jemba

CASE STUDY

MANUFACTURING | PROCESS OPTIMISATION | MECHANICAL PARTS

Production yield from 30% to 80% on a complex new industrial process

A global industrial leader needed to decode a new manufacturing process with 700+ variables. Jemba's ML Optimisation module identified the critical drivers and delivered precise parameter ranges — confirming expert intuition and accelerating time-to-production.

30% → 80%	2.7×	10	80%
PRODUCTION YIELD	YIELD MULTIPLIER	KEY LEVERS FOUND	VARIANCE EXPLAINED

THE SITUATION

A world leader navigating process uncertainty

An international conglomerate — dominant in its sector with significant European operations — launched a new product requiring a novel fabrication process. With 800 costly experiments, 700+ variables, and 30% baseline yield, they needed fast, data-driven answers.

KEY CHALLENGES

- ⚙️ Multi-step fabrication with 700 variables — signal buried across 150+ relevant parameters
- 📊 Limited dataset: 800 experiments, each costly and time-intensive to run
- 🎯 No clear understanding of quality drivers or optimal operating windows
- ⏱️ Competitive pressure: faster time-to-market required rapid, defensible insights

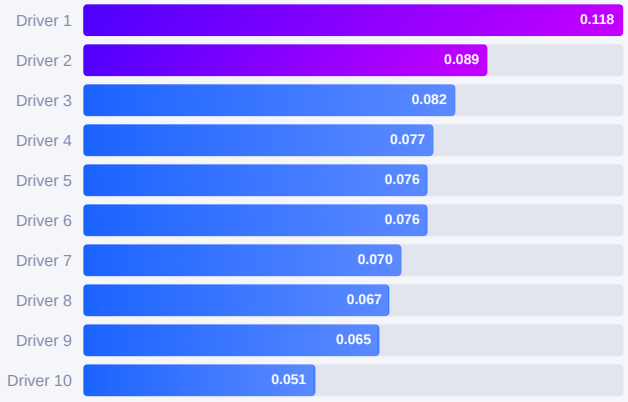
JEMBA'S APPROACH

ML-powered process intelligence

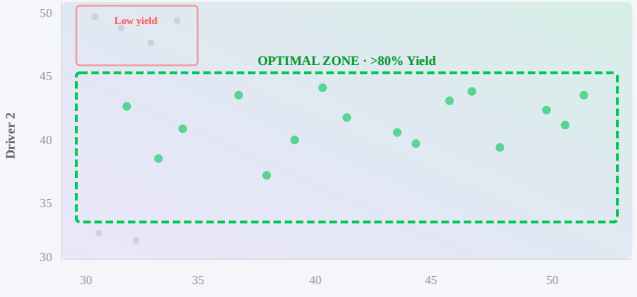
1. **Automated Data Cleaning**
   Jemba's algorithm filtered 350 of 800 experiments containing anomalies or inconsistencies — no manual preprocessing required.
2. **Feature Importance Ranking**
   Advanced ML ranked all 700 variables, surfacing the 10 most impactful drivers that explain 80% of yield variance.
3. **Optimal Zone Mapping**
   Probability heatmaps pinpointed exact parameter ranges needed to sustain >80% yield across production runs.
4. **Expert Validation**
   ML findings cross-validated with client process engineers, confirming alignment with domain expertise and Six Sigma analysis.
5. **Actionable Deployment**
   Delivered specific, implementable parameter windows directly usable by production teams on the factory floor.

RESULTS & DATA

Top 10 Process Drivers — Feature Importance Score



Yield Probability Map — Optimal Operating Zone



DRIVER 1	DRIVER 2	✓ These ranges sustain >80% yield
31 – 56	32 – 38	

> *"We analyzed the data with traditional Six Sigma tools to understand the process, and Jemba's work confirmed our initial analysis with a global vision and faster. Great job!"*
>
> — Process Engineering Lead, Global Industrial Conglomerate