## KALYPSO

# Product Lifecycle Intelligence

## Turn PLM Data into Insights with Machine Learning

Early adopters of Product Lifecycle Management (PLM) achieved valuable benefits to the product development process. As companies progressed from basic CAD data management through product data management (PDM) to more advanced PLM, they achieved harmonized business processes aligned around a single source of truth for full product definitions.

However, PDM and PLM alone can no longer help businesses sustain competitive advantage. In today's digital age, driven by vast amounts of data consumed from connected products, equipment and systems, business leaders and product innovators must be focused on data-driven insights and evidence-backed decision making.

## PLI Improves Product Development Results

Product Lifecycle Intelligence (PLI) is an evolution of PDM/PLM, focused on mining operational insights from product development data that has accumulated within mature PLM environments, as well as integrated business systems like ERP, quality and manufacturing platforms.

**Enabled by advanced machine learning techniques, PLI helps organizations predict the impact of product development decisions on key business performance metrics** like demand, cycle time, cost, quality, regulatory compliance, manufacturability and supply chain efficiency.
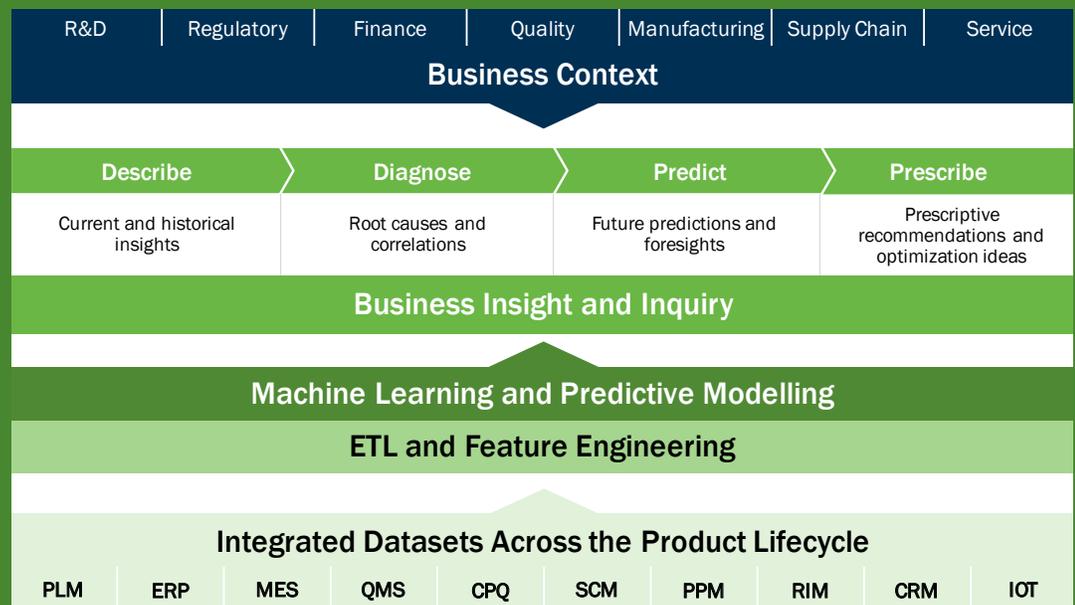
## PLI helps innovators:

- **Explore** current and historical product development performance
- **Explain** these performance trends and diagnose root causes
- **Predict** future performance based on these observations
- **Prescribe** evidence-based recommendations to improve future outcome

## A Structured, Data-Driven Approach to Solving Problems

**The insights gleaned from PLI can benefit multiple business contexts in the organization**, including R&D, regulatory, finance, quality, manufacturing, supply chain and service functions.

PLI applies machine learning and predictive modeling techniques to integrated datasets across the product lifecycle, including PLM, ERP, MES, QMS, IoT and more.

From this, business leads can make inquiries to describe, diagnose or predict a problem, and then prescribe a solution.

| R&D | Regulatory | Finance | Quality | Manufacturing | Supply Chain | Service |
|-----|-----------|---------|---------|---------------|--------------|---------|

**Business Context**

| Describe | Diagnose | Predict | Prescribe |
|----------|----------|---------|-----------|
| Current and historical insights | Root causes and correlations | Future predictions and foresights | Prescriptive recommendations and optimization ideas |

**Business Insight and Inquiry**

**Machine Learning and Predictive Modelling**

**ETL and Feature Engineering**

**Integrated Datasets Across the Product Lifecycle**

| PLM | ERP | MES | QMS | CPQ | SCM | PPM | RIM | CRM | IOT |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

# Maximize the Potential Value of PLM with Predictive and Prescriptive Inquiries

| DESCRIPTIVE | DIAGNOSTIC | PREDICTIVE | PERSCRIPTIVE |
|---|---|---|---|
| What happened? | Why did it happen? | What will happen? | What recommendations will optimize future outcomes? |

While PLI allows business leads to make descriptive, diagnostic, predictive and prescriptive inquiries of the data, the real power and business benefit comes from predictive and prescriptive inquiries.

**Here are some examples** of predictive and prescriptive inquiries enabled by PLI.

As a design engineer, if I **replace a material**, **adjust a tolerance**, or **change an attribute**, how will this impact downstream operations or business performance?

- R&D
- Quality
- Finance
- Compliance
- Manufacturing
- Supply Chain
- Service

| Predictive Inquiry | Prescriptive Inquiry |
|---|---|
| How long can I expect my NPD cycle times to take? How many changes per year should I expect for this product? | How can I decrease product cycle times? How can I strengthen my product to reduce change frequency? |
| Which product quality issues are likely to arise? What is the likelihood of failure? | What design features should I avoid to ensure that my product doesn't fall victim to common failure modes? |
| How much will this product, part or material cost? | Where can I make reductions or adjustments to minimize COGS for my product or portfolio? |
| Will these product meet regulatory guidance across my customer geography base? | Which markets should I avoid if I want to minimize compliance violations? How can I change my product to be compliant? |
| Is my product likely to fail in production? Will I have scrap or throughput issues? | How should I adjust by BOM or line configurations to optimize throughput and minimize scrap and COPQ? |
| Can I secure deliverables from suppliers on time and meet my inventory requirements? | Which suppliers and plants should I use to meet my demand needs on time? |
| When are my products likely to fail in the field, and how? | How can I adjust my product to avoid future failures? |

## We help clients **accelerate the build of digital capabilities** to meet their business objectives and drive results.

### Creating value with **Business Models** at new frontiers
- Smart, connected products
- Digitization & digital twin
- Leveraging customer data
- Collaborative consumption
- Pay per use
- Freemium
- Direct to consumer
- Systems of systems
- XaaS

### Reimagining **Customer Experiences** with new capabilities
- Proactive decision making
- Blended digital & physical experiences
- Enhanced situational awareness
- Real-time automation
- Digital integrations that cross over traditional boundaries

### Achieving results with **New Technologies**
- Internet of Things/ smart operations
- Machine Learning
- Digitized manufacturing/ Industry 4.0
- 3D/ Digital Product Creation
- Model-based enterprise
- Supplier/ 3rd party digital collaboration
- Augmented/ Virtual Reality
- 3D Printing
- Cloud
- Mobile
- Security

### Building **Company Digital Competencies**
- View of the future
- Digital mindset with imperatives
- Design thinking
- Digital talent and culture
- Digital skills and capabilities
- Digital M&A, ecosystems, accelerators, and incubators
- Systems engineering

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