact on these. Ultimately, each manufacturing company must determine what is applicable given their situation and with regard to what numbers to use in an ROI assessment.

PLM can help companies save up to 5% on direct material costs and 15% on direct component costs.

Here are some areas where companies can find these savings:

- Enabling engineering and/or manufacturing personnel to reuse materials already on hand when developing new products or changing existing ones
- Consolidating part designs to reduce the number of part numbers that must be manufactured and stored in inventory
- Continuous monitoring and management of the Bill of Material costs throughout the development process. A commonly cited metric in the PLM industry is that “80% of product costs are determined in the first 20% of the design process”.
- Enabling consolidation of suppliers across divisions and understanding the performance of those suppliers
- Proactive management of supplier quality through Supplier Corrective Actions

For similar reasons to those cited some have indicated that ***supplier costs may be cut by up to 25%***.

PLM can help companies reduce scrap, excess, and rework ranging from a more modest 8% to upwards of 60% by:

- Ensuring manufacturing personnel, buyers/planners and suppliers are working from the right revision of a specification, avoiding development of parts that must be scrapped or reworked
 - This benefit is further enabled by means of an MES integration (automated shop-floor execution pulling latest work instructions from PLM)
- Reducing data errors through the design process. For example, cutting manual data translation errors between CAD/CAE tools, PLM, ERP and MES. Incorrect unit of measure data entry into ERP is cited as a problem by clients. One client had ordered an expensive material in meters instead of feet resulting in significant waste. Upon investigation the approved engineering change had the correct information and the issue related to manual data entry into ERP.
- Providing better data, enabling a move to preventive actions over corrective actions. For example, now it is possible to see trends of common Nonconformance’s across plants.

PLM can help reduce the number of designed parts by up to 55% (less for higher volume parts) by:

- Enabling product developers (engineering/manufacturing) to easily find parts and determine the dependability of those parts to be reusable (e.g. by looking at connected validation data and quality issues such as CAPAs, NCRs and Complaints)
- Having strong “where-is-this-part-used” (where-used) capability to help product development teams to understand clearly what is to be affected by a change. This contrasts with an engineer who may feel ignorant to the impact and feels safer to develop new part

numbers vs. revisions of existing part numbers.

- Similarly leveraging well considered and leaned change impact assessments involving appropriate business functions (such as quality, engineering, risk, regulatory, labeling, etc.) at the commencement of a change should give designers greater confidence in reuse vs. reinvent
- Finding parts that meet a certain specification becomes easier, especially as data is liberated from documents to the PLM data (such as weight and dimension attributes)

It has also been researched that ***inventory may be reduced by up to 15%***.

PLM can help reduce inventory turn times by 5 - 10%. The following are typical reasons cited:

- Part consolidation means inventory is reused more rapidly
- “on-hand” information is injected directly from ERP into the design process, enabling designers to reuse existing parts

NOTE: It is important that most companies do not attempt to implement and integrate all of the processes cited above in a single phase of PLM. The most common starting point is getting a handle on the part, BOM, change, and design control data. CAPA, supplier management, and collaboration among many capabilities can be added in a later phase. Some benefits are only realized when implementing and integrating more advanced processes.

Reference Sources:

Dassault Systèmes

Time Metrics (Average Reduction %)	
Searching Data	20-60%
Entering/Re-keying Data	10-85%
Managing CAPAs	15-25%
Design Authoring/Management	5-30%
Change Initiation/Management	15-45%
Project/Program Management	35%
Program Financial Analysis	20%
Time Preparing Reports	20-50%

Operational Metrics (Average Improvement*/Reduction %)	
BOM Accuracy	35-80%*
On Time Product Launch	15-40%*
Product Launch Costs	10-35%
Cost of Poor Quality (Rework, Scrap, Obsolete, Excess)	15-40%
Cost of FDA Product Cert's/Sub's	15-50%
Cost of Audit/Avoidance	25-50%
Cost of CAPA/Quarantine Avoidance	10-25%
Shorter Mfg Line Turns Times	5-10%*
IT Maintenance and Admin. Costs	15-35%

Personnel (Hiring Practices) Metrics (Average Reduction %)	
Staff Avoidance (Program, Procurement, IT)	2-5 FTE/Year
Cost of Staffing	20% 1 st Year Salary/FTE

Revenue Metrics (Average Reduction*/Improvement %)	
Lost Sales/Margin Product Launch Delay	15-30%*
Number of Product Launches	15-35%
Lost Margin - Launch Velocity	5-15%*
Lost Margin	10%

Cost of Goods Metrics (Average Reduction %)	
Direct Components/Assemblies	3-15%
Vendor Premium/Penalties	10-25%
Overtime	10%
Direct Material Cost	0.5-5%
Outsourcing Costs	10-25%

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PDXpert:

- 7% to 14% improvement in engineering non-value-added time
- **55% reduction in number of designed parts**
- Design cycle time reduced 25%
- 10% reduction in ECO cycle time
- ECO cycle time improved 40%
- ECO cycle time reduced by 50%; ECO administration expense reduced by 60%
- 90% faster FDA document generation cycle time
- Reduced engineering changes and administration resulted in 20% savings in engineering costs
- Overall engineering administrative activity improved 80% (ECO, search, vault, etc.)
- Engineering productivity increased 10% per year over 5 year period
- Engineering change cycle reduced from 45 days to 4 days
- TTM reduced by 5%; design errors and development costs reduced by 5%
- **50% increase in component reuse: 5% to 15% cost decrease for higher-volume parts**
- Supplier access to CAD files reduces tooling lead time by 80%
- **60% reduction in rework production costs**
- **Material cost reductions approximately 2% to 3%**

- Reuse improved from less than 2% to 59%
- Customer RFQ to prototype cycle time reduced 50% - 75%
- Eliminated almost 100% of customer order errors
- Reduced purchasing order time by 30 minutes per transaction
- 100% elimination of sending clients out-of-date product data
- Order errors reduced by 50%
- Order volume increase 40%—order errors decreased 75%
- RFQ response reduction from 2 weeks to 24 hours
- Significant savings on allowances for warranty and returns
- Engineering meeting reduction, per week, of 2 hours
- Engineering change process reduced by 5 to 20 hours per change
- **Elimination of duplicate part numbers by 56%**
- ECO time reduction of 50%
- Time for document search reduced by 80%
- Employee productivity improved by 10-15%

CIMdata:

CIMdata research of PLM and ERP integration benefits showed the following:

75% reduction in the time, cost, and errors associated with re-keying data entry from one system to the other.

75% reduction in BOM error cost as BOMs are created once and then managed consistently in both PLM and ERP.

15% reduction in inventory costs as the result of designers and engineers knowing what parts are already on hand and incorporating them into new versions or products – improved part reuse.

8% reduction in scrap of materials that cannot be used in production and which were either already in inventory or ordered before procurement was aware of pending changes.