



Smart Manufacturing Maturity Model

Smart manufacturing, a technology-driven approach, monitors production processes while utilizing internet-connected machinery. And its goals? Identify opportunities for automating operations and use data analytics to optimize manufacturing practices and performances.

Smart manufacturing is an industrial paradigm emerging from the integration of information and industrialization. This approach focusses on smart technologies and the optimization of an organization's design, production, management, services and business processes to enhance competitiveness. This trend reflects the evolution of manufacturing technology—from mechanization and automation to digital to intellectualization.

The purpose of our model is to facilitate a rapid assessment of an organization's

maturity levels. This involves evaluating its current status, identifying opportunities for improvement and aligning priorities with client expectations to draft a well-defined growth roadmap.

The maturity model enables us to conduct a comprehensive assessment within a two-week timeframe. This assessment is conducted collaboratively through platforms like MIRO, providing real-time data access and tracking capabilities.

Our Smart Manufacturing Maturity Model is a comprehensive and proven approach that assesses and improves an organization's smart manufacturing practices. By evaluating a client's current processes and capabilities, the model guides them on a journey to gain a competitive advantage.

The imperative of rapid assessment in smart manufacturing

In the rapidly evolving landscape of smart manufacturing, where technological advancements reshape industries, the ability to adapt swiftly and effectively is paramount. This underscores the significance of a rapid assessment tool that accelerates the evaluation of an organization's maturity in smart manufacturing. In today's hyper-competitive environment, where opportunities and challenges emerge with lightning speed, understanding an organization's current state, identifying areas for improvement and aligning priorities has never been more critical.

Relentless innovation and disruption: The digital revolution in manufacturing is characterized by relentless innovation and constant disruption. A rapid assessment tool enables agile decision-making and swift readiness to harness emerging technologies such as AI, IoT and 3D printing.

Efficiency and performance: Competitive advantage in smart manufacturing is directly linked to efficiency and performance. A rapid assessment expedites the implementation of smart manufacturing practices, resulting in immediate gains and cost savings.

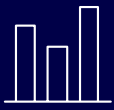
Real-time data flow: The dynamic interplay between information and industrialization demands an assessment tool that keeps pace with real-time data flow. Smart manufacturing relies on seamless data access and tracking capabilities, making rapid assessment indispensable for decision-making.

Common pitfalls in the industry

- Reluctance to fully embrace digital transformation, underestimating the required changes and investments
- Operational silos hindering system interoperability and data utilization
- Cybersecurity vulnerabilities due to insufficient protective measures, potentially leading to threats and data breaches
- Inadequate data strategy leading to data overload and inefficiencies



Pillars of the maturity assessment



Data management and analytics:

This pillar involves big data analytics to monitor and optimize production, identify patterns, predict maintenance needs and improve product quality through supply chain optimization, sustainability and resource optimization.



Integration and interoperability:

In the context of smart manufacturing, the deployment of integrated digital technologies will enable holistic connectivity within organizations. This facilitates interoperability and data exchange, enhancing both internal process efficiencies and external collaborations among industry stakeholders. Today, information systems remain inadequately integrated, with companies rarely establishing robust connections with their suppliers and customers. Engineering design departments often operate in isolation from their production counterparts within the same organization. Furthermore, as connectivity and digitalization surge, prioritizing the security of manufacturing systems becomes paramount.



Performance measurement and continuous improvement:

Performance measurement and improvement are systematic processes through which an organization continually and consistently monitors and utilizes critical program and operational data to enhance its capacity to efficiently achieve its intended impact. The implementation of an effective performance measurement system (PMS) is essential for organizations striving for ongoing improvement.



Skills and workforce:

Training and upskilling programs should be established to nurture a workforce capable of harnessing both smart manufacturing technologies and the corresponding mindset. Smart manufacturing demands new skills and a growth mindset that extend beyond technical proficiency to promote ongoing learning. An example of this would be resource planning, leading to well-informed decisions about resource allocation to ensure that projects receive appropriate resources.



Strategy and vision:

This pillar focuses on aligning with the company's overall strategy and identifying how smart manufacturing contributes to the organization's objectives.



Technology and processes infrastructure:

This encompasses various stages of smart manufacturing—artificial intelligence, machine learning, 3D printing, virtual reality and advanced sensors used for machines to enhance automation, optimize processes and enable intelligent decision-making. These technologies can analyze complex data, learn from patterns and make predictions or recommendations to achieve improved productivity and efficiency.

Purpose of this model

The purpose of this model is to assess the maturity of an organization in different areas around smart manufacturing, identify opportunities, create a prioritization diagram and define a clear roadmap.

- Optimization of operations, enhanced production efficiency and reduced operational costs
- Predictive maintenance, reduced downtime and improved product quality, leading to significant cost savings
- Improved connectivity and collaboration among departments and stakeholders, enhancing supply chain efficiency
- Competitive advantage through rapid response to market demands and innovation
- Culture of continuous improvement and upskilling, ensuring long-term success in the digital era

We will help clients enhance their capabilities and effectiveness, leading to improved performance, efficiency and outcomes. The maturity model also provides a structured and methodical approach to assess, benchmark and enhance an organization's performance and capabilities, fostering a culture of continuous improvement and excellence.

Deliverables

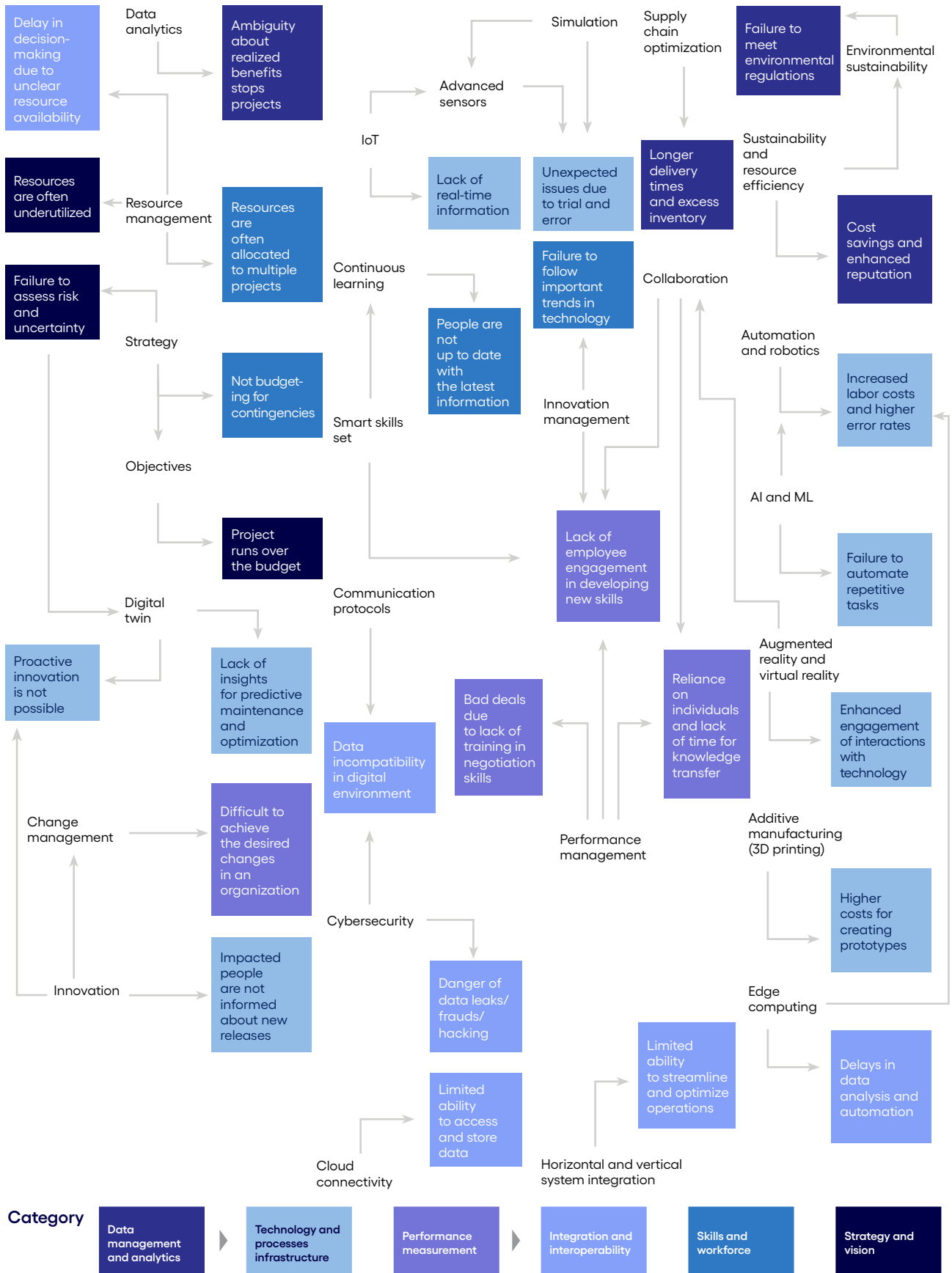
During this rapid assessment, we cover three key deliverables:

- Opportunity diagram
- Prioritization matrix
- KPIs

Opportunity diagram

This tool is used in smart manufacturing to identify potential issues that may arise if categories of the maturity model are not implemented. It helps outline which projects should be prioritized and which are most likely to provide the greatest benefit to the organization.

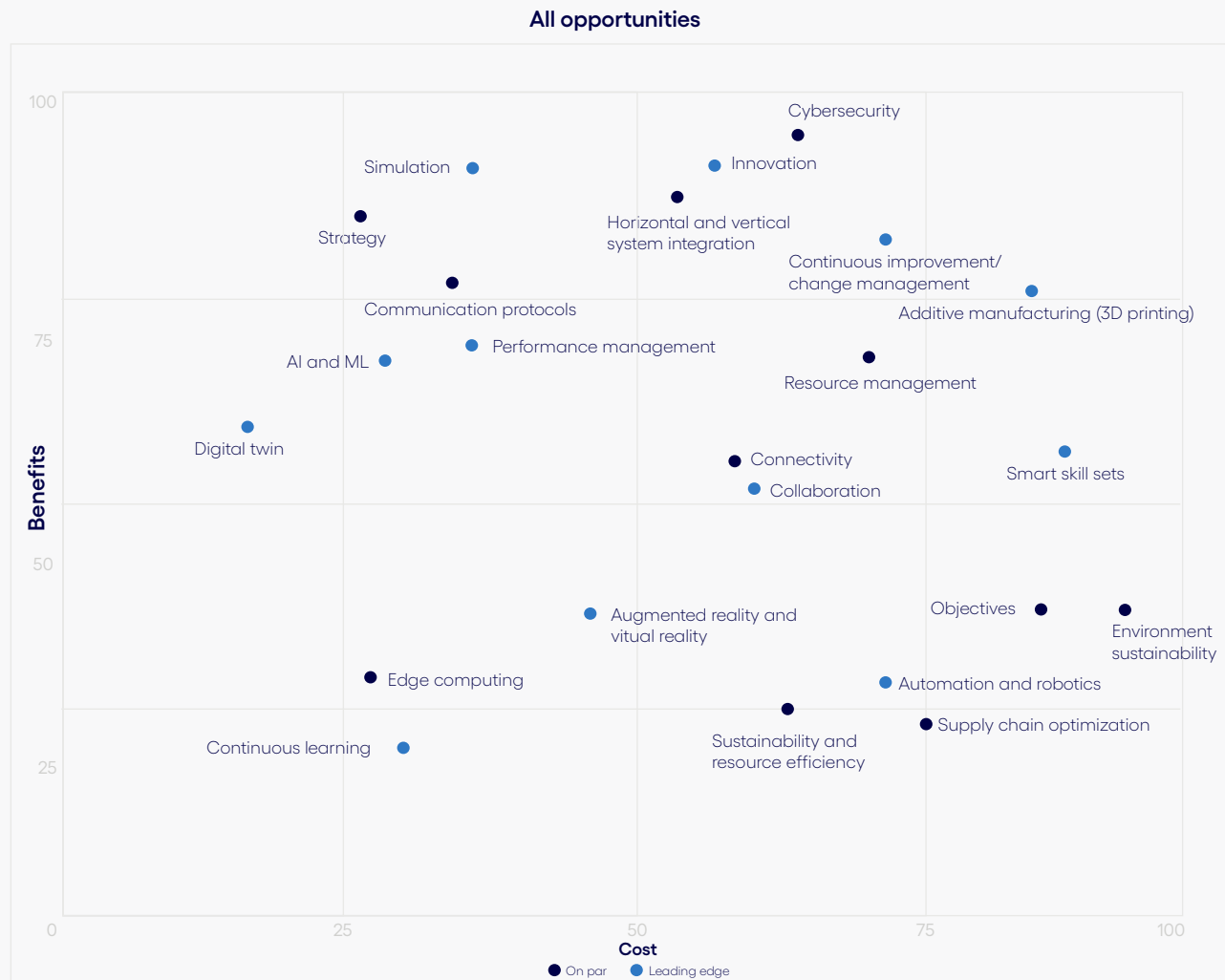
This diagram shows issues found during an assessment of smart manufacturing capabilities. The issues can be found within the sticky notes. The color of the sticky note is used to structure the main focus area and identify patterns in issues found.



Smart Manufacturing Opportunity Diagram

Prioritization matrix

This prioritization matrix is a tool to systematically evaluate and prioritize options or alternatives based on multiple criteria. It offers a structured approach to decision-making, particularly when addressing complex problems or assessing various projects, tasks or concepts. Informed decisions can be made regarding which options to pursue based on the ranking. Top-ranked options are those that align most closely with the criteria and hold the greatest potential for achieving the desired objectives.



KPIs

Cognizant ensures that the client receives measurable metrics for the Smart Manufacturing project by establishing relevant key performance indicators (KPIs). For each subcategory within the maturity model, we have identified a minimum of three KPIs to assist the client in achieving the following outcomes:

- Access objective evidence of progress toward desired objectives
- Measure the intended parameters to facilitate informed decision-making
- Enable comparisons to gauge performance changes over time
- Monitor performance metrics
- Foster alignment of individual and team efforts toward specific goals
- Establish accountability by clearly defining who is responsible for achieving specific metrics

Question	Level	KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 6	KPI 7	KPI 8	KPIs (Table checked, integrated or modified)
What is the maturity level of the organization in establishing a clear manufacturing strategy and vision?	1	•	•							<ul style="list-style-type: none"> • Business value score (BVS) • Strategy alignment score • Stakeholder satisfaction rate • Asset utilization rate • ROI for technology implementation • Benefit realization rate • Strategy execution score • Resource utilization rate
	2			•	•	•				
	3							•	•	
What is the maturity level of the organization in identifying the specific business goals and objectives for smart manufacturing implementation?	1	•	•							<ul style="list-style-type: none"> • Quality yield percentage • Overall equipment efficiency (OEE) • New product introduction (NPI) speed • Quality escape rate • Inventory turnover ration • Downtime rate • Waste reduction percentage • Operational cost reduction rate
	2			•	•	•				
	3							•	•	

KPI recommendations to measure improvements in Smart Manufacturing

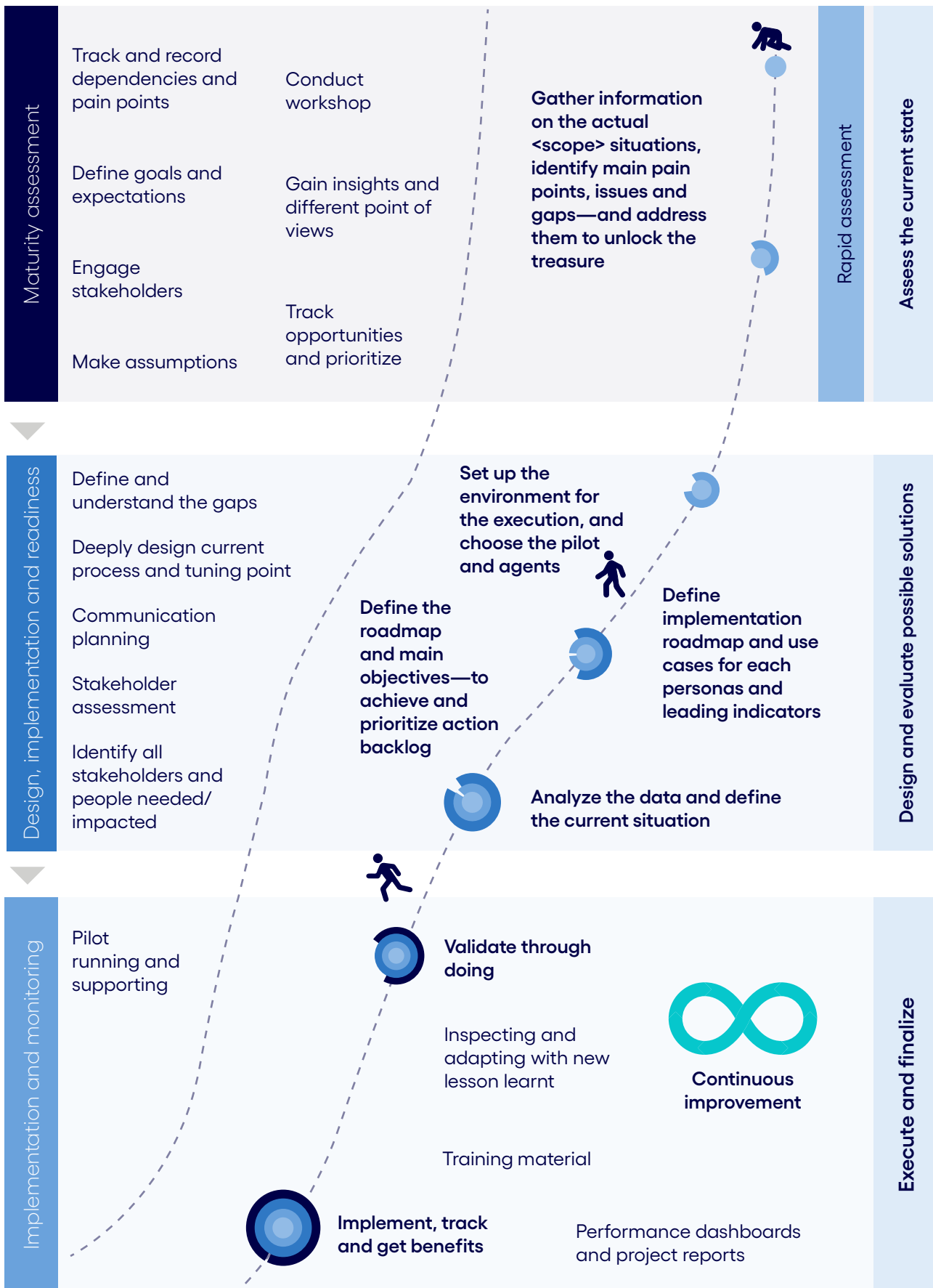
Our approach to unlock clients' potential

We help clients unlock value within their business processes by harnessing the power of data to discover insights that will guide their transformation journey. In that sense, the maturity assessment is the first step, gathering the building blocks that indicate the current state of their processes. At the same time, we gain insights about their goals and expectations. Using this information, we provide an agile, data-driven and high-level diagnostic approach—to identify the challenges and dependencies that can impact the actions required to bridge the gap between their current situation and their desired outcomes. This is the blueprint that guides the design of the transformation roadmap.

The second stage involves detailed design for enhanced results. This includes prioritizing initiatives and establishing measurable KPIs that define the expected improvements for each project. The roadmap also requires the identification of significant milestones to track progress and the impact of the prescribed measures.

The final step is the implementation of the transformation plan while closely monitoring the deployment of each project—tracking challenges, gains and lessons learned to facilitate agility and foster a culture of continuous improvement.

The image below represents our standard approach to consulting/implementation engagement.



Our approach to unlock all the potential value

Roadmap

The roadmap below outlines the objectives, priorities and timelines for this specific type of engagement.



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