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Strategic PLM (AI?) Implementation – How to Avoid the Typical Ten Mistakes

PLM Road Map™ & PDT North America 2026
AI in PLM: A Disruptive Opportunity and Challenge
Turning AI disruption into enterprise value:
Strategic insights for the PLM professional
CIMdata
6-7 May 2026
www.CIMdata.com

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Baden-Baden

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Context

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Introduction

- PLM-Systems promise a lot of benefits for companies (time, quality, collaboration, compliance)
- About 60-75% of all PLM-Projects fail to achieve their original goals or achieve them only partially.
- Industry surveys and case studies consistently reveal that the root causes often based on organizational, process, human, cultural, and strategic misalignments, that are too often overlooked in PLM initiatives
- This presentation synthesizes insights from industry research, expert commentary, and real-world case studies to identify and explain the ten most common reasons why PLM projects fail in industrial settings. (See attached literature)

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Introduction

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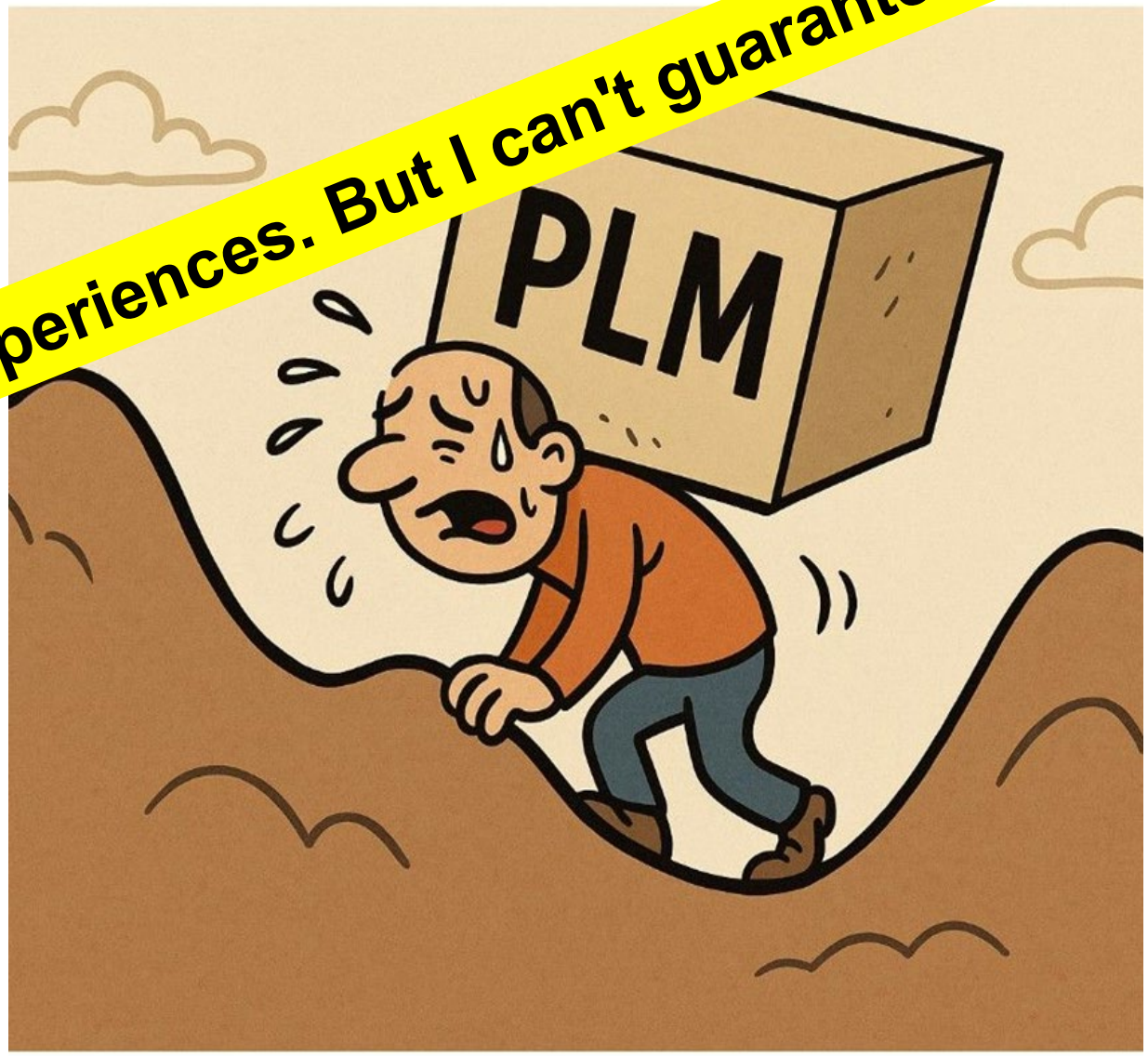
- Th… …ation synthesizes insights from industry …n, expert commentary, and real-world case studies to identify and explain the ten most common reasons why PLM projects fail in industrial settings. (See attached literature)

I hope you will not have any déjà vu experiences. But I can't guarantee that.



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WHY ARE SO MANY EXPEDITIONS UNSUCCESSFUL?

LEARNING FROM MISTAKES

1. NO LEADERSHIP
2. NO STRATEGY
3. UNCLEAR SCOPE, NO ARCHITECTURE
4. NO CHANGE MGMT. & CULTURAL UNDERSTANDING
5. NO GOVERNANCE AND DATA OWNERSHIP
6. NO PROCESS UNDERSTANDING
7. PLM isn't a IT PROJECT
8. SHADOW IT and EXCEL
9. WRONG SOLUTION and OVERCUSTOMIZATION
10. NO TECHNOLOGY EXPERTISE

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1 Lack of Executive Sponsorship and Leadership Alignment

PLM initiatives fail when they lack strong, visible, and sustained executive and cross-functional leadership

- Inconsistent or weak executive commitment
- Shifting business priorities
- Loss of momentum of the PLM Initiative
- Stakeholder disengagement over time
- Absence of a clear executive champion
- Missing alignment to strategic projects at the corporate level (digitalization, innovation, AI, cost reduction, …)?
- What are content, milestones and risk of a Cybertronic Digital Transformation?

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RISK&CHALLENGES OF THE CYBERTRONIC TRANSFORMATION

A comprehensive approach is mandatory; half-hearted changes risk existence.

COMPLEXITY TRAP

- Exponential rise in complexity due to non-integrated systems
- Risk of unpredictable errors in connected products
- **Mitigation**: Fully integrate ALM & PLM systems

SKILLED WORKER SHORTAGE

- Massive shift in engineering requirements
- Mechatronics evolution to Systems Engineers (HW & SW logic)
- Job structural shift (e.g., Automotive Industry)

SAFETY & SECURITY RISKS

- Connected products as potential cyberattack targets
- "Safety & Security by Design" is mandatory
- Must be deeply embedded in the ALM process

GOVERNANCE & COMPLIANCE

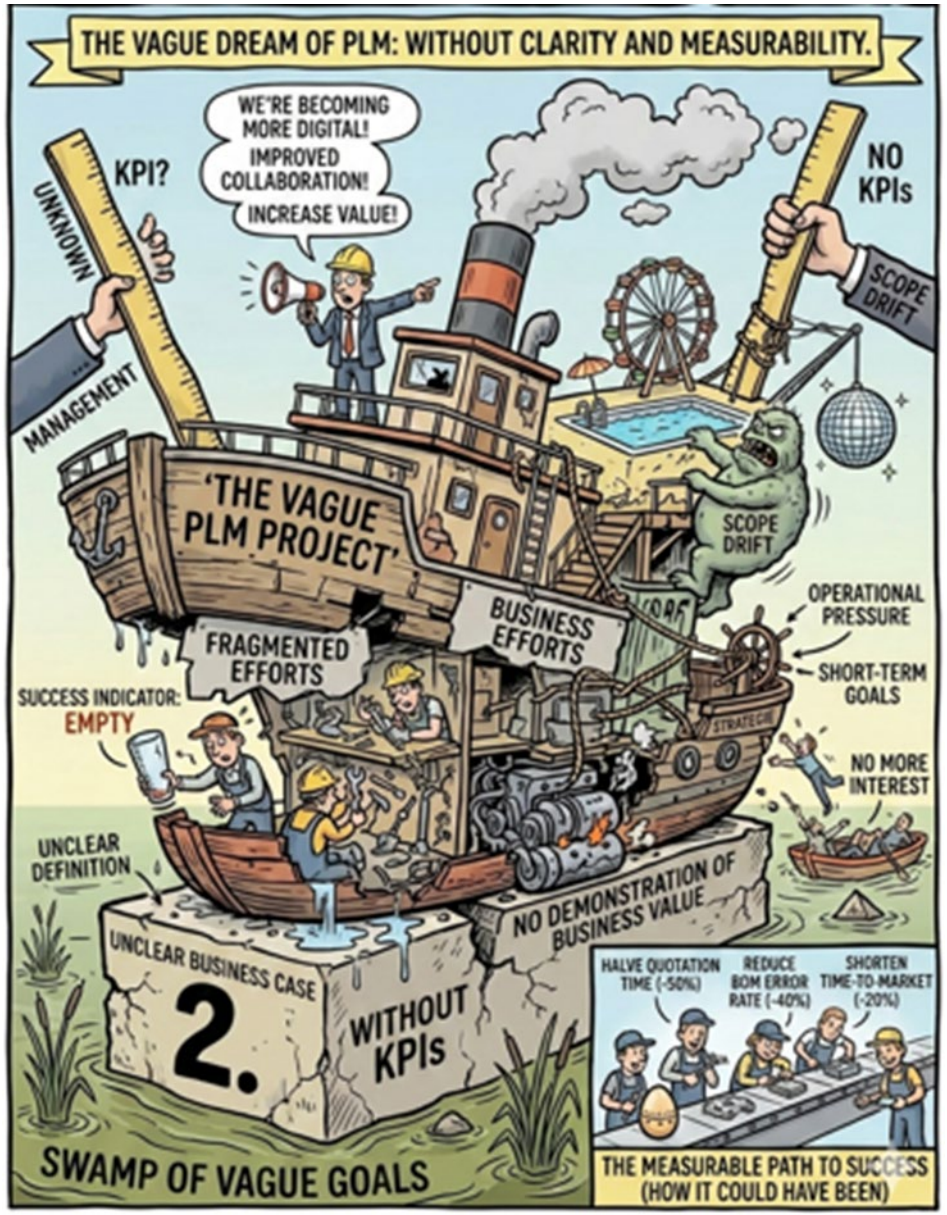
- Challenges of continuous updates
- Must prove software version on physical products
- Meeting safety standards and audit trails

Acknowledge and Mitigate Risks to Unlock Success.

2 Unclear Strategy and Absence of Measurable KPIs

Without a strategy and clear business case, PLM projects struggle to demonstrate value.

- Vague objectives such as “becoming more digital”
- Unclear definition of the business case
- What exactly needs to be improved at the process level (time, costs, quality, compliance, interdisciplinarity, …)?
- No quantified business outcomes defined upfront, missing or poorly defined KPIs. KPIs could be:
  - Reduction quotation lead time by 30%
  - Cutting BOM error rate by 20%
  - Shorter time to market by 20%
- Without KPIs no basis for resource allocation and post-implementation benefit validation



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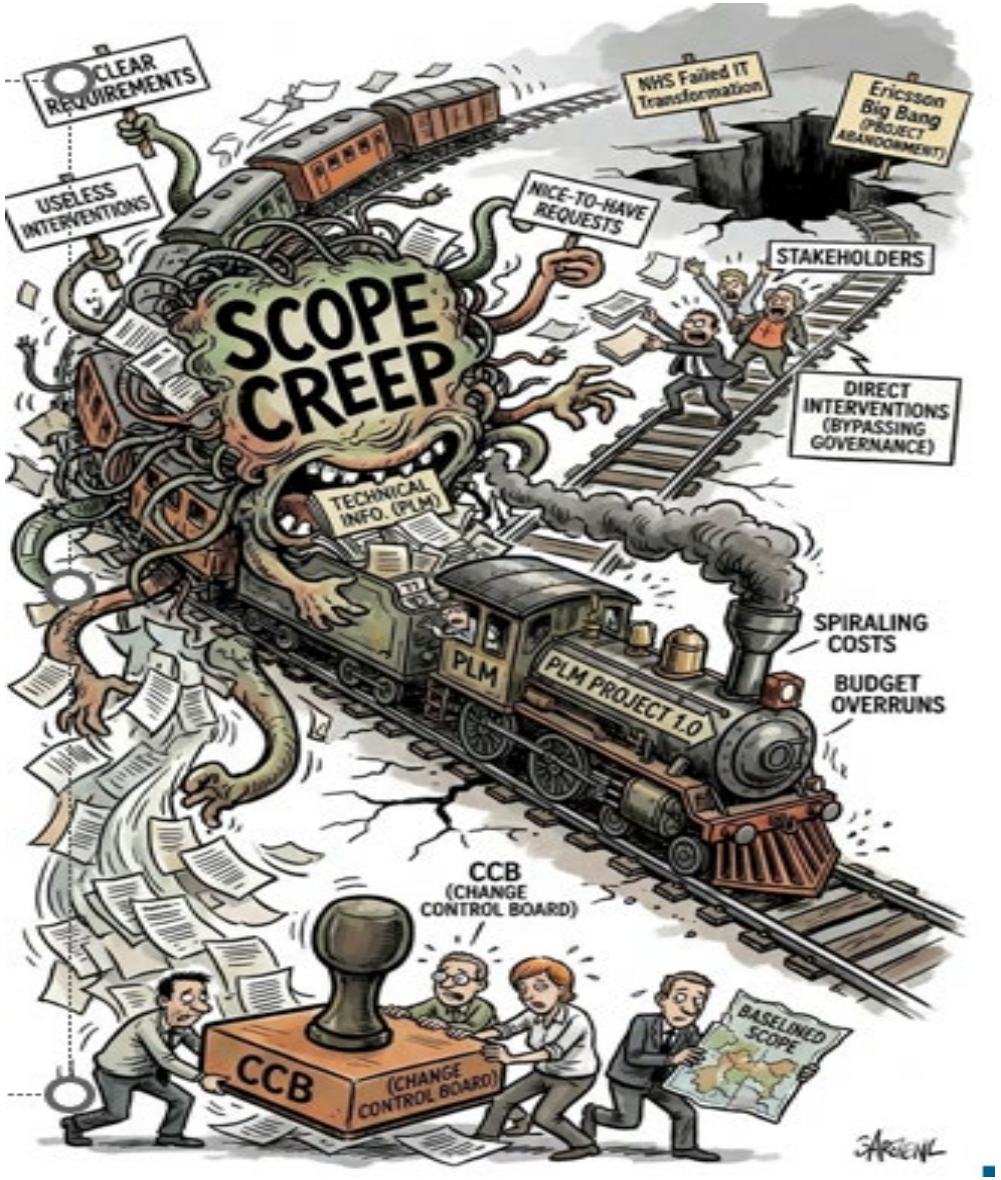
3 Unclear Scope Definition and Rampant Scope Creep

Unclear scope and uncontrolled scope expansion is a major cause of PLM project failure.

- Incomplete or unclear initial requirements
- Continuous addition of features and integrations
- Stakeholder interventions bypassing governance
- Overambitious “big bang” implementation approaches
- Budget overruns and timeline delays
- Increased system complexity and risk
- Not defined: What is in/out of Scope (Function, Processes)



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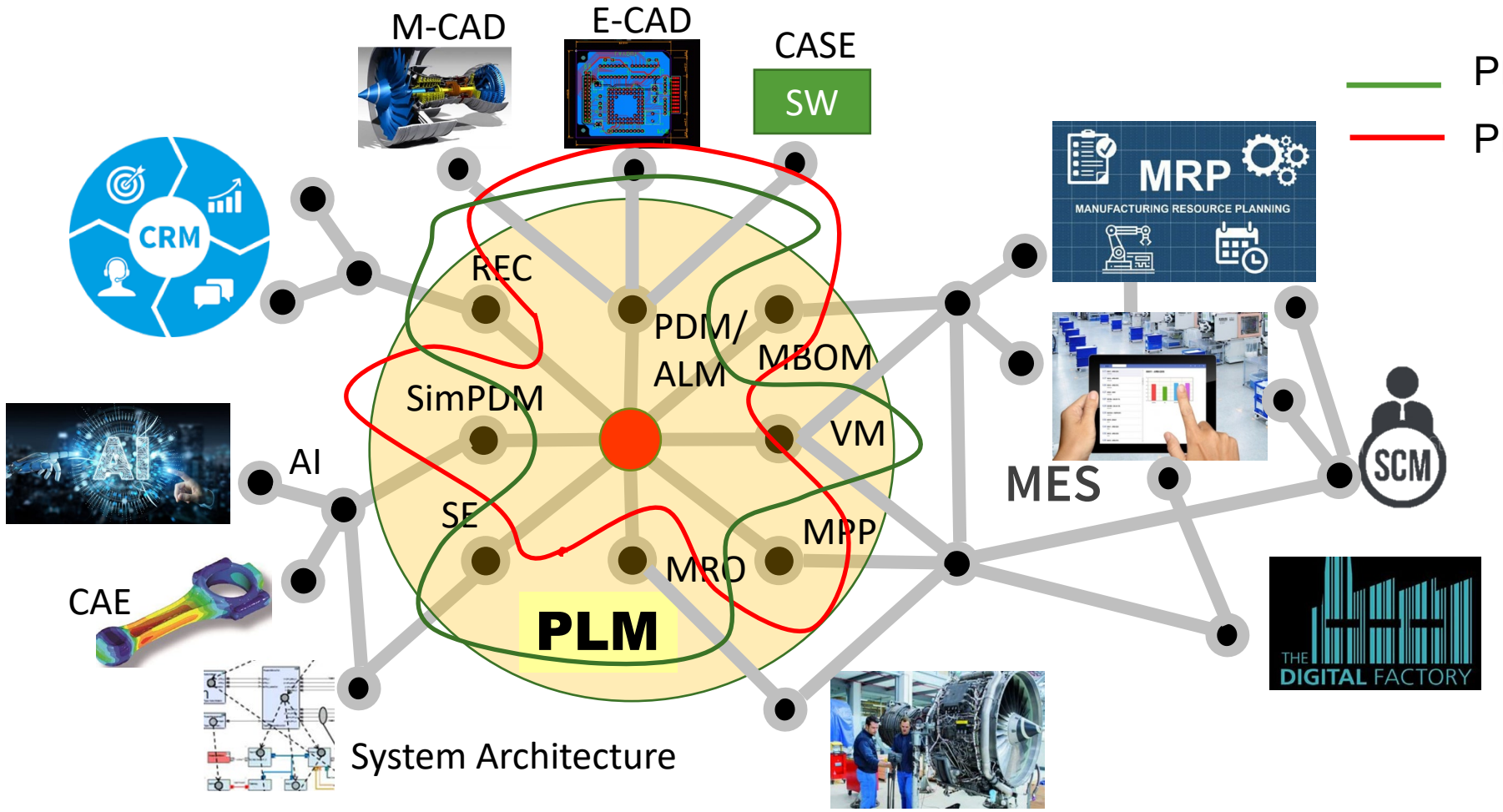
Typical PLM-Question: What is in or out Scope of PLM

Specialized stand-alone solutions often offer better functionality than solutions integrated into PLM (e.g., requirements, QMS, assembly planning, etc.).
The permanent discussion: Best in function or best in integration!!!

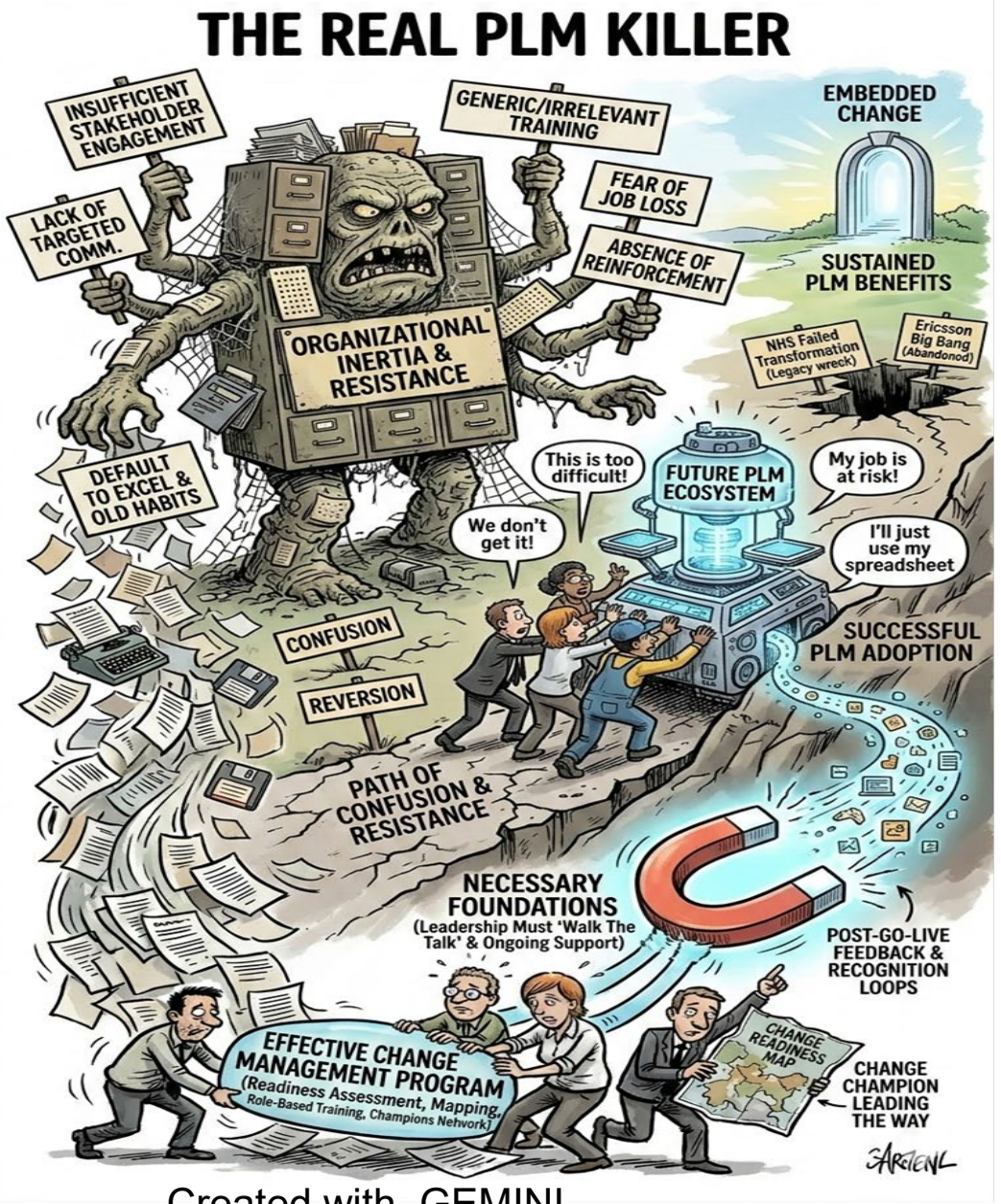


REC: Requirements, Function
MPP: Manufacturing Process Planning
MES: Man. Execution System
VM: Variant Management
SE: Systems Engineering
ALM: Application Lifecycle Mgmt.

4 Missing Cultural Understanding and Change Management

Many manager underestimate the organizational inertia, resistance and cultural change required for success

- Strong attachment to familiar tools and processes
- General resistance to new processes and tools
- Weak communication and information strategies
- Fear of job loss or loss of control
- No transparency and accountability
- No change and acceptance management
- No understanding of cultural differences and behavior along the product lifecycle and between disciplines



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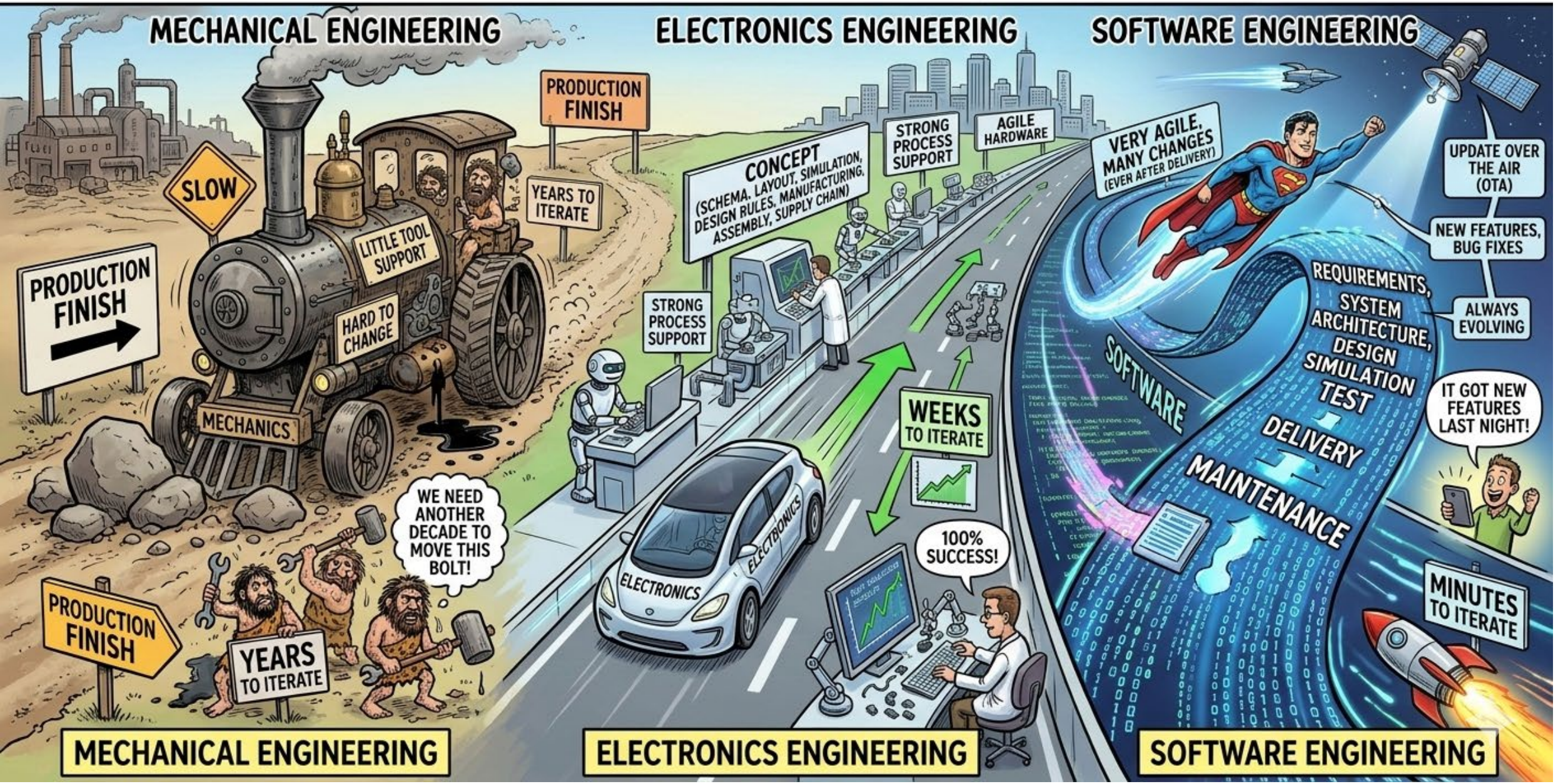
Identity shapes people’s value and role in the world

COMPARING ENGINEERING PROCESSES: MECHANIC, ELECTRONIC & SOFTWARE



Different Speed, Processes, Methods, Tools and Culture

EIGNER Engineering Consult 2026

5 Weak Cross-Functional Governance and Data Ownership

PLM is cross-functional, interdisciplinary, spanning the whole Product Lifecycle, but robust governance is missed.

- Siloed decision-making across departments and disciplines
- Unclear roles and responsibilities
- Conflicts over data ownership
- Poor coordination between ALM, PLM and ERP initiatives
- Lack of escalation mechanisms
- Absence of structured governance bodies
- Competition between disciplinesorganizational units alo the product lifecycle and divisions

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6 No Understanding of Engineering Processes and Integration

Digitizing unstructured processes leads to digital bureaucracy and chaos.
No integration concept leads to system war.

Engineering Processes

- Do not exist,
- Are poorly documented
- Differ across organizational units

- Therefore, no holistic Engineering Processes along the Product Lifecycle (ECR, ECM, CM, QMS, FMEA, …)
- Missing Integration and Migration Strategy between all Legacy-Systems along the Product Lifecycle
  ↳ Integration Failure and Systems War!!!
- Lack of understanding and supporting among C-Level regarding administrative processes (ECM, FMEA,…)

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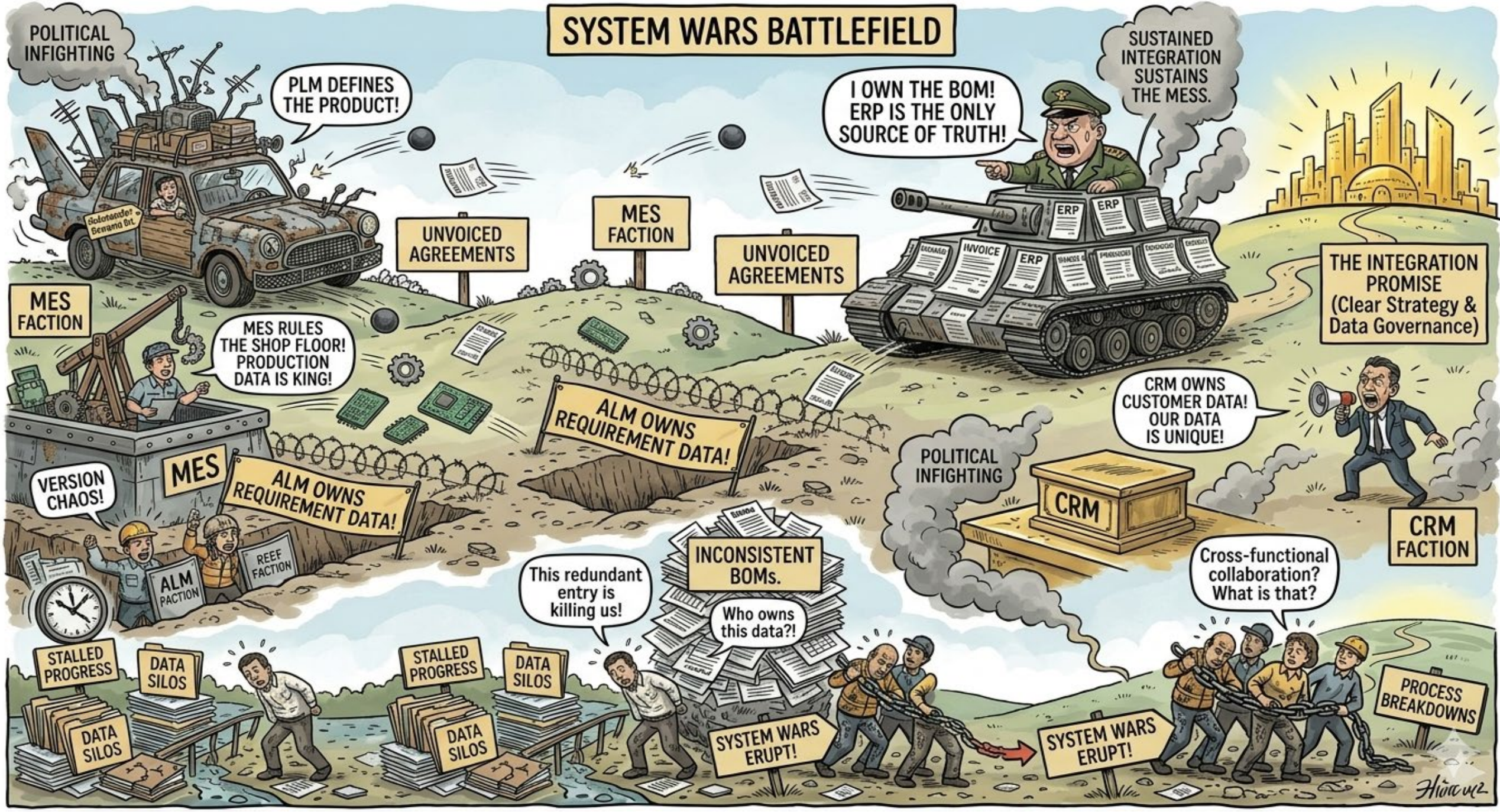
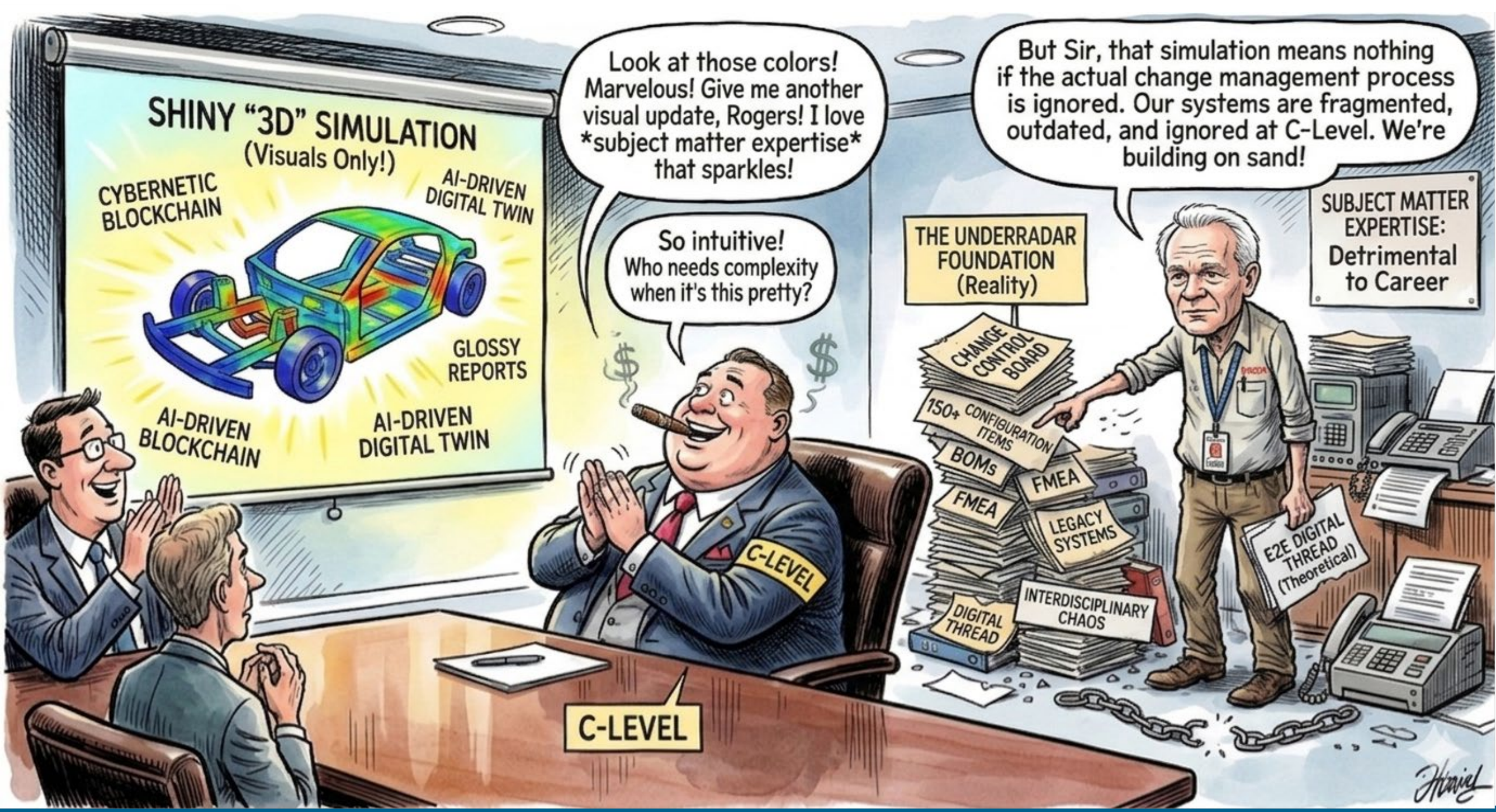

SYSTEM WARS BATTLEFIELD
POLITICAL INFIGHTING
PLM DEFINES THE PRODUCT!
UNVOICED AGREEMENTS
MES FACTION
UNVOICED AGREEMENTS
I OWN THE BOM! ERP IS THE ONLY SOURCE OF TRUTH!
SUSTAINED INTEGRATION SUSTAINS THE MESS.
THE INTEGRATION PROMISE (Clear Strategy & Data Governance)
MES FACTION
MES RULES THE SHOP FLOOR! PRODUCTION DATA IS KING!
ALM OWNS REQUIREMENT DATA!
MES
ALM OWNS REQUIREMENT DATA!
VERSION CHAOS!
ALM FACTION
REEF FACTION
CRM OWNS CUSTOMER DATA! OUR DATA IS UNIQUE!
POLITICAL INFIGHTING
CRM
CRM FACTION
INCONSISTENT BOMs.
This redundant entry is killing us!
Who owns this data?!
Cross-functional collaboration? What is that?
STALLED PROGRESS
DATA SILOS
DATA SILOS
STALLED PROGRESS
DATA SILOS
SYSTEM WARS ERUPT!
SYSTEM WARS ERUPT!
PROCESS BREAKDOWNS


SHINY "3D" SIMULATION
(Visuals Only!)
CYBERNETIC BLOCKCHAIN
AI-DRIVEN DIGITAL TWIN
GLOSSY REPORTS
AI-DRIVEN BLOCKCHAIN
AI-DRIVEN DIGITAL TWIN
Look at those colors! Marvelous! Give me another visual update, Rogers! I love *subject matter expertise* that sparkles!
So intuitive! Who needs complexity when it's this pretty?
C-LEVEL
C-LEVEL
But Sir, that simulation means nothing if the actual change management process is ignored. Our systems are fragmented, outdated, and ignored at C-Level. We're building on sand!
THE UNDERRADAR FOUNDATION (Reality)
SUBJECT MATTER EXPERTISE: Detrimental to Career
CHANGE CONTROL BOARD
150+ CONFIGURATION ITEMS
BOMs
FMEA
FMEA
LEGACY SYSTEMS
DIGITAL THREAD
INTERDISCIPLINARY CHAOS
E2E DIGITAL THREAD (Theoretical)

7 Treating PLM as an IT-Project

...And Pretending It's Just a 'Tool' Issue

- **Processes Come Before Tools**
  Implementing PLM without first defining target processes leads to digital chaos instead of efficiency.
- **Organizational Roles Must Be Redefined**
  PLM changes responsibilities, decision rights, and ownership across engineering, manufacturing, quality, and service.
- **Cross-Functional Alignment Is Mandatory**
  PLM breaks silos; success depends on collaboration between departments, not isolated system configuration.
- **Change Management Is a Core Success Factor**
  User adoption, mindset shifts, and behavioral change are as critical as technical deployment.
- **Product Data Is a Strategic Asset, Not an IT Artifact**
  Product data quality, semantics, and ownership must be managed at the business level.
- **Technology Enables—People and Processes Deliver Value**
  The PLM system is only successful if the organization is ready to work differently.(Model Based, System Thinking, Interdisciplinary and Collaborative)

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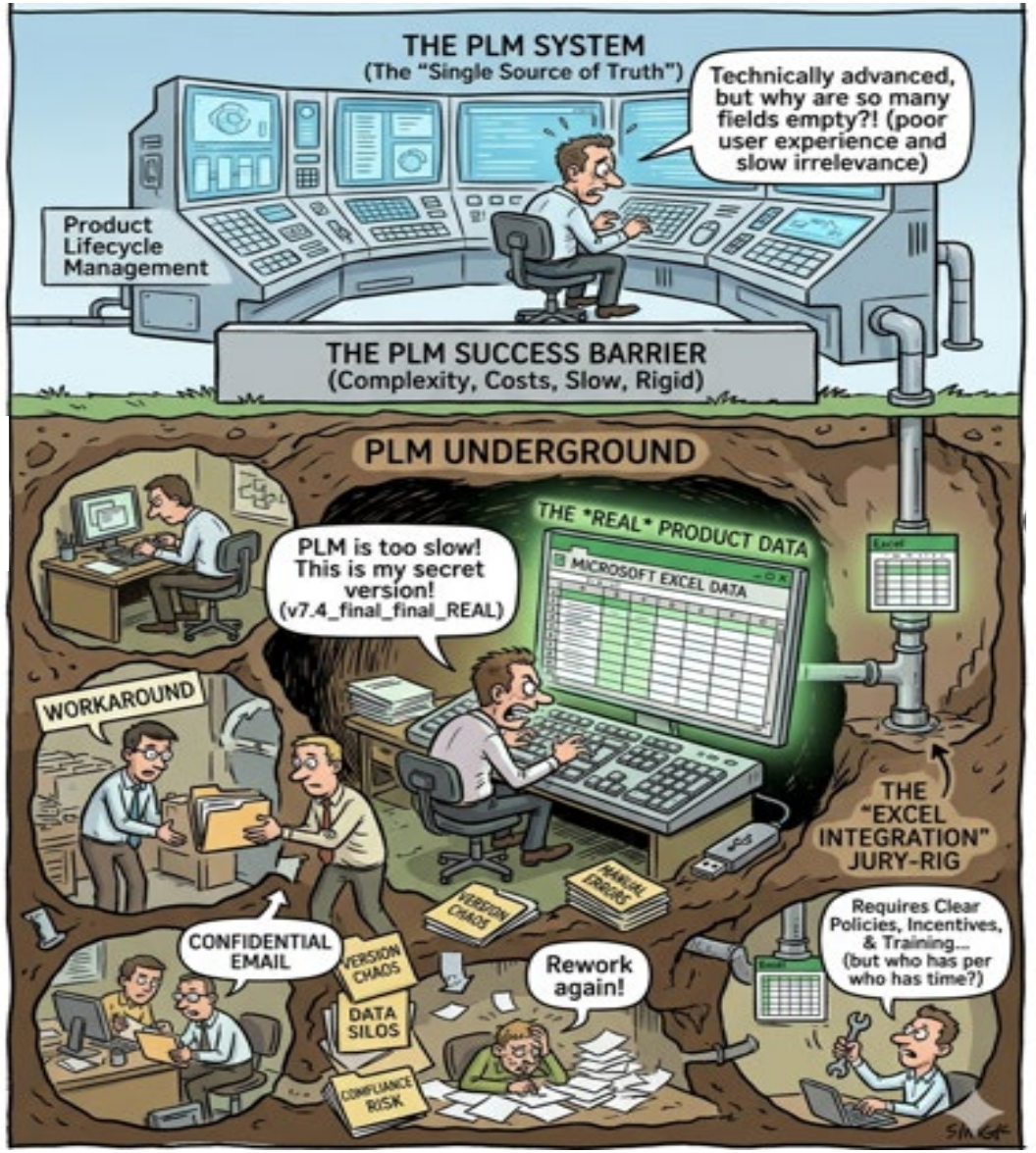
8 Shadow IT and Persistent Excel Dependence

Critical product data often remains outside PLM systems, managed through email, Excel and workarounds.

- "PLM-Underground"
  - Continued use of spreadsheets and email
  - EXCEL is the most widely used IT-System in Engineering
  - Behavior to keep the familiar systems running
- Version chaos and data inconsistencies
- Manual workarounds bypassing PLM
- Lack of trust in PLM data
- Undermining a common data model in engineering
- Missing governance and enforcement
- Harmonizing strategies often fail



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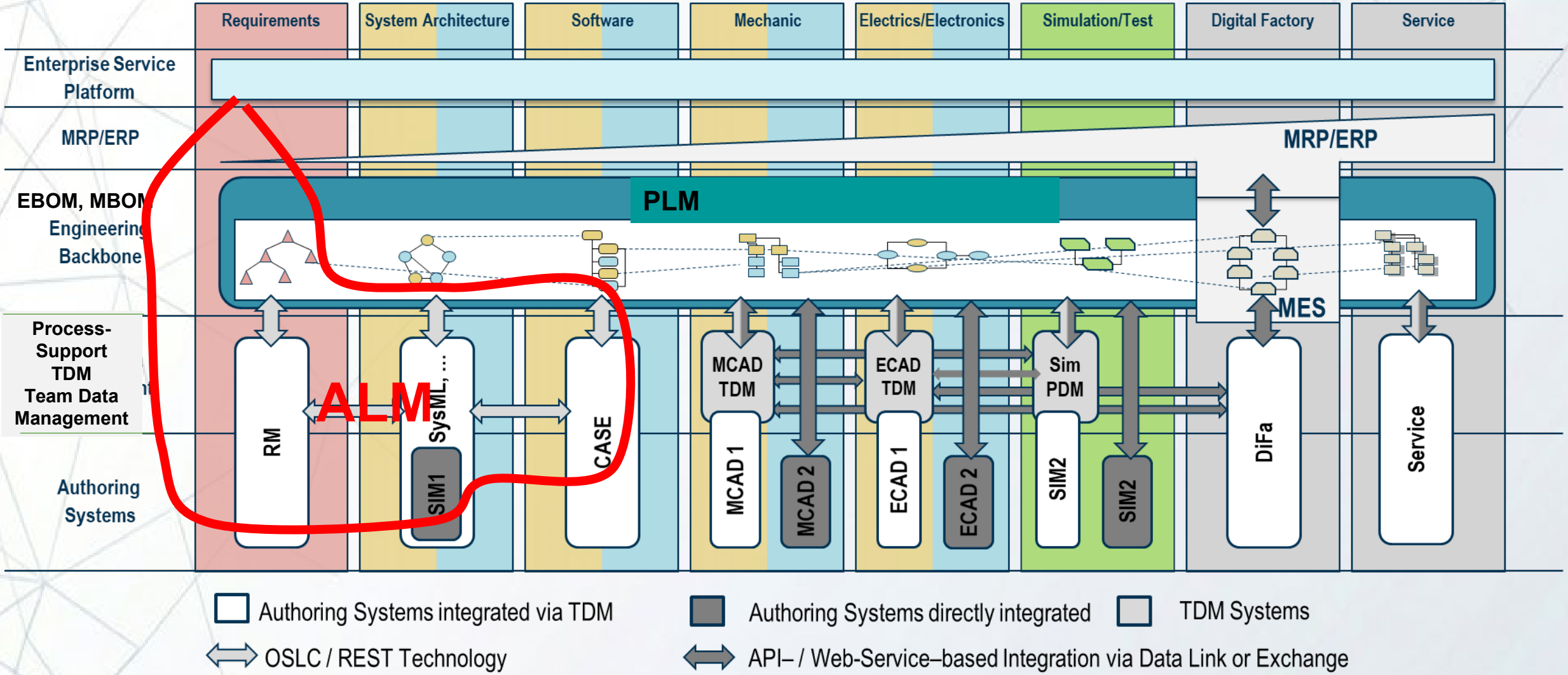
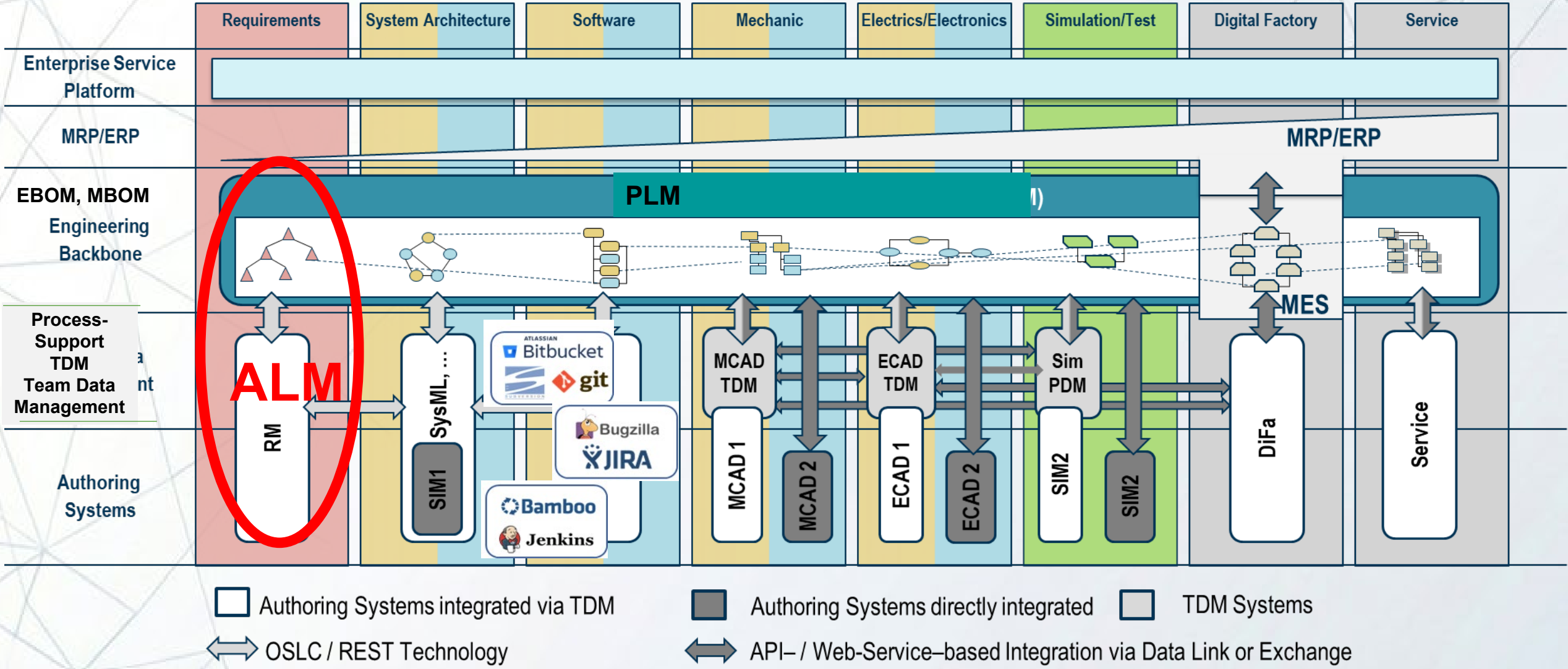
IT ARCHITECTURE BASED ON VDA 4(5)-LEVEL CONCEPT
THEORETICAL POSITIONING OF ALM 1



IT ARCHITECTURE BASED ON VDA 4(5)-LEVEL CONCEPT

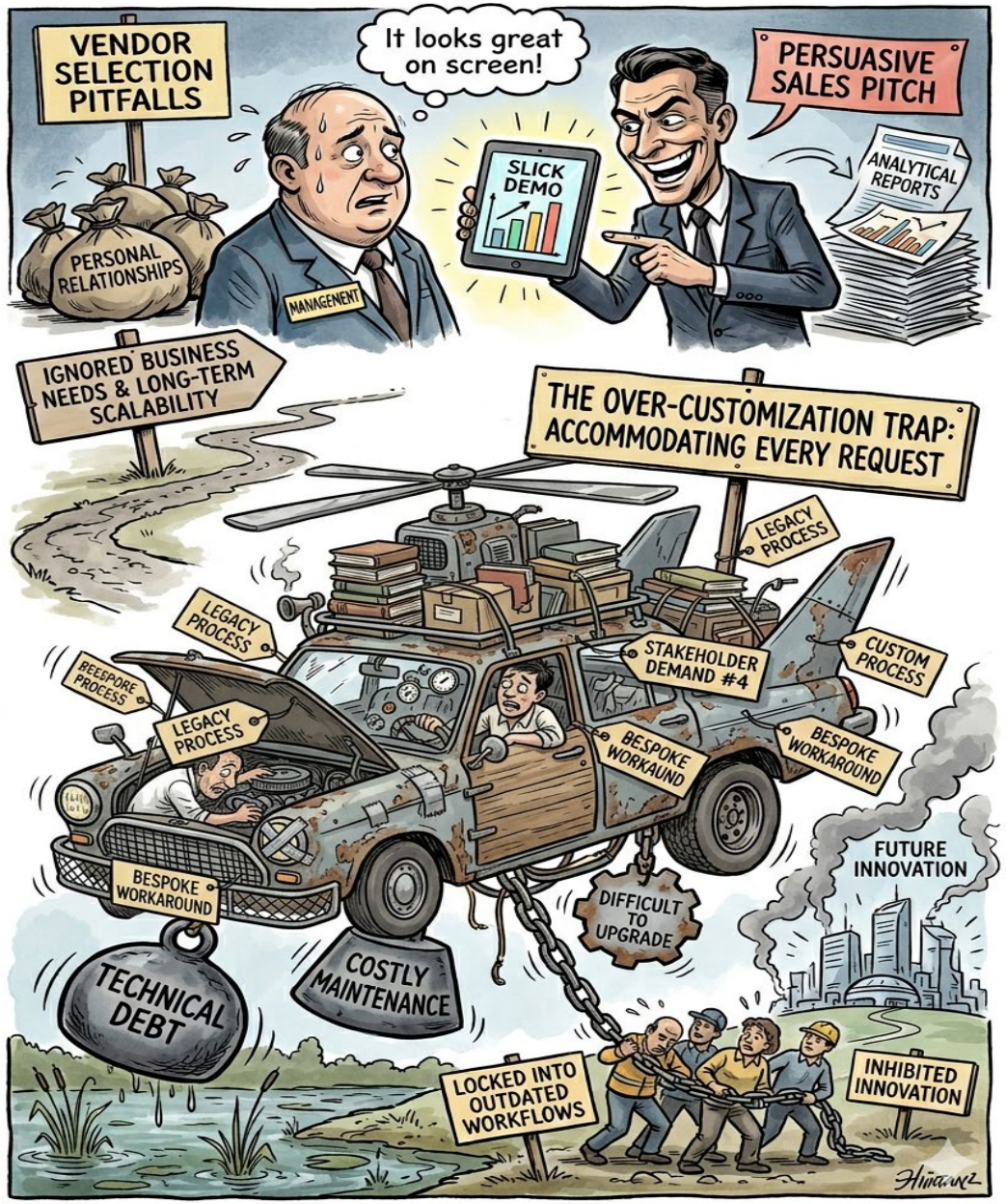
PRAGMATICAL POSITIONING OF ALM 2



9 Vendor Selection Pitfalls and Over-Customization

Wrong tool choices and excessive customization increase failure risk.

- Vendor selection driven by demos or sales pressure
- Nice videos versus detailed functional test
- Poor fit with business requirements
- Lack of long-term scalability assessment
- Excessive customization of data and process model
- This results in high maintenance and upgrade costs
- The TCO over a 3- to 5-year period is not calculated
- Vendor lock-in and reduced flexibility
  (Code for PLM Openness ProSTEP)



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CLOSED PLM ECOSYSTEM
PROPRIETARY LOCK
THE DIGITAL FEUDALISM PACKAGE DEAL
'MARKET LEADER' PLM VENDOR
(STANDING FOR LARGE VENDORS)
WE NEED MULTI-CAD!
ENGINEER
'MARKET LEADER' PLM VENDOR
STOP HOLDING ENGINEERING DATA HOSTAGE!
A WAKE-UP CALL FOR PLM "MARKET LEADERS"!
ProSTEP iVIP SYMPOSIUM
VDA 4-LEVEL CONCEPT
4. ERP
3. PLM BACKBONE
2. OPEN TDM LAYER
1. AUTHORING SYSTEMS
RECLAIM THE CODE OF PLM OPENNESS (CPO)!
THE TRUE PATH TO DIGITAL TRANSFORMATION: OPEN TDM!

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10 Missing Technological Expertise
When Buzzwords Kill the PLM-Project

Lack of technology cause a PLM-Project to fail:

- PLM Software Technology?
  - Monolithic, Containerized WEB Services, Cloud Native?
  - Repository Technology and Low Code Engine
  - Open Interfaces ↳ no vendor lock in
  - Missing of a general SW-Architecture Strategy
- Cloud Technology?
  - Does PLM really need Public Cloud and Multi Tenant?
    ↳ restricted customizing, many companies ⟶ one server
  - Is Single Tenant (on-prem/private cloud) better?
- AI Technology?
  What is the solution, when companies want to combine gen AI with proprietary product knowledge?
  - Fully Private Single-Tenant (on-prem/private cloud)
  - Hybrid RAG Retrieval Augmented Generation
    Private Tenant for product data,+ LLM on public cloud

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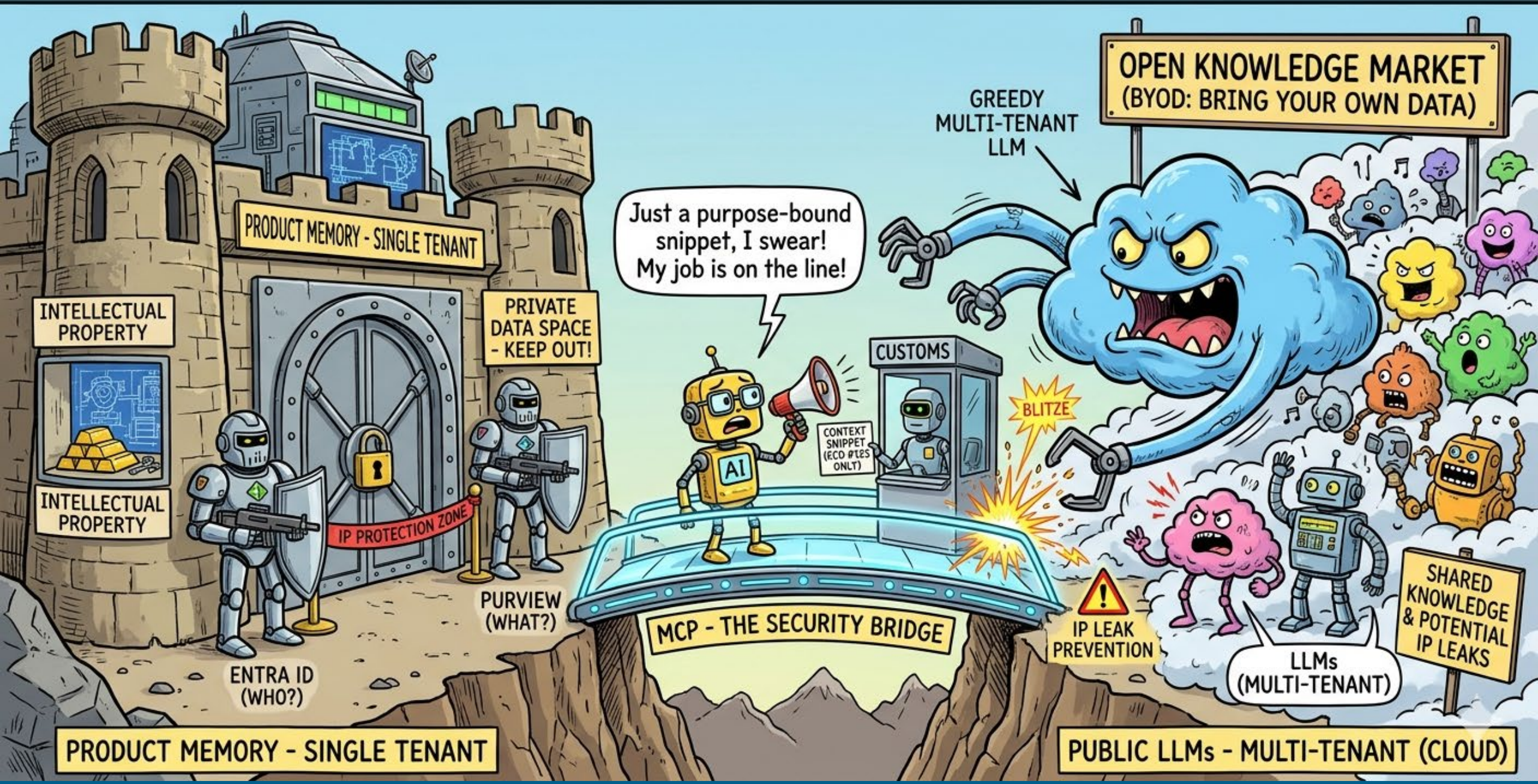
HYBRID AI ORCHESTRATION: DO NOT TRUST THE CLOUD (UNLESS YOU HAVE MCP)



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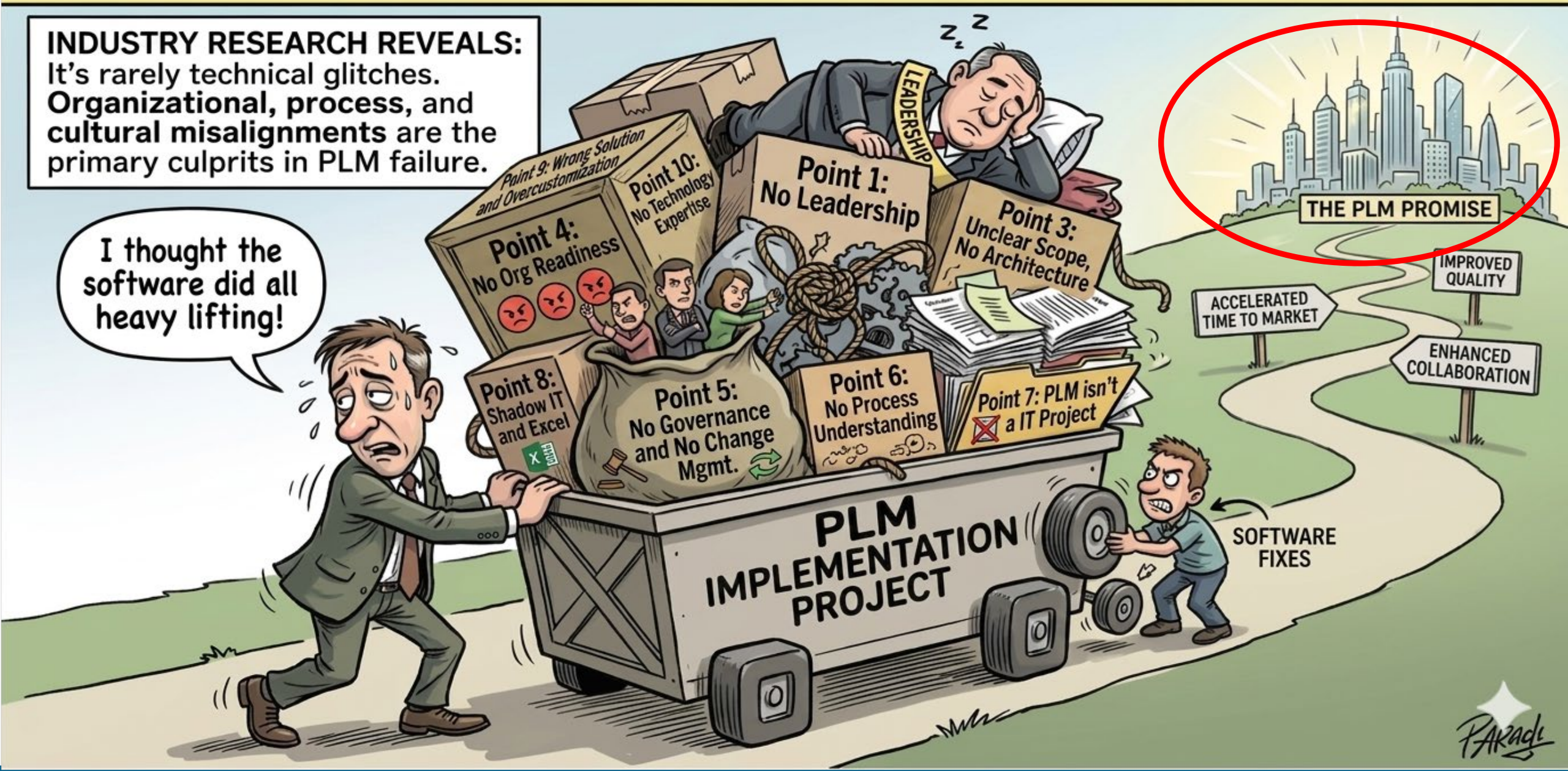
THE REALITY OF PLM: WHY THE PROMISE STALLS



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Yes, Waldorf
Did you think it could get any worse?
MUPPET LOGE
WHERE WAS THE STRATEGY?
DON'T STRIRANCE!
LACK OF GOVERNANCE!
DATA MIGRATION FAILURE!
NO TRAINING PLAN!
CEO IGNORED US!
WORKFLOWS ARE A MESS!
POOR STRATEGY!
SCOPE CREEP!
BUDGET OVERRUN!
10 ERRORS DURING IMPLEMENTATION
10 ERRORS DURING IMPLEMENTATION
POOR STRATEGY!
BUDGET OVERRUN!


Finally, positive challenges arising from **Agentic AI**
MUPPET LOGE
CLEAR AGENTIC STRATEGY DEPLOYED!
SMART AGENT GOVERNANCE IS HERE!
CLEAR AGENTIC STRATEGY DEPLOYED!
DATA FOUNDATION SECURED!
AI LITERACY & SKILLING!
WORKFLOWS NOW OPTIMIZED!
WORKFLOWS ARE A MESS!
ROBUST AGENT ARCHITECTURE!
AGILE & ADAPTIVE AGENT GOALS!
COST-EFFECTIVE AGENT MANAGEMENT!
ERROR-FREE PILOT ACHIEVED!
ERROR-FREE PILOT ACHIEVED!
POOR STRATEGY!
IMPLEMENTATION SUCCESS!

Actual Concept E2E Digital Thread with AI Assistance

Execution (AI Assistance

Change Management | QMS/FMEA | Impact Analysis | Gen. AI / LLM

Data and Process Model E2EDT

COTS .....

CRM CPQ | RM | SA | PDM | ALM | CAE | MPP | MRP/ SCM | MRO .....

Requirement Definition | System Architecture | Design Cax + E-BOM | Virtual und Physical V&V | Manufacturing Process Planning | Operation

Product Lifecycle

ECO Engineering Change Objects

FMEA

Standard LLMs (The Predictor)

- **Standard LLMs are language based primarily passive text predictors (A-creativity):**
  - The Logic: They predict the next token in a sequence based on statistical probability.
  - The Constraints: They lack an internal “world model”. They don’t understand cause and effect; they only understand linguistic pattern.
  - Strength: Can outperform average humans on some divergent-thinking benchmarks.
  - Limit: Outputs lack the semantic depth and lived experience behind top human creativity (= B-Creativity)
- It does **not** act **independently –** it only responds when prompted.
- It has **no** persistent **goals, planning, or real autonomy.**

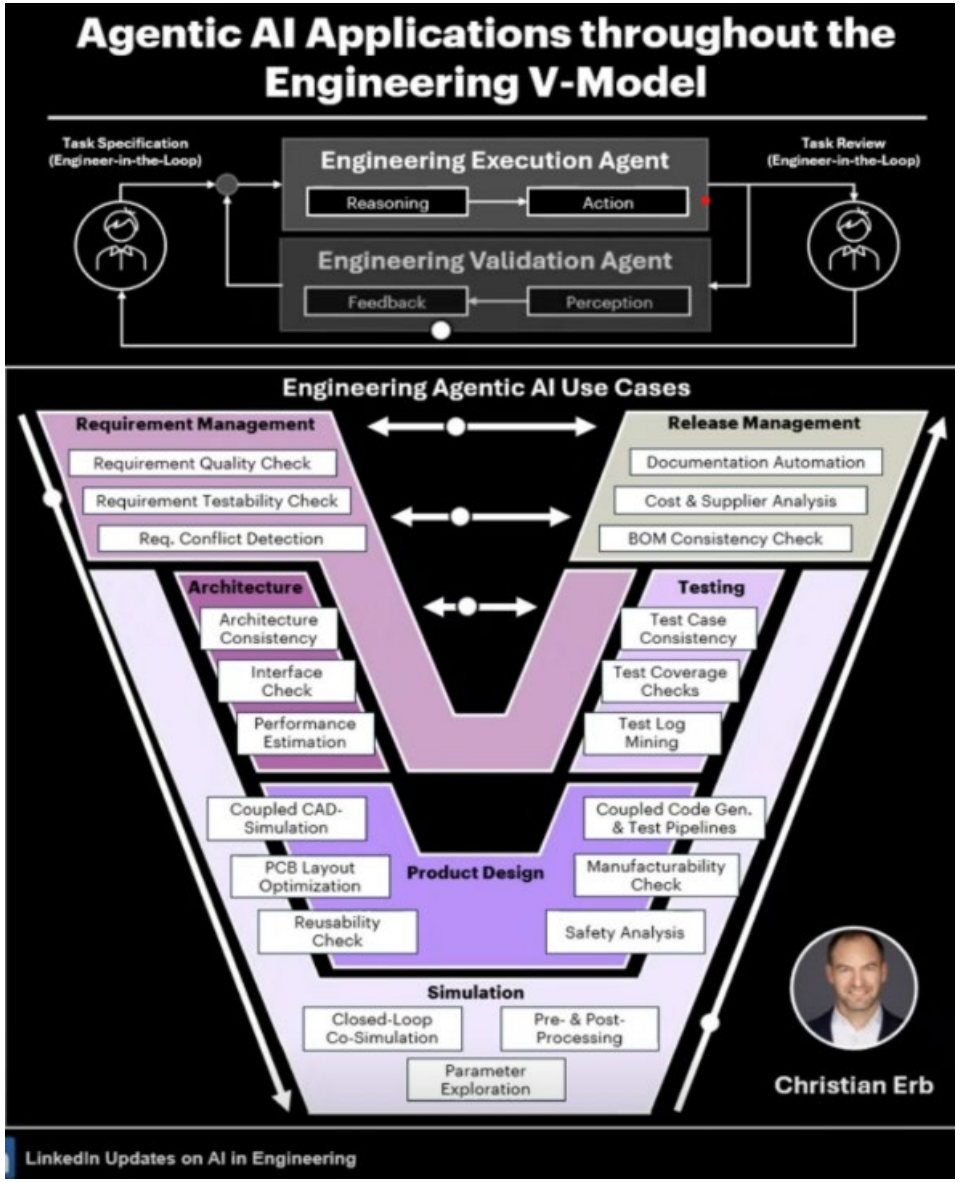
In short:
Standard LLM = reactive, single Step A-creativity

A-Creativity Artificial Creativity / B-Creativity Biological Creativity

One Step Further: Iterative DESIGN Agentic AI ↳ Design Intelligence

- **Iterative DESIGN:** Use LLMs for broad idea generation inside an **iterative, agentic design loop**.
- **Iterative DESIGN loop: Brief → Generate → Simulate → Validate → Refine**.
- **Agentic patterns:** Decomposition, API connectors, stateful workflows, automated checks, multistep and human-in-the-loop escalation.
- **Boundary:** Agentic AI raises automation reliability but **remains bounded** by underlying model

- Claude Cowork and (Open Claw) materially increases the scope and reliability of automation built on ANI components by turning single-turn outputs into multistep, stateful processes.
- These systems still operate within predefined process boundaries and require explicit orchestration logic.
- The work of Yann LeCun and Eve Bodnia represents a logical shift from generative AI to reasoning AI, which expands the boundaries of A-Creativity.



The Future: Product Memory Based on E2E Digital Thread Admin Intelligence

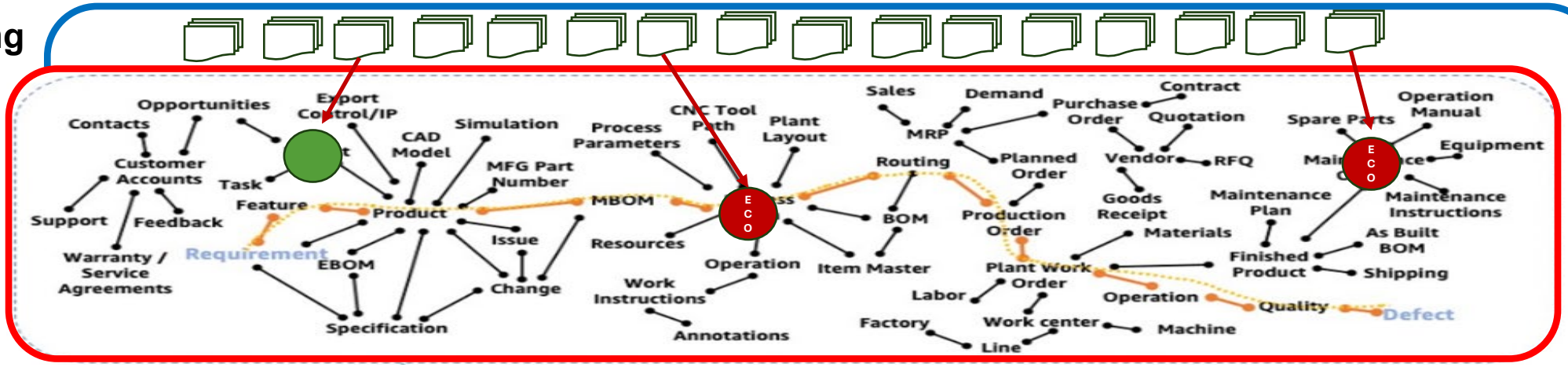
AI Agents Processes

AI Agents Functions

CRM CPQ | RM | SA | PDM | ALM | CAE | MPP | MRP/ SCM | MRO

Reasoning

Data and Process Model E2EDT



Product Memory

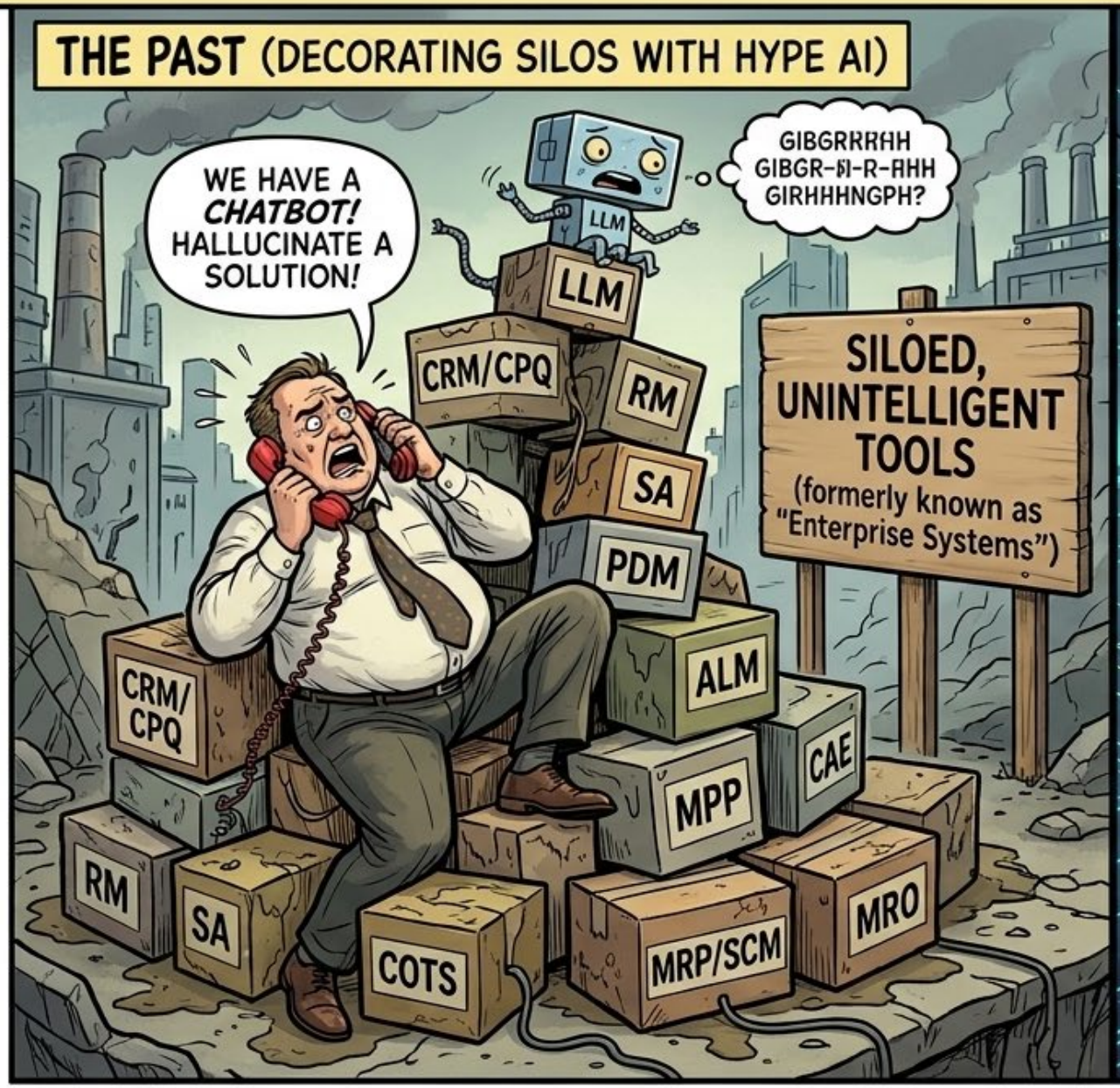
Requirement Definition	System Architecture	Design Cax + E-BOM	Virtual und Physical V&V	Manufacturing Process Planning	Operation

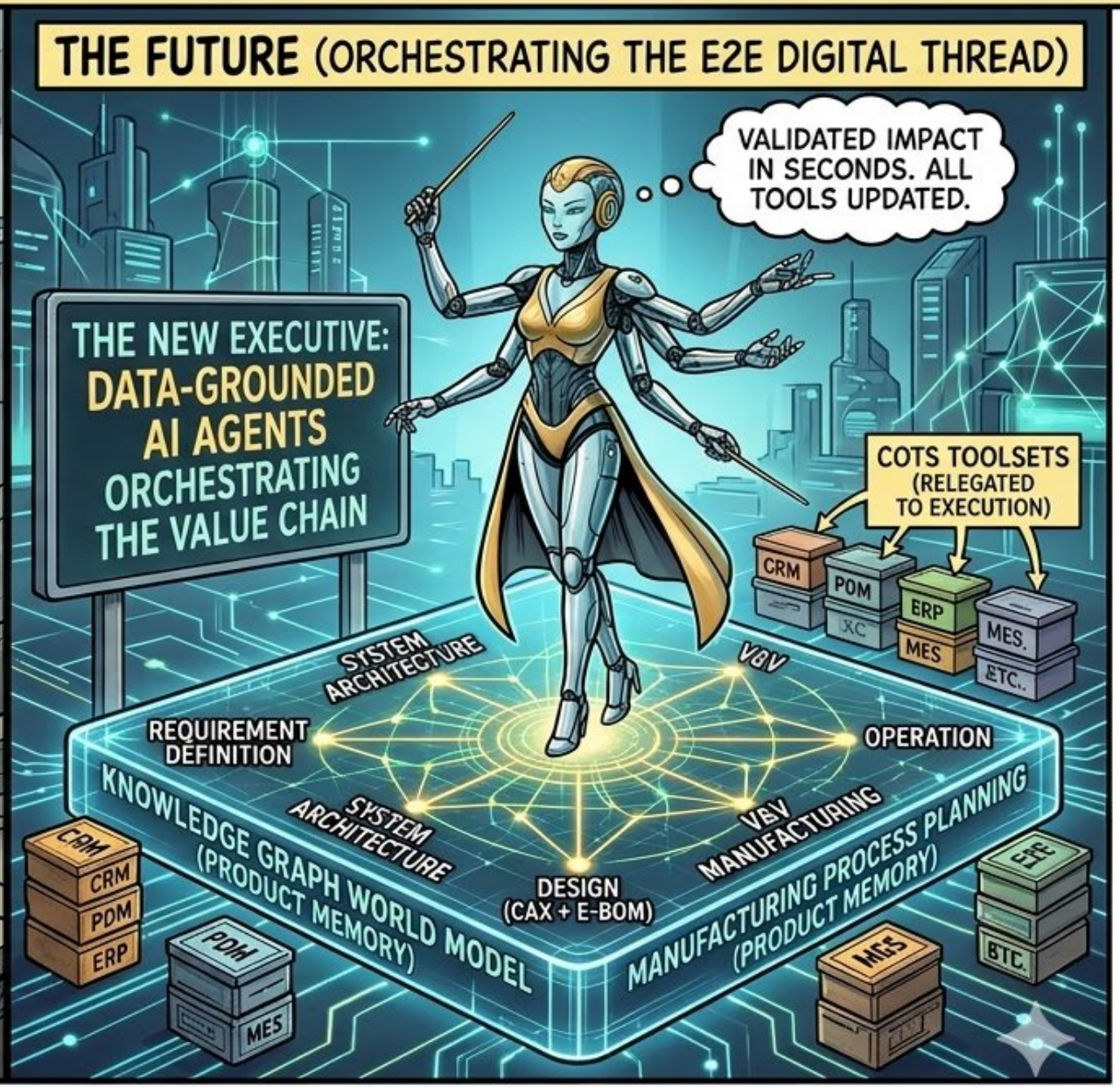
Product Lifecycle

ECO Engineering Change Objects

FMEA

THE END OF THE "INTELLIGENT" ENTERPRISE SUITE: WELCOME TO AGENTIC PRODUCT MEMORY





STOP DECORATING SILOS WITH AI. BUILD A WORLD MODEL, OR BECOME OBSOLETE. - #AgenticPLM #ProductMemory

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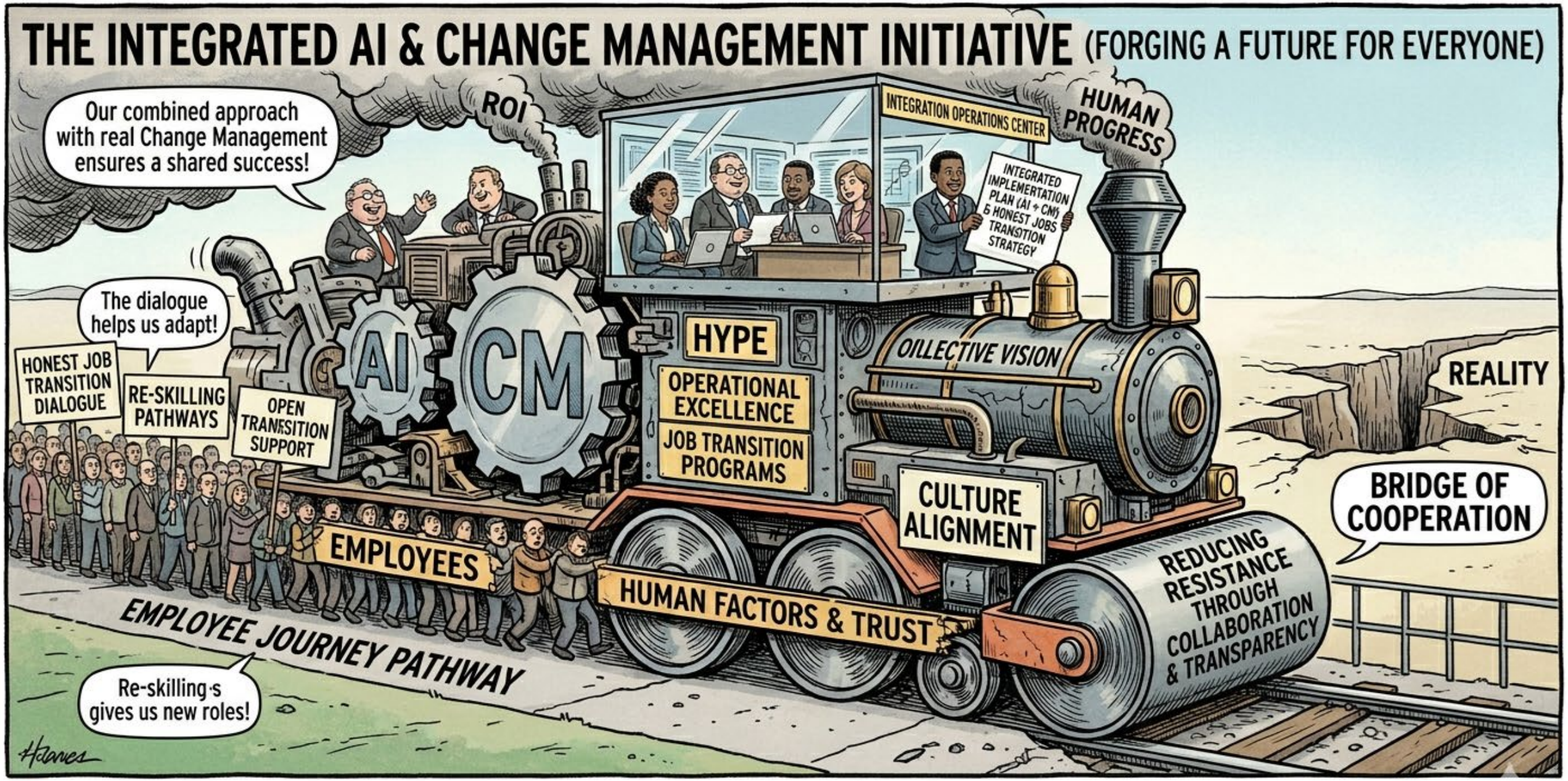
THE INTEGRATED AI & CHANGE MANAGEMENT INITIATIVE (FORGING A FUTURE FOR EVERYONE)



THE AI REVOLUTION: ELEVATING STRATEGY, ENABLING HUMAN PROGRESS

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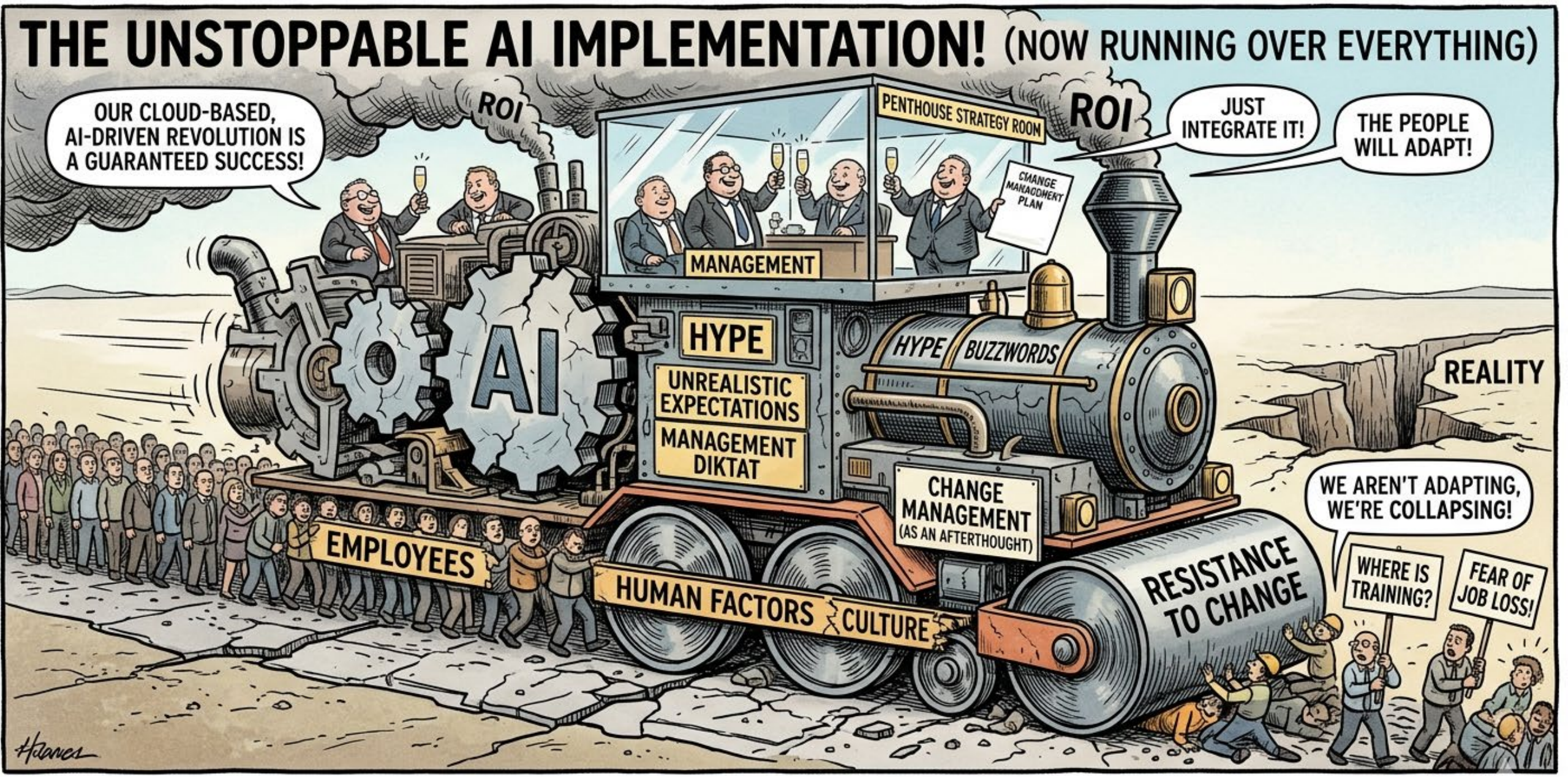

THE AI REVOLUTION: ELEVATING STRATEGY, FLATTENING HUMANITY

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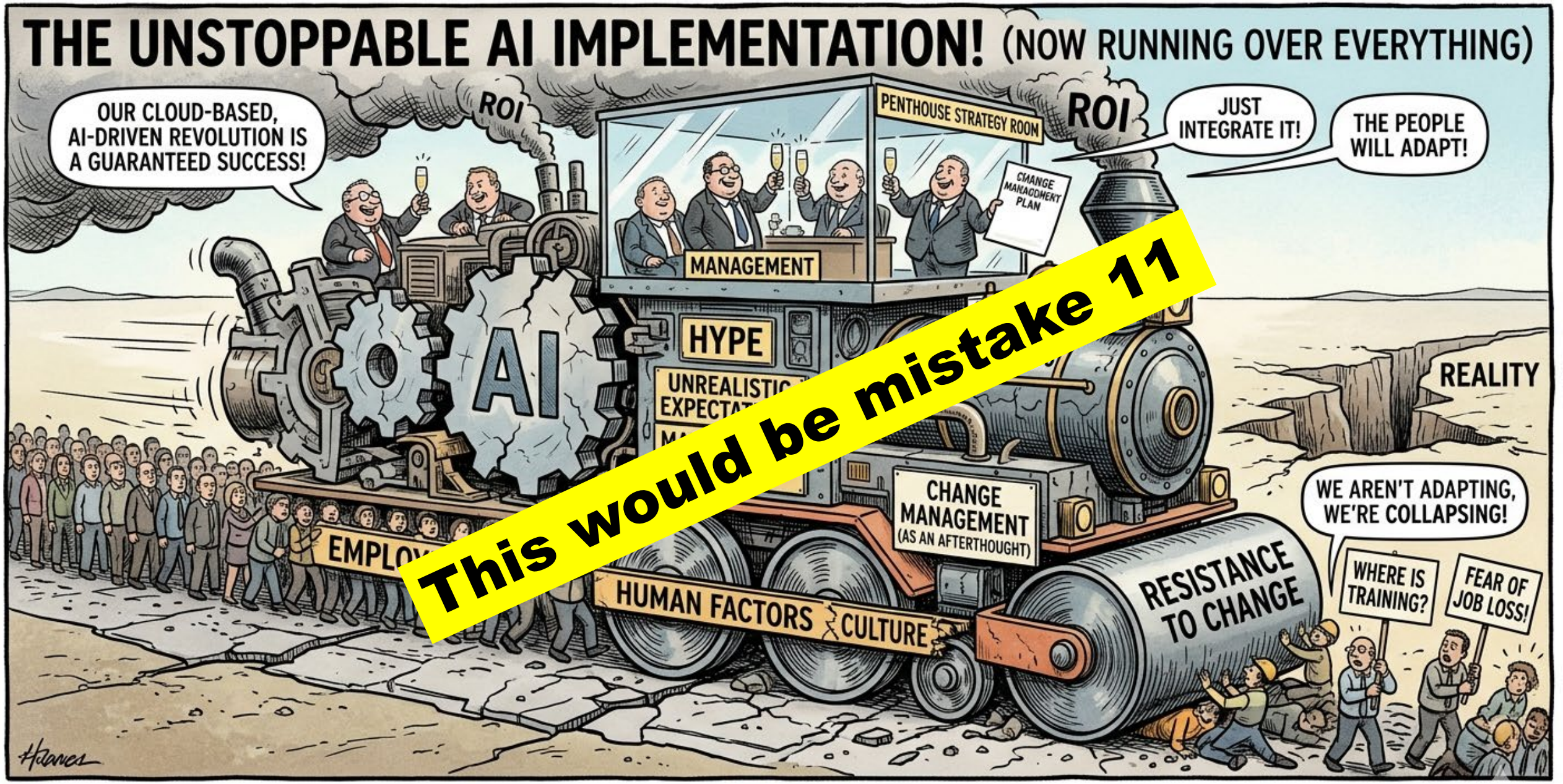

THE AI REVOLUTION: ELEVATING STRATEGY, FLATTENING HUMANITY

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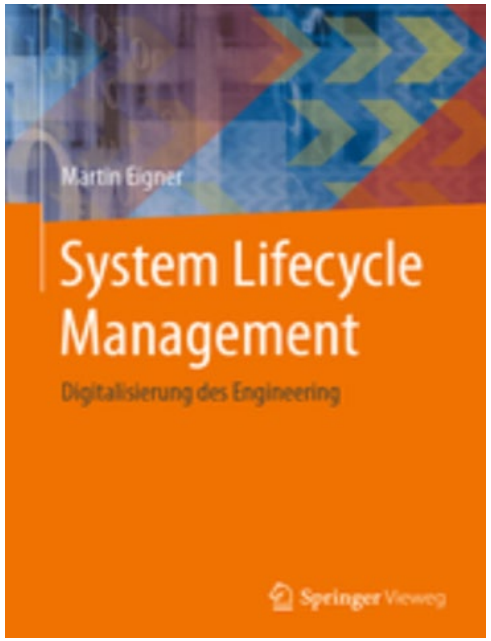

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