AI Accelerator Summit

AIAI AI Accelerator Institute

Constructing a business framework to unshackle innovation and breakdown internal AI literacy gaps

Wim Verleyen, PhD

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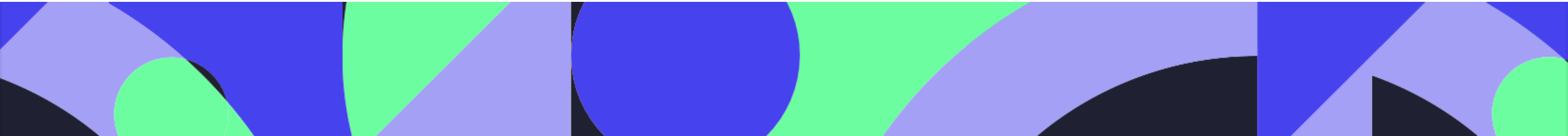


Speaker’s profile

Profile

I am a technology leader with +15 years of experience advancing data capabilities for descriptive, diagnostic, and predictive services. I work closely with technology leaders and business stakeholders to define global strategy’s short-term deliverables, and support mid-term and long-term innovation initiatives.

- Belgium (soccer, cycling)
- PhD in Biology from the University of St Andrews, Scotland, UK
- Postdoc in Computational Biology at Cold Spring Harbor Laboratory, NY, US
- Executive Education for Chief Technology Officer, Wharton School, University of Pennsylvania, PA, US
- Worked at Audible (subsidiary of Amazon) and Raytheon Technologies

Demonstrate key considerations that allow teams to translate AI/ML innovation into a business plan.

Provide context for understanding long-term investments for AI/ML capabilities across a firm.

AI/ML Innovation | Motivation for framework[1]

Current Struggles Businesses Face

"How can we improve the return of investment (ROI) for AI/ML?"

- Only 10% - 13% of organizations create value from AI/ML investments
- Scaling AI/ML Solutions is extremely challenging
- Inform C-suite and improve execution of AI/ML Innovation themes

Current emergent technology literature fails to provide the context of AI/ML capabilities

"How can we adopt emergent AI/ML technologies?"

- Technology leaders are used to managing disruptive technologies; therefore, this framework is leveraging existing frameworks
- AI/ML technologies force business and technology leaders to reconsider current solutions
- AI/ML technologies are a collection of emergent technologies that demand for practical experimentation

Operational considerations for investment in AI/ML

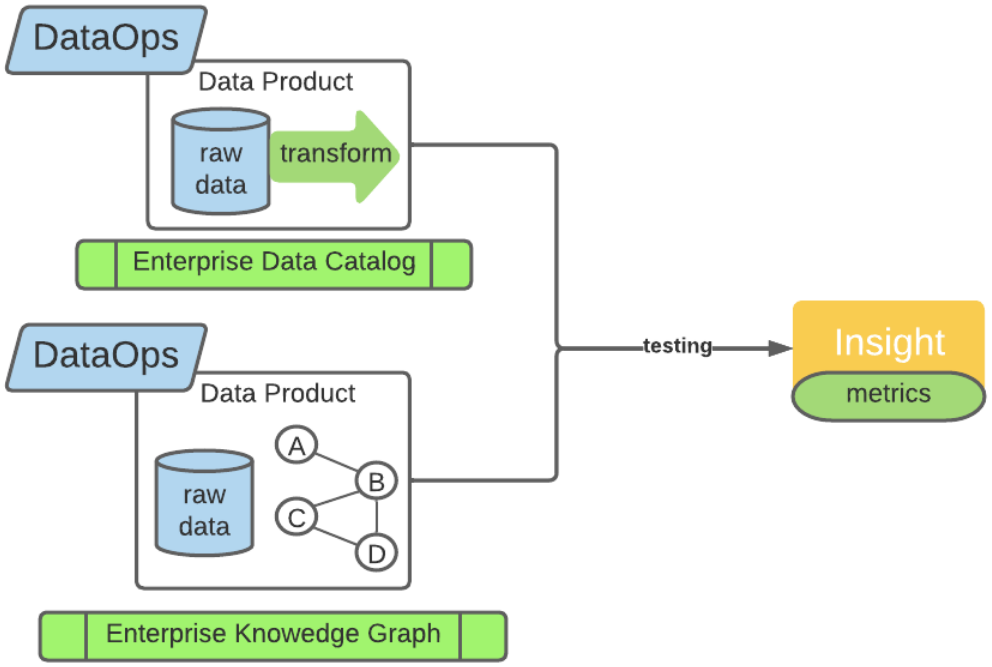
"How can we invest in AI/ML Innovation?"

- Define the horizon of AI/ML Innovation themes for building an AI/ML solution
- The definition of a business model and organizational structure for AI/ML
- Strategies and AI/ML journey for AI/ML Product development
- Compose a business plan for investing in AI/ML

[1] Verleyen W., *Framework for disruptive AI/ML Innovation*, 2022, preprint arXiv - 2204.12641

Motivation
Investment in AI/ML
AI/ML technology maturity
Organizational strategy
AI/ML technology development
Business model
Business plan

Data Product | Enterprise Data Catalog and Enterprise Knowledge Graph



Data product

A data product is a high-quality, ready-to-use data set that employees can access and apply to different business challenges. Practically, data products can include a set of pipelines that transform data from the centralized raw layer into new data models to support advanced analytics and generate insights.

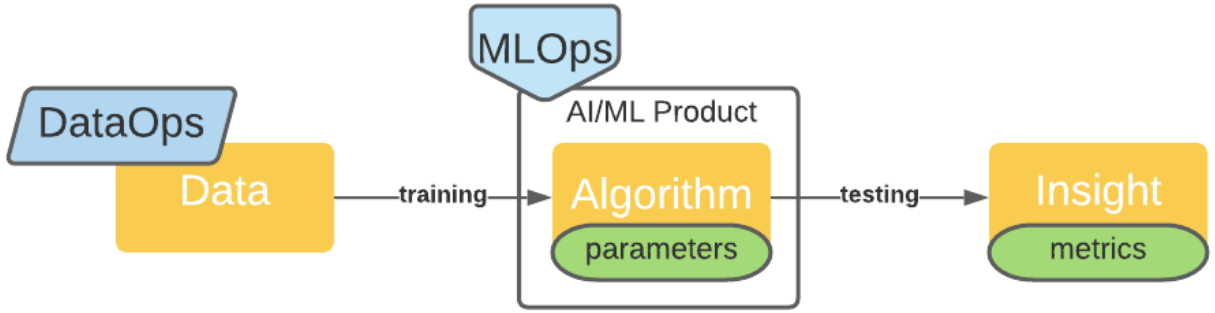
Enterprise data catalog

An enterprise data catalog (EDC) is a suite of tools that automates data governance activities, i.e., meta-data handling, data lineage creation, data-quality management, and other governance functions. It is used to track back to the raw data and prioritizes enterprise needs.

Enterprise knowledge graph

An enterprise knowledge graph (EKG) is a data structure that uses ontologies and knowledge graphs to map the relationship between different classes of data and data points. It is used to create a holistic view of the customer that can be modeled in real time.

AI/ML Product & AI/ML Ecosystem | Definitions



AI/ML Product

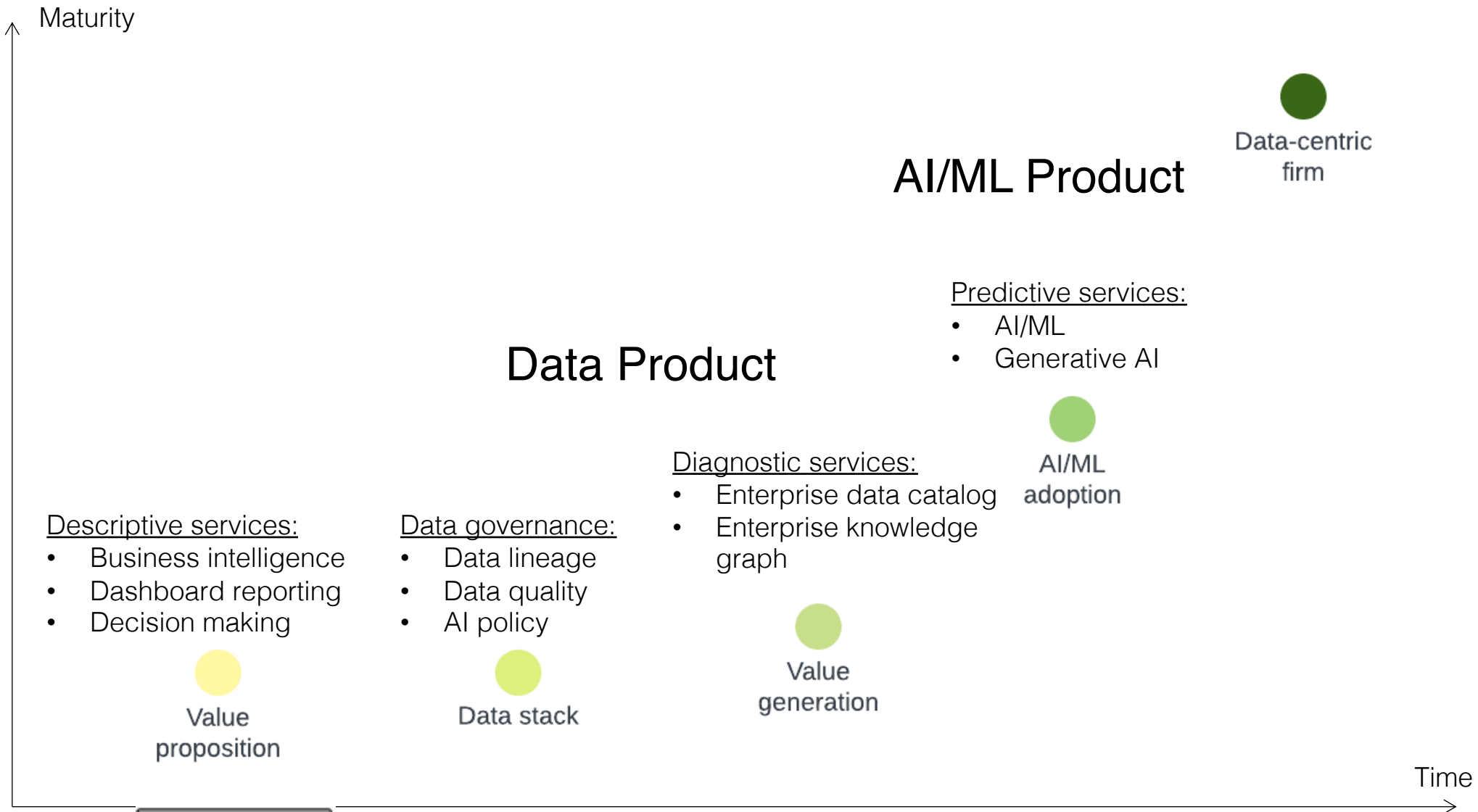
An AI/ML Product abstracts the algorithm, training procedure for learning parameters, and scoring procedure to make predictions with the trained model for creating predictive capacity

AI/ML Ecosystem

An ecosystem includes the community and the platform (MLOps and DataOps) for effectively hosting AI/ML Solutions for the marketplace and its customers. The AI/ML Solution will provide the insights in the format a customer can use

Figure in: Verleyen W., *Framework for disruptive AI/ML Innovation*, 2022, preprint arXiv - 2204.12641

Data-centric firm | Descriptive // Diagnostic // Predictive



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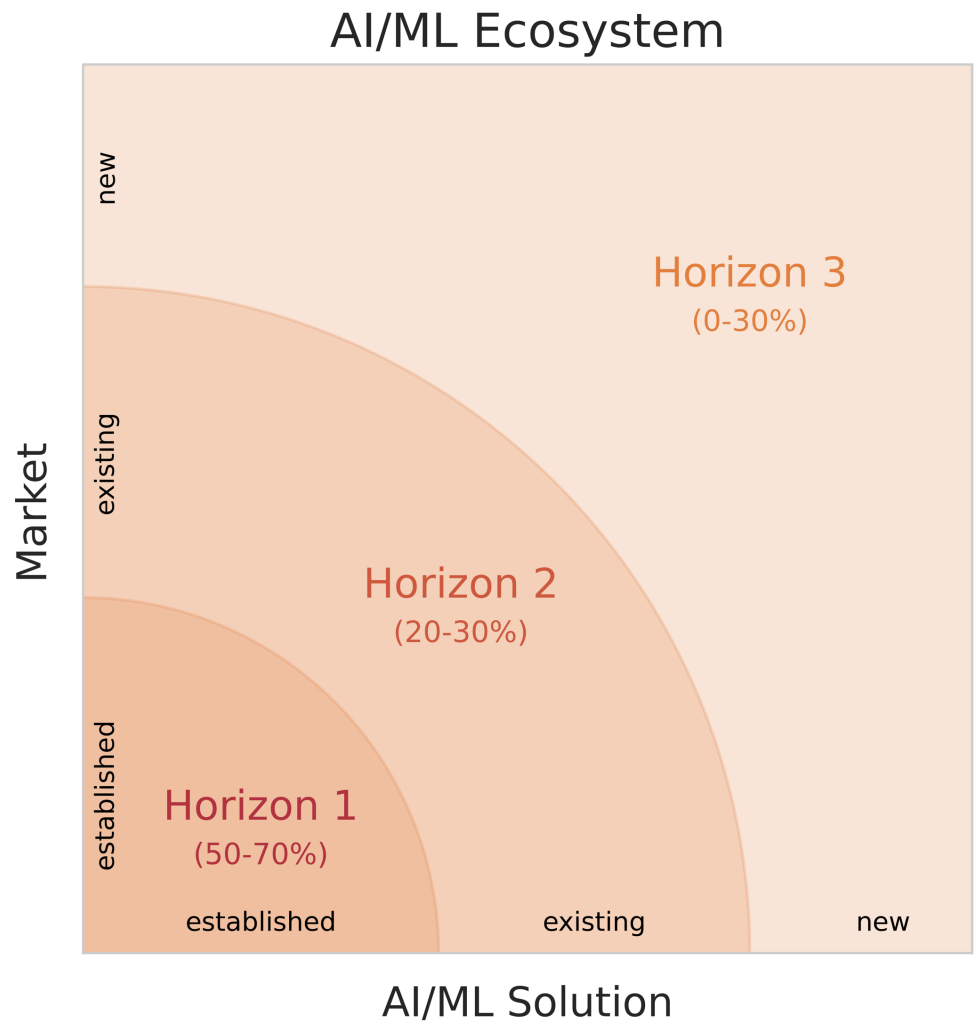
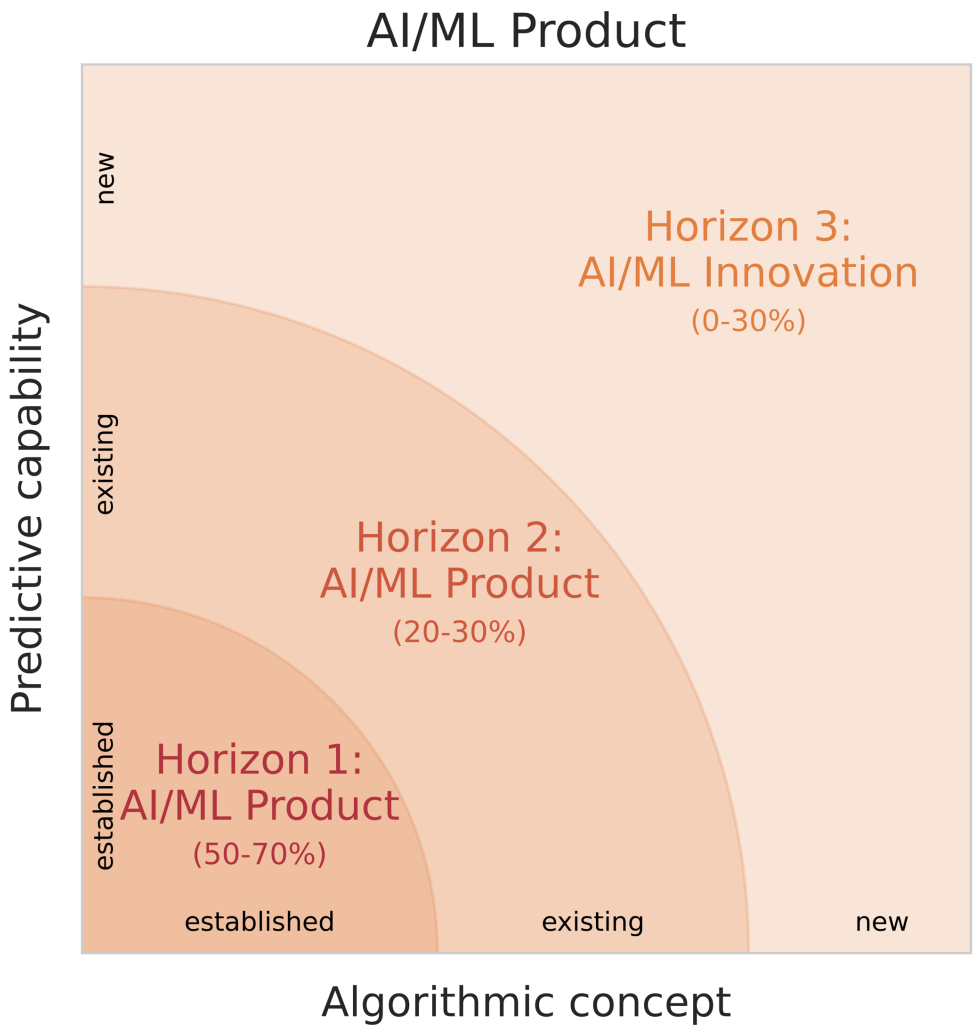
AI/ML Innovation Framework | 3 horizons of Innovation





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Technology Readiness Assessment (TRA) [1]

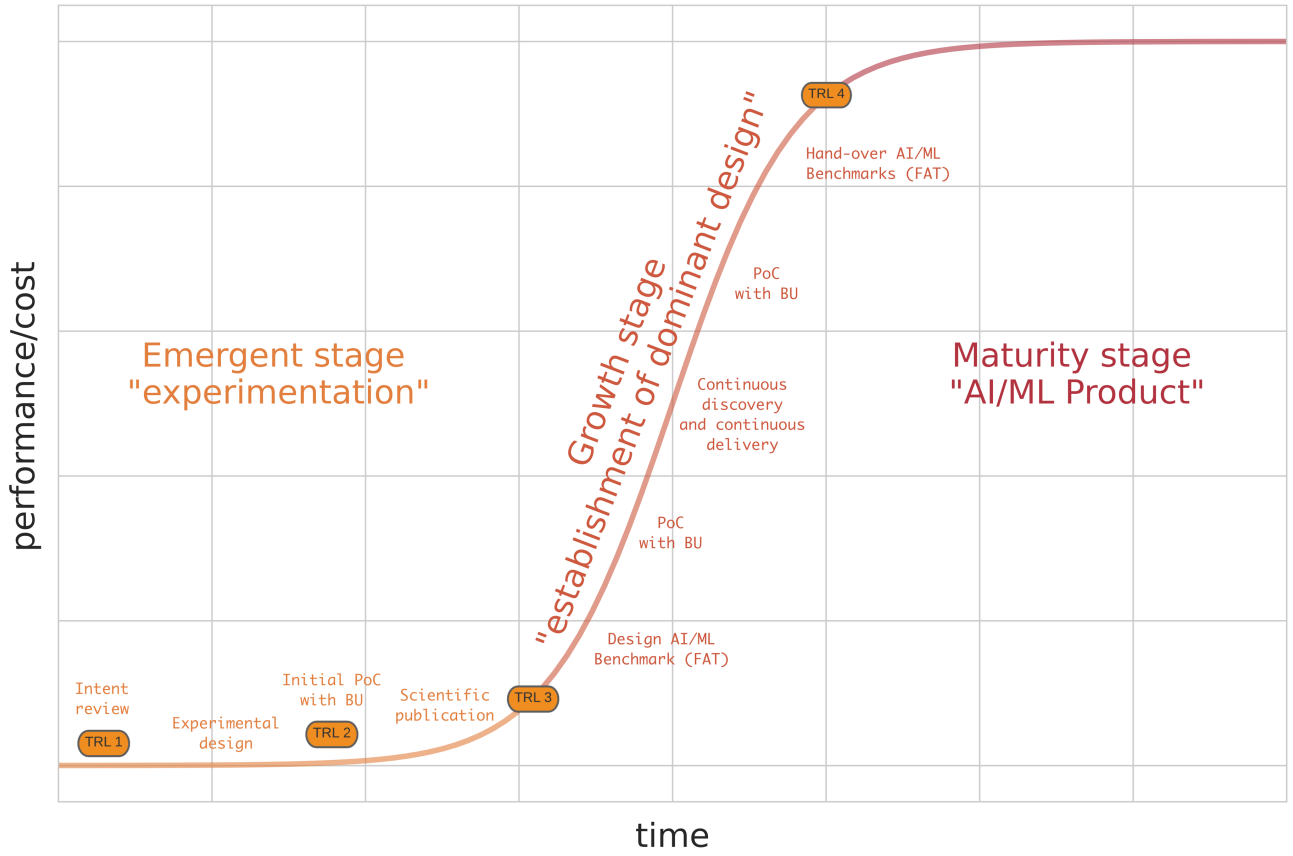
A TRA evaluates the technology's maturity. It is widely used by the US Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), and other government agencies.

Technology Readiness Levels (TRLs)

TRLs are a compendium of characteristics describing increasing technological maturity levels (1-9) based on demonstrated capabilities.

[1] US Government Accountability Office, Technology Readiness Assessment guide, January 2020, GAO 20-48g

AI/ML Innovation | AI/ML Innovation journey



Emergent stage: experimentation

- Technology is expensive; aim for cost reduction and performance improvement
- Intent review (literature review)
- Experimental design
- Initial proof-of-concept with BU
- Scientific publication (FOSS) // IP review

Growth stage: dominant design

- Design AI/ML Benchmark and functional acceptance test (FAT)
- Iterate of proof-of-concepts with BUs with continuous discovery and continuous delivery

Maturity stage: AI/ML Product

- Hand-over AI/ML Benchmarks (FAT) to AI/ML Product team

Product Innovation
Flexibility
User Education

Process Innovation
Process Control
User Segmentation

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AI/ML Innovation | Investment management

TRL 1: review current solutions

- Baseline and/or published solutions are reviewed
- Reproduce most relevant results from existing solutions
- Define computational resources

TRL 2: define experimental design for comparing innovative solution(s)

- Experimental design implemented for the evaluation of a baseline solution, published solution(s), and innovative solution(s) on publicly available data
- Report a critical assessment of the performance of these solutions

TRL 3: use case translation

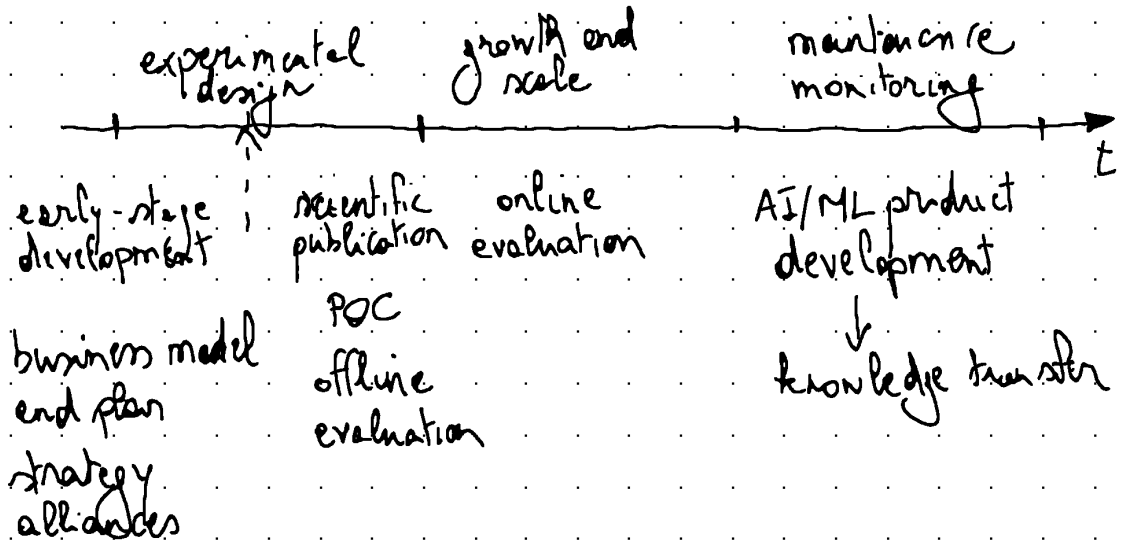
- Baseline/benchmark on publicly available data translated to real/proprietary data
- Define MLOps/DataOps research architecture

TRL 4: prototype validation

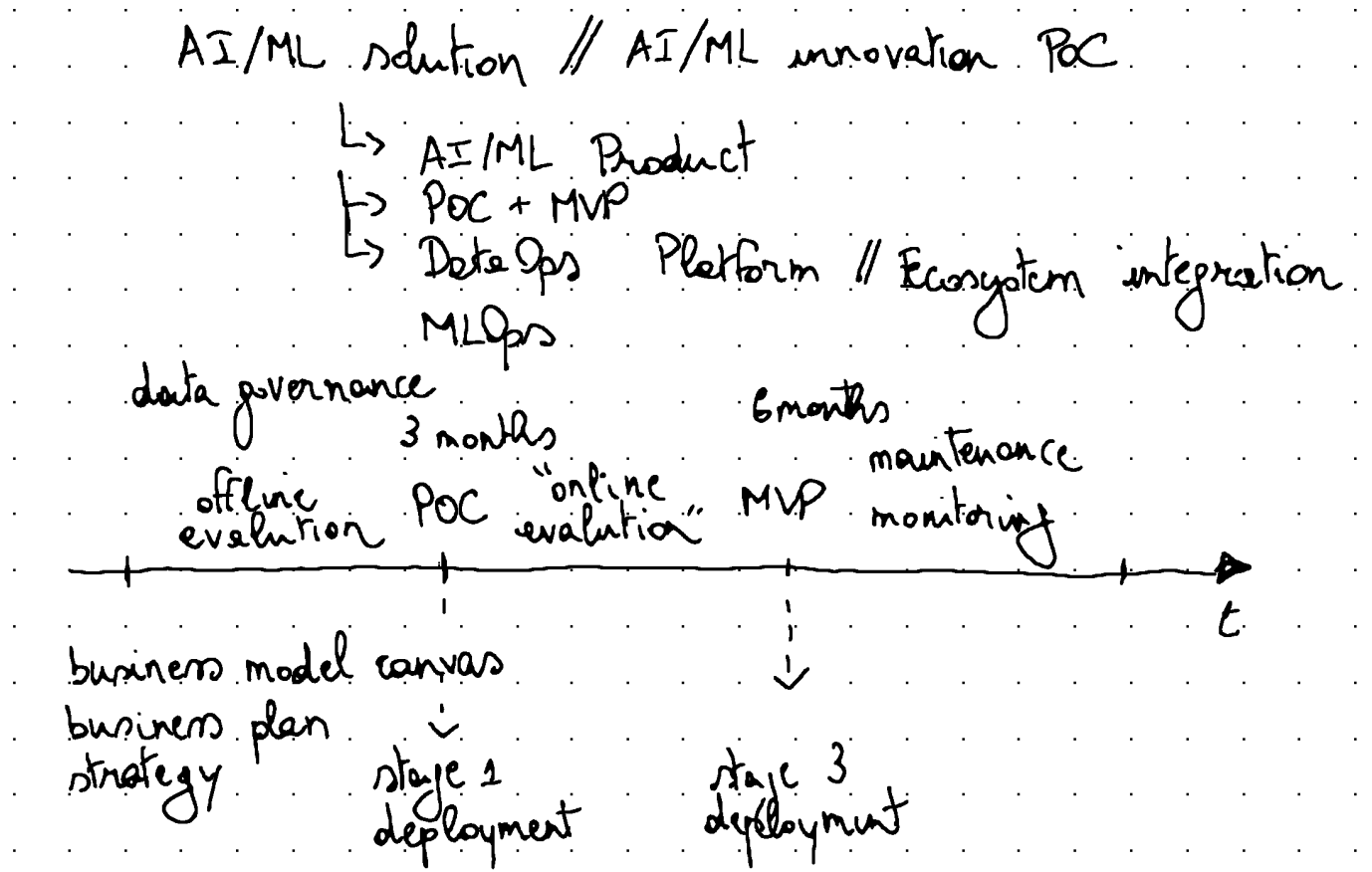
- Validate AI/ML Product prototype across various use cases
- Best performing solution by experimental design assessed
- Define DataOps and MLOps requirements

AI/ML Innovation | Roadmap early-stage development

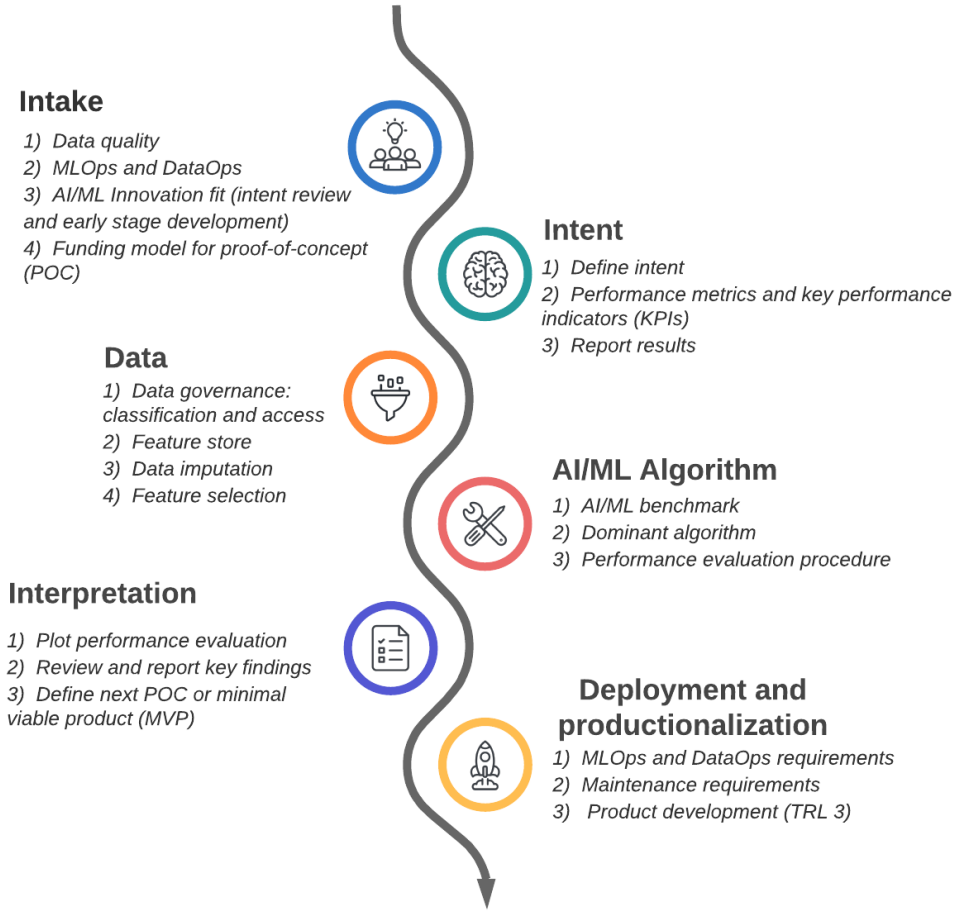
AI/ML innovation initiative
↳ AI/ML Product development
↳ prototype development
↳ multiple solutions for solving a problem



AI/ML Innovation | Roadmap proof-of-concept



AI/ML Solution | Proof-of-concept



- Intake
  - Risk management
  - Alignment with AI/ML Innovation team research
  - CSPM and delivery team involvement
  - Funding by on-demand operating model:
    - Man/Women Hours logging
    - Software licenses and 3rd party
    - Finance SAP internal order
- Intent
- Data
- AI/ML Algorithm
- Interpretation
- Deployment
  - Service cost

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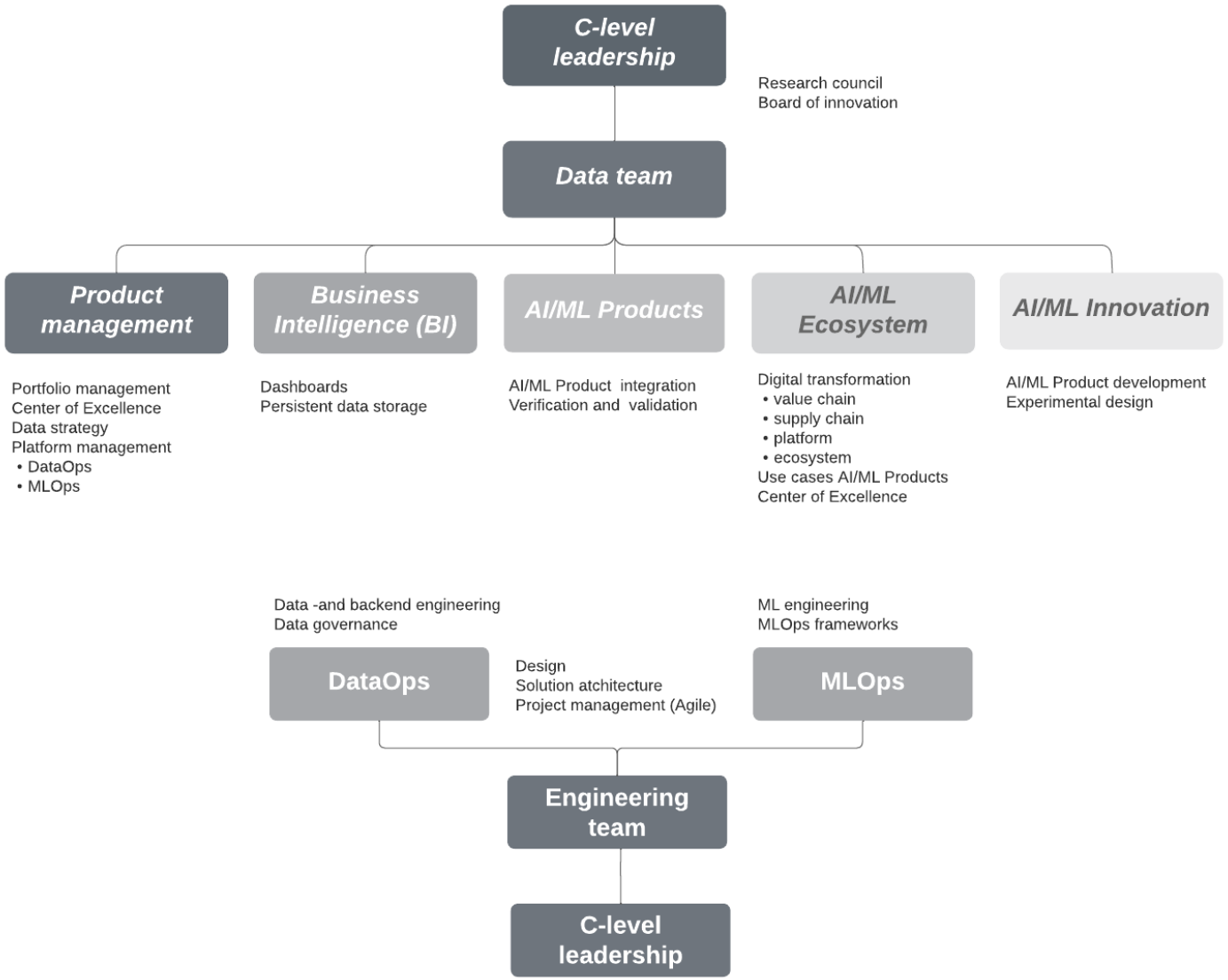
AI/ML demands for sufficient exploration

AI/ML products and AI/ML Ecosystem development seek to exploit existing capabilities and need continuous monitoring and sufficient experimentation to assess AI/ML adopted business processes

Organizational and contextual ambidexterity

- Contextual: each employee in the organization balances their time between exploration and exploitation
- Organizational: exploration and exploitation are separated in the organization

Data team | Organizational structure



Data team

These functions need to address AI/ML

- Product management
- Business intelligence
- AI/ML Products
- AI/ML Ecosystem
- AI/ML Innovation

Engineering team

AI/ML Innovation demands for research into DataOps and MLOps capabilities and assess if the current platform supports novel AI/ML Product development

- DataOps
- MLOps

Challenges

Generic challenges on an organizational level

- Product management for AI/ML
- Centralized engineering teams
- Fragmented data team

Organization

Innovation management and Center of Excellence (CoE)

- Research council and Board of Innovation
- CoE for AI/ML and Data Science

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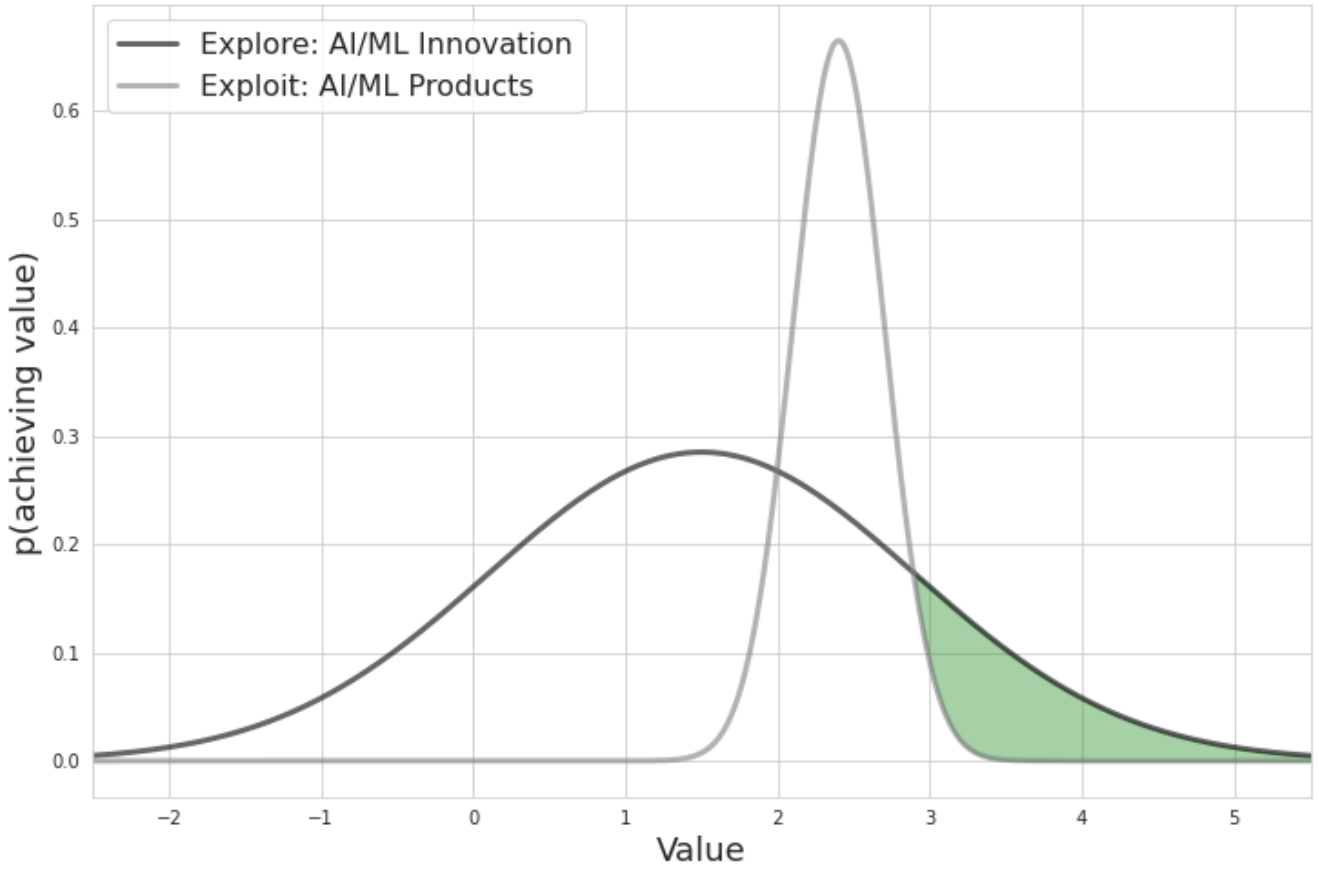
AI/ML Innovation | Strategy and planning



AI/ML Innovation

- Complementary to existing AI/ML Products
- Higher variance and risk [1]

Customer Success and Portfolio Management (CSPM)

- Create customer success criteria
- Manage and catalogue DataOps, MLOps, and AI/ML Products
- Technology Readiness Levels (TRL)

Delivery

- Identify a roadmap to productionalization
- Manage maintenance planning

Prof. Bill Hamilton's (Faculty of Management and Technology at Wharton) take on ROI:
"*ROI does not stand for Return of Investment; ROI stands for Repression of Innovation!*"

[1] March J.G. 1991, Exploration and Exploitation in Organizational Learning - *Organizational Science, Vol. 2 No. 1*

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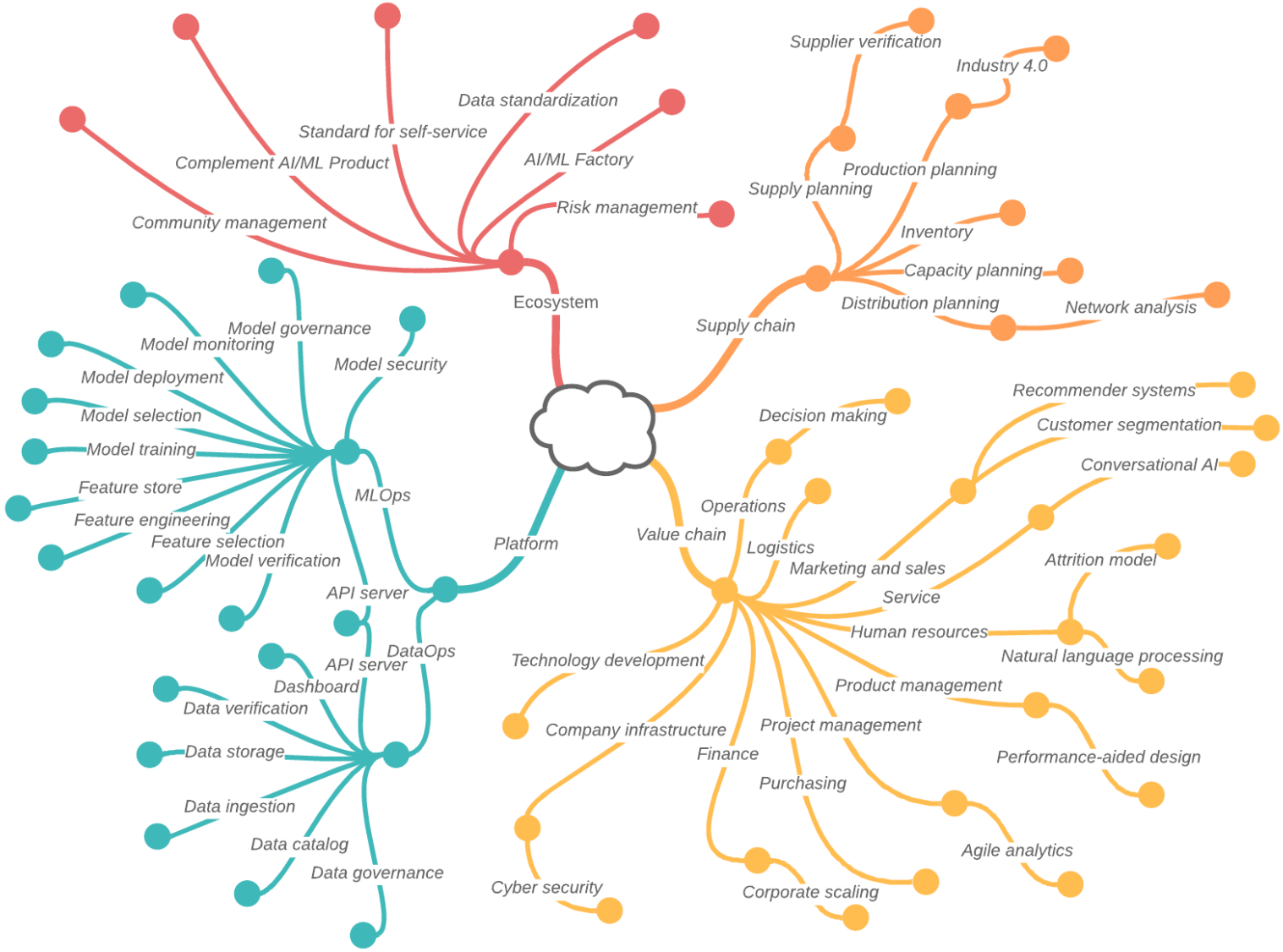
Value chain

The chain of internal activities in the firm result in the creation of a product or service that leads to monetization in the market.

Supply chain

The chain of all individuals, firms, resources, activities, and technologies involved into the creation and sale of a product or service.

AI/ML Innovation Framework | Components[1]



Value chain

- Aim for cost reduction
- Funding for AI/ML related value chain products and services

Supply chain

- Supply chain optimization
- Spare part management

Ecosystem

- AI/ML Factory: AI/ML Product portfolio
- Data ingestion and standardization for the ecosystem
- Self-service for community member to contribute with complement AI/ML Products

Platform

- Technology in the platform needs to facilitate the value chain, supply chain, and ecosystem

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Business model

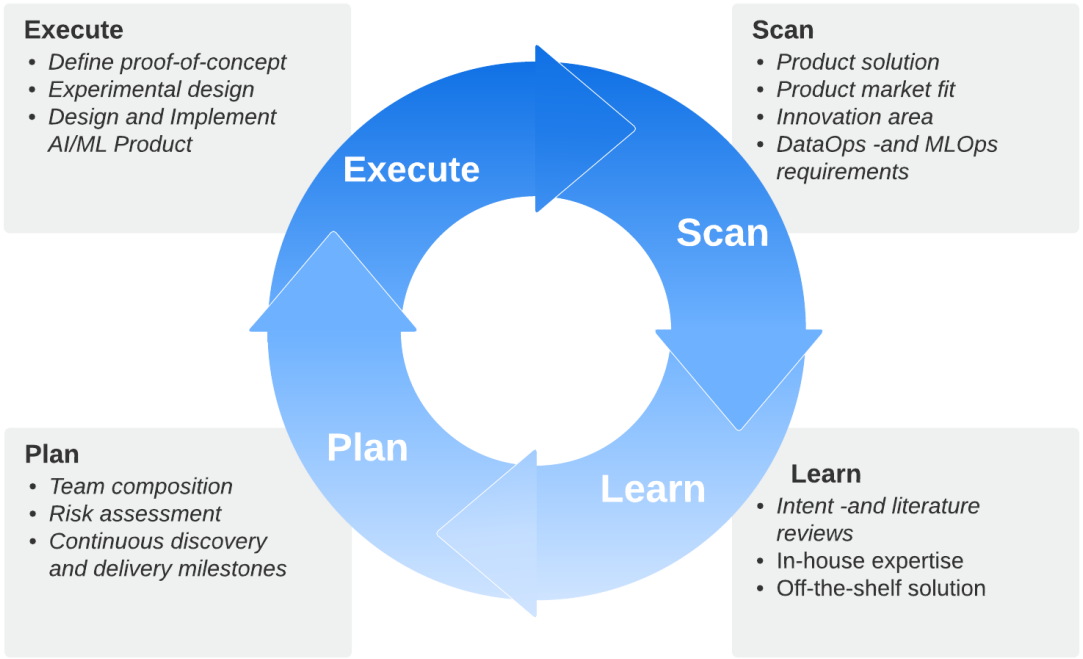
A business model refers to a company's plan for making a profit. This model specifies a product's or service's profitability by identifying the target market, business plan to sell, and related costs.

Business model canvas

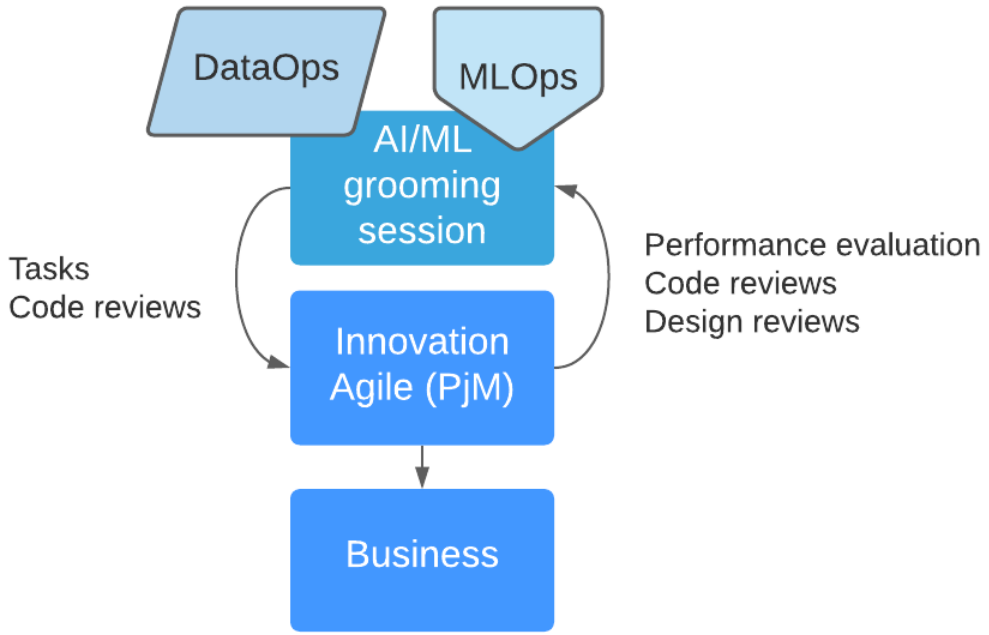
This strategic management template is used to design new business models and document existing ones. It visualizes the firm’s or product’s value proposition, infrastructure, customers, and finances.

Innovation Flywheel | Innovation agile[1]

Product Management

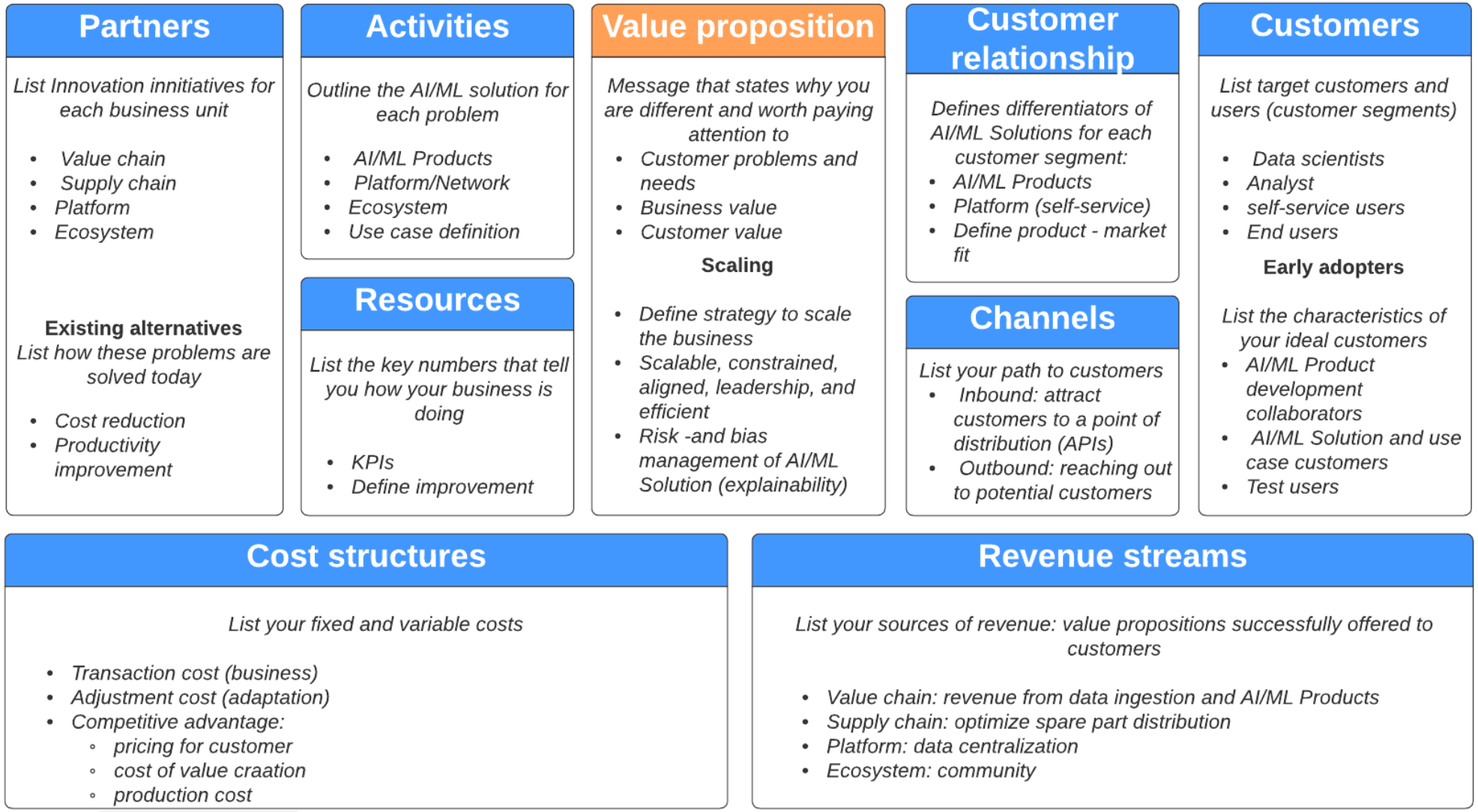


Project Management



[1] Gildehaus C., *Powering the Innovation Flywheel in the Digital Era*, 2021, Boston Consulting Group

AI/ML Innovation Framework | Business model canvas



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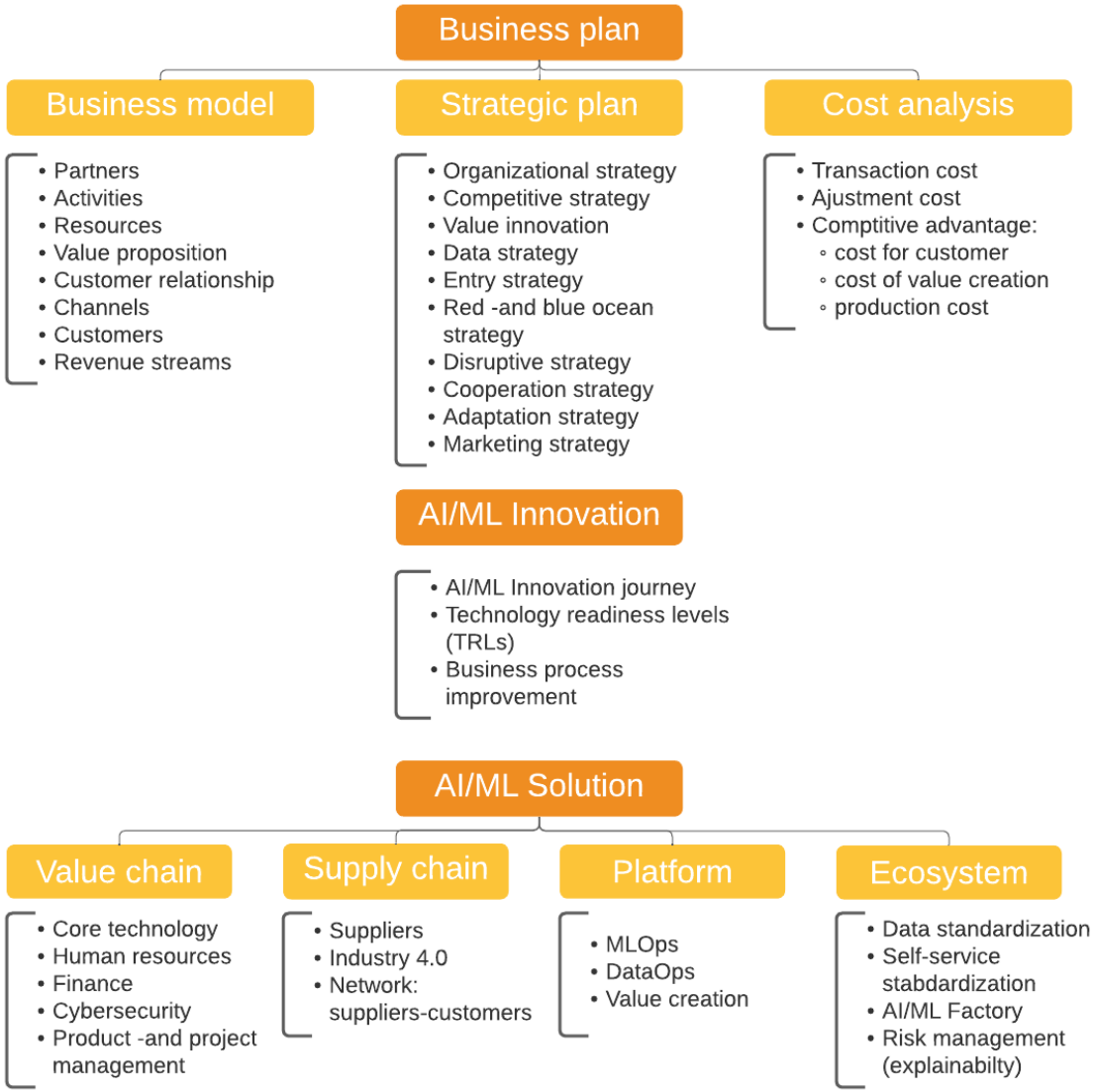
AI/ML Innovation Framework | Business plan



Business plan

- Aim for cost reduction
- Review strategy for AI/ML investment
- Cost analysis for AI/ML investment

AI/ML Innovation

- Supply chain optimization
- Spare part management

AI/ML Solution

- Value chain, supply chain, platform, and ecosystem
- Define the requirement components for the AI/ML Solution

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