MRO Inventory Optimization
to Unleash Captive Capital

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MRO Inventory Optimization

Scope

MRO = Maintenance, Repair and Operations

MRO Inventories are kept along the value chain to ensure up-time of all equipment / production machinery and typically comprise $20+ Million

Mission Statement

MRO Inventory Optimization focus asset-intensive companies to help reduce costs and eliminate waste via advanced prescriptive analytics and value services
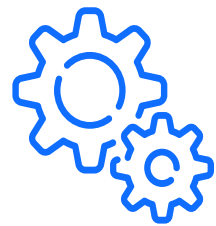
IBM MRO Inventory Optimization
We optimize inventories for asset intensive companies, like these, across the world

The Challenge of MRO Inventory Optimization in Asset-Intensive Industries

With 100K-2M+ MRO spare parts to manage, and 20+ variables to consider for every part, companies typically have only two minutes per year to manage each part*

- Book value?
- Replacement value?
- Repair price?
- Pack sizes?
- Variable usage?
- Mean Time Between Failure?
- Variable sizes?
- Set sizes?
- Planned/ unplanned downtime?

- Lead times?
- Lead time variability?
- Ability to expedite?
- Alternate suppliers?
- Internal lead time?
- Criticality/business impact?
- Equipment linkage (BOM)?
- Work-around options?
- Stock out costs?

X 2M+ spares!

* Based on IBM internal analysis of client data. Individual client results will vary.
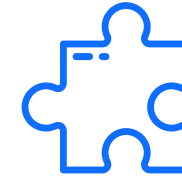
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The Costs of Poor Inventory Management to Operations and Revenue
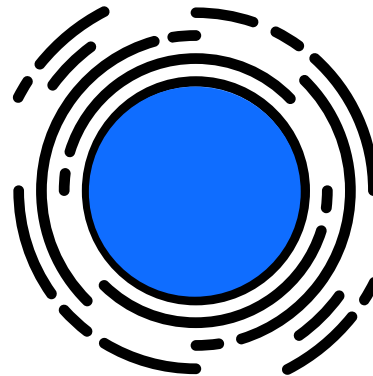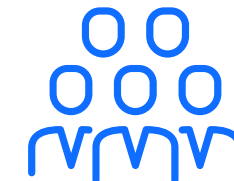
Bloated Inventory

Equipment Downtime

Parts Become Obsolete on Shelf

Endless spend on inventory reduction projects

Bloated headcount

End result: A margin sinkhole and inventory on balance sheet growing 2-10% per year*

* Based on IBM internal analysis of client data. Individual client results will vary.
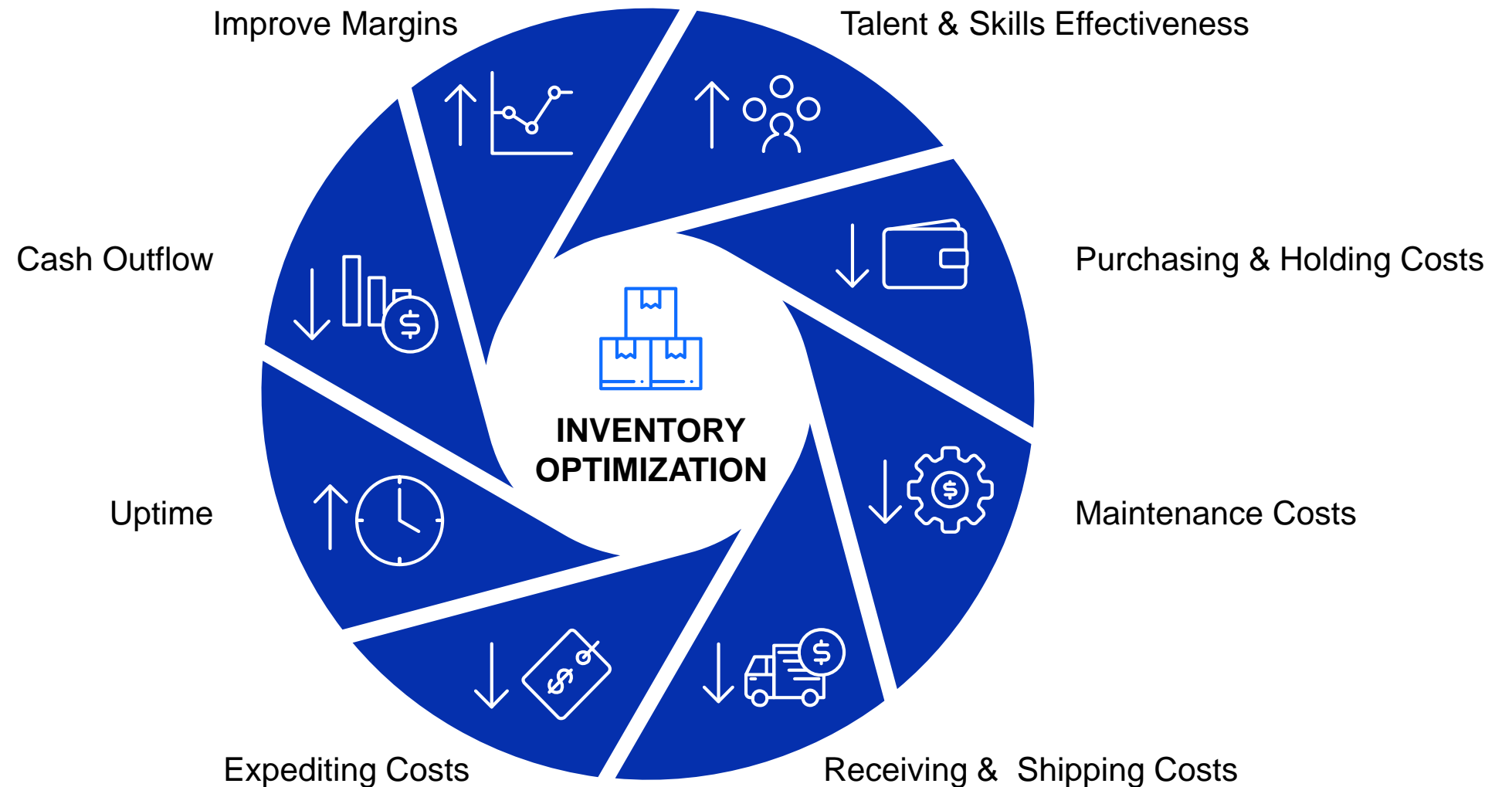
The Impacts of IBM® MRO Inventory Optimization

Addressing key operational challenges

Delivering rapid payback to fund broader transformational operations initiatives

Improve Margins

Talent & Skills Effectiveness

Cash Outflow

Purchasing & Holding Costs

INVENTORY OPTIMIZATION

Uptime

Maintenance Costs

Expediting Costs

Receiving & Shipping Costs

How IBM® MRO Inventory Optimization Works
Automated and Continuous, with priority work lists

ERP / EAM SYSTEMS agnostic

Extract Master Data & History

Data Enrichment

Segment for efficiency analysis

Data standardization and proofing using cost, criticality, usage, lead time, and other parameters

- Apply business rules
- Forecast demand
- Apply economic model
- Apply optimization algorithms
- Generate recommendations
- Compare against current settings and policies

Recommendations within policy limits

Auto or Manual Updates

Recommendations and Alerts

Review Exceptions Work Queues

Exception filter

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Proactive not Reactive

Not just Data, but rather what you can do with it!

Prescriptive Analytics

Priority work lists

Criticality based logic and decisions

RISK MITIGATION

UNPLANNED – HIGH RISK

FIRE MANAGEMENT – Planned & Lower Risk

Still Hard Work, It's not a Silver bullet

IBM® MRO Inventory Optimization Sample Feature ISet

SERVICE LEVEL ANALYSIS

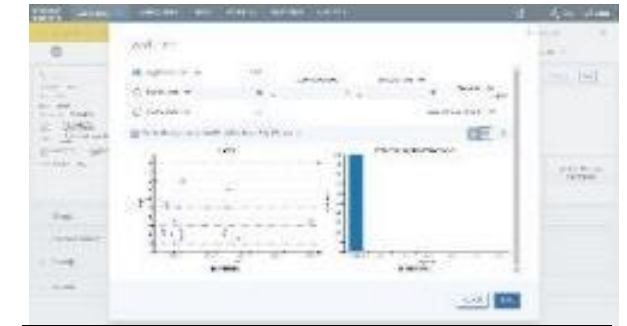Optimize service levels using business impact codes to help maximize uptime

INVENTORY OPTIMIZATION

Automated, analytics-based approach to aligning safety stock with business impact

CRITICALITY ANALYSIS

Minimize risk of overstocking consumables or stocking out of critical spares

LEAD TIME ANALYSIS

Determine actual lead times and drive improvements to help reduce cost and downtime

QUICK REPORTS

Rapidly generate and display reports and KPIs across all your key metrics

BASELINE ANALYSIS

Analyze inventory value-based On average price, inherited items and other criteria

DEMAND FORECASTING

Minimize risk of overstocking consumables or stocking out critical spares

WHAT IF ANALYSIS

Change the game with flexible What-If capabilities. Test different circumstances, and find your business 'sweet spot'
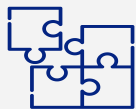
MRO Inventory Optimization

Provides *continuous*, sustainable, consistent optimization by combining:
+ **Client Data** (Items, Equipment, Suppliers, BOMs, Issues, Receipts, Work Orders)
+ **IBM Prescriptive Analytics & Algorithms**
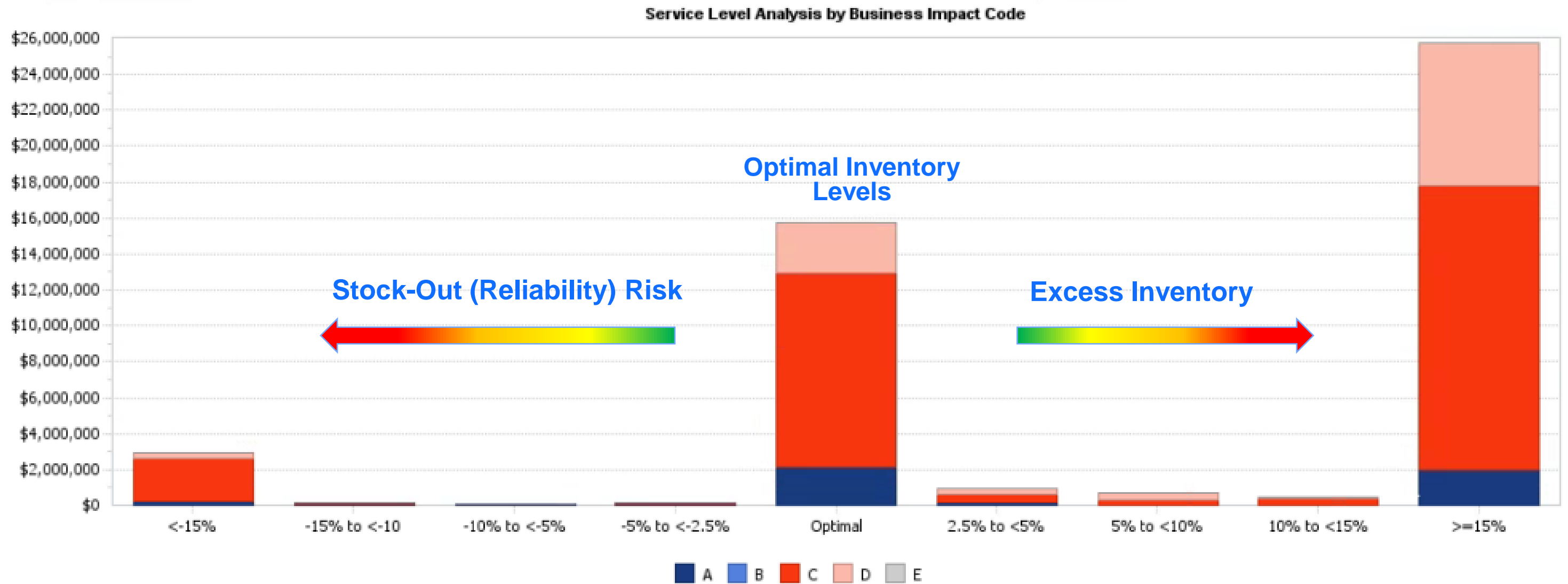+ **Client-Based Logic Configuration**

Uniquely packaged in one solution to improve spares availability, **increase equipment uptime and reduce costs**
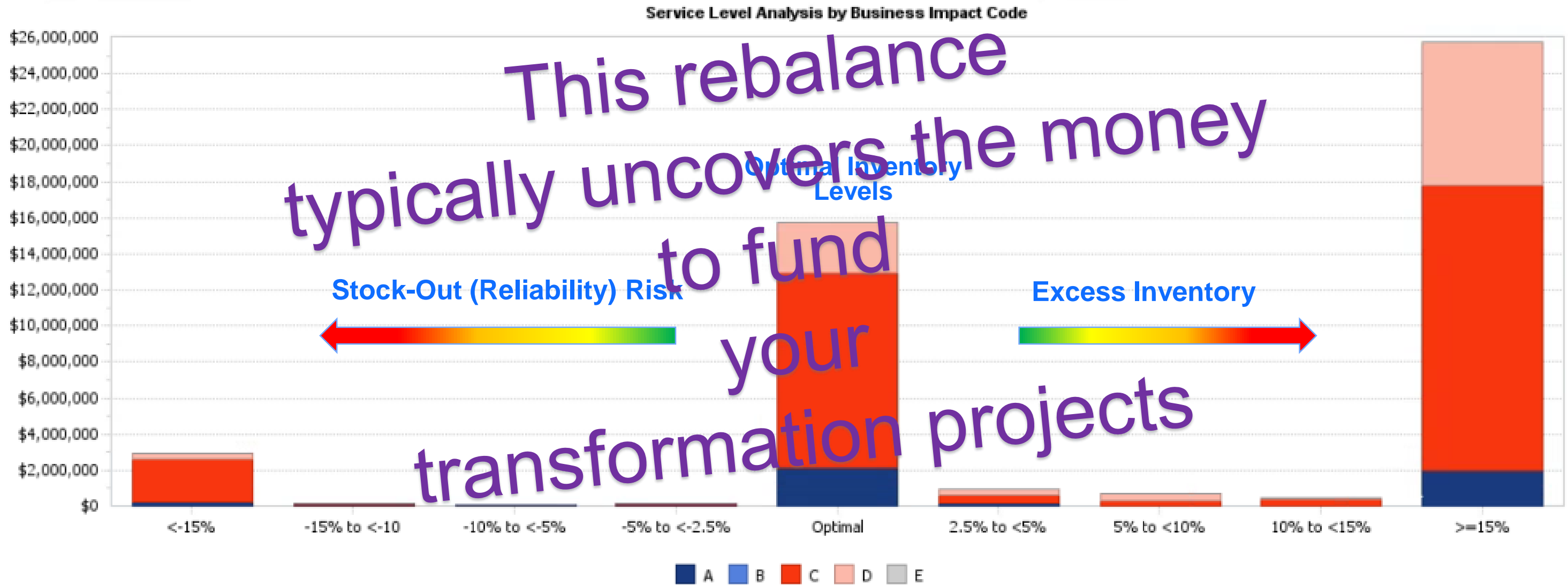
Data Enrichment	Item Characteristics	Demand Forecasting	Availability/ Lead Time	Item Criticality	Risk-Based Cost Model	Workload Prioritization/Efficiency
Lead Time	Automated Segmentation	Historical Demand	Internal PR-to-PO	5 Levels of Business Impact	Stockout Risk	Prioritized Work Queues
Criticality	Movement Stratification	Planned Demand	Weighted Average PO-to-Receipt	Equipment Linkage	Holding Cost	Item-Level Scoring
Potential Duplicates	Bin Constraints	14 Forecasting Methods	Receipt-to-Put Away	Material Type & Class	Expediting Cost	Work Flows
Average Issue Size	Set/ Pack Size	Forecast Scoring/Selection	Outlier Clipping	Supplier	Replenishment/ PO Line Cost	Fully Automated Recommendation Process
Data Anomaly Alerts	Average Issue Size	Historical & Future Durations	Variance Factoring	Cost	Economic Order Quantity	Excel Import / Export
Missing Data Alerts	Shelf Life	Automated Clipping	Supplier Performance	Description	Safety Stock	On-Line Grid Format Drill Down
Where-Used Issues/BOMs		Forecast Factoring	What-If Overrides	Availability		User-Specific Filters and Views

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Inventory Service Level Visibility

Service Level Analysis by Business Impact Code

Optimal Inventory Levels

Stock-Out (Reliability) Risk

Excess Inventory

Legend: A B C D E

X-axis categories: <-15%, -15% to <-10, -10% to <-5%, -5% to <-2.5%, Optimal, 2.5% to <5%, 5% to <10%, 10% to <15%, >=15%

Y-axis: $0, $2,000,000, $4,000,000, $6,000,000, $8,000,000, $10,000,000, $12,000,000, $14,000,000, $16,000,000, $18,000,000, $20,000,000, $22,000,000, $24,000,000, $26,000,000

Inventory Service Level Visibility

Service Level Analysis by Business Impact Code

Stock-Out (Reliability) Risk

Optimal Inventory Levels

Excess Inventory

This rebalance typically uncovers the money to fund your transformation projects

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A practical example from IBM MRO Inventory Optimization

IBM MRO IO analyses the historical and expected consumption and optimizes all inventory and replenishment parameters … and continuously updates these!

Detailed result from IBM MRO Inventory Optimization for one material in Plant A

Material Data:

Material Number:	FC494059673
Unit Price:	1.965,96 €
Current Stock Level:	11 Pieces
SAP stated replenishment Time:	14 Days

IBM MRO Inventory Optimization result:

Demand forecast:	1,84 / Month
Maximum Stock Level:	3
Reorder Point (Order if below):	2
Order Quantity:	2
Safety Stock Level:	1
Calculated Average Lead Time:	7 Days
Adjusted Replenishment Time:	10 Days

Savings Potential: 8 Pieces
15.728 €

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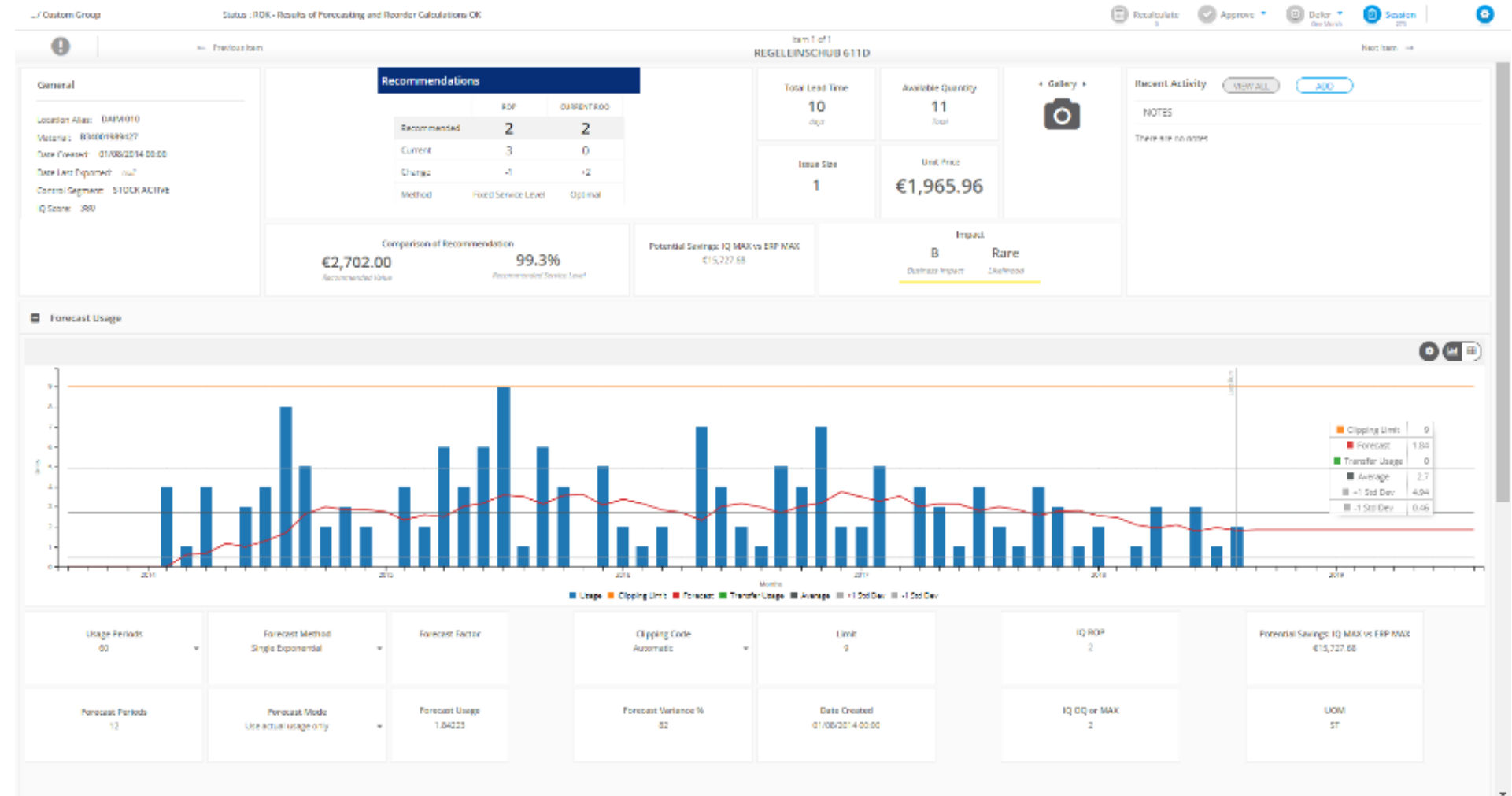
IBM® MRO Inventory Optimization: Results Delivered

One of World's Largest Manufacturers of Aluminium	Major Global Miner	Large Utility	One of World's Largest O&G Companies
Inventory Rebalanced by	**Inventory Reduced By**	**Net Spend Avoidance of**	**Inventory Costs Reduced by**
$37M (33%)	**$52M (71%)**	**$77M**	**10%**
In One Year	**Over Six Years**	**In Inventory Costs**	**In Six Months**

One of World's Largest Manufacturers of Aluminium

- $23B in revenue
- Maintenance driven initiative to reduce inventory
- **$23M net inventory reduction in first 12 months, including $30M reduction in inventory with a $7M inventory spend increase to minimize downtime**
- Additional $5M in repairable costs avoided
- Optimized levels for all inventory segments

Major Global Miner

- Operating 7 mine sites, 1 terminal
- **MRO inventory value decreased from $73M to $21M over 6-year period**
- Sustained 50% year-over-year reduction in MRO inventory spend for 6 years running
- No attributed production loss
- No negative impact on reliability

Large Utility

- Inventory value growing at 10% annually
- Reduced 10% inventory growth rate ($13 million a year) to 0% growth
- $12.5 million reduction in inventory first 12 months
- Net spend avoidance in MRO inventory of $77M
- **Net inventory rebalance by $33M, $18M reduction after $15M new stock spend**
- No negative impact on reliability

One of World's Largest O&G Companies

- Reduced MRO working capital by 10% in six months at one site alone
- Lowered inventory levels by at least 10% three years in a row
- Achieved 10's of $millions in savings
- **Savings at Alaska site funded global implementation in year 1**

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Implementation Methodology & Effort

Your Data data + Your business logic + IBM® MRO Inventory Optimization

Estimated time to implement:
3-6 months
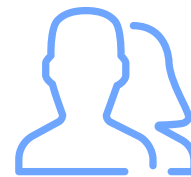
Primary resource (personnel) requirements: **supply chain and operations SME's, during the Design Workshop and Design Review phases (approximately 3-5 days each).**

Establish (1 month)

Implement & Improve (2 to 3 months)

Realize & Sustain (on-going)

Project Definition & Planning

Initial Data Extract & Validation

Design Workshop

Configure & Test IQ Inventory

Design Review & User Acceptance

Training, Go-Live & Support

Ongoing Benefits Realization

Rapid time-to-benefits

IBM MRO Inventory Optimization

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