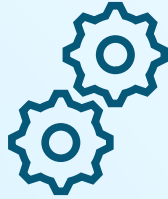# XAUTOMATA
The ultimate digital twin Platform

Adaptive control for resilient and efficient industrial processes

The challenge in Manufacturing and Xautomata's response

The challenge

In the manufacturing sector, **process efficiency**, **product quality**, and **sustainability** are critical success factors.
Manufacturing companies struggle to have an integrated, up-to-date, and predictive view of their production assets.

Despite the adoption of sensors, SCADA systems, MES, and automation solutions, **data remains fragmented** and difficult to leverage for effective support of operational and strategic decisions.
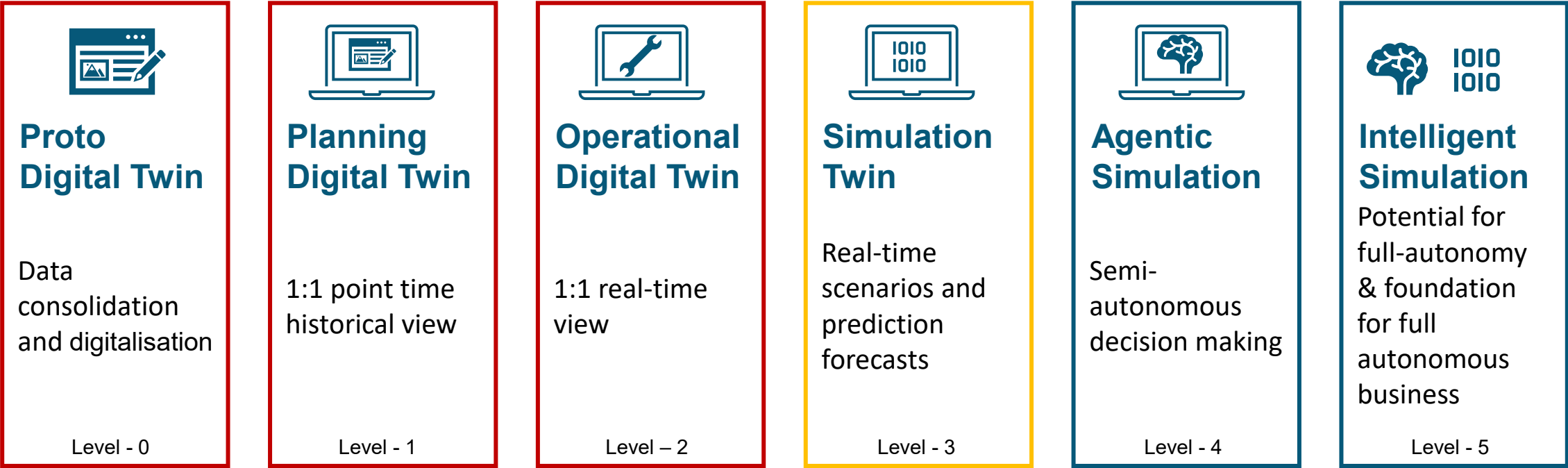
So what now?

The lack of scalability and accurate controls inevitably leads to operational inefficiencies and unexpected costs.

Xautomata addresses this need by integrating and orchestrating OT and IT technologies to provide a unified view that serves productivity, predictive maintenance, and process optimization.

A platform designed to ensure precise control and efficient scalability, capable of intelligently and adaptively managing production processes.

Enabling the Industry of the Future: The Foundation for Agentic AI

Proto Digital Twin

Data consolidation and digitalisation

Level - 0

Planning Digital Twin

1:1 point time historical view

Level - 1

Operational Digital Twin

1:1 real-time view

Level – 2

Simulation Twin

Real-time scenarios and prediction forecasts

Level - 3

Agentic Simulation

Semi-autonomous decision making

Level - 4

Intelligent Simulation

Potential for full-autonomy & foundation for full autonomous business

Level - 5

Level of Autonomy by **Gartner**®

XAUTOMATA
The ultimate digital twin Platform

Profilglass Reduces Defects and Increases Productivity via Digital Twins and Intelligent Simulation

Business Challenge

Profilglass' investments into traditional business intelligence and analytics software failed to drive the proactive action necessary to uncover and mitigate ongoing errors in production.

Solution

Utilizing XAUTOMATA's digital twin platform, **Profilglass** is deploying autonomous AI agents to monitor the production cycle in real-time. Agents were used to detect deviation in production with data gathered from MES and other IoT technologies and empowered to take subsequent corrective action. The solution was additionally utilized to dynamically adjust production schedules to minimize waste, rework, and energy consumption.

Results

- A **94% Reduction in cracking defects** for 12,000 kg coils, leading to a significant decrease in waste.
- An estimated productivity increase of 3.75%, representing **an additional profit of €700,000 per year.**
- An annual energy savings of 3.7%, equating to approximately **€1 million in costs avoided.**

Using historical data, Xautomata's behavioral model simulates potential scenarios to dynamically select the next controlled action.
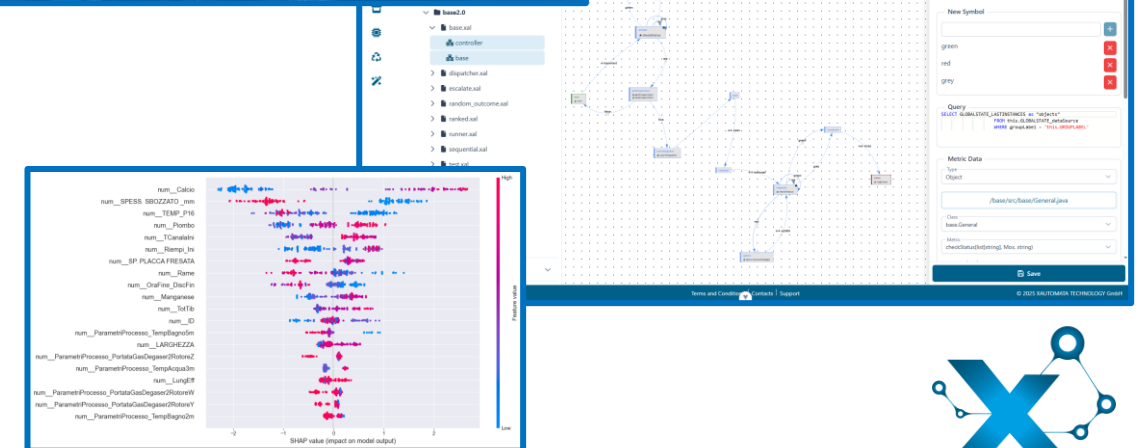
USE CASE

The introduction of Xautomata has enabled a **scalable model of predictive and proactive maintenance for production machines**, resulting in tangible benefits in terms of **operational efficiency** and **service quality**.

The system employs predictive algorithms to **generate maintenance tickets** based on both anticipated anomalies and real-time conditions of the machines, automatically involving experienced technicians and end customers through a controlled and supervised process. Xautomata has made it possible to offer a **new active maintenance service without the need to increase field technical staff.**

Scalable Active and Predictive Maintenance:

A new scalable active maintenance service has been enabled without an increase in technical resources.	Automated management of **75% of tickets**, with an estimated reduction in operational costs of over **€250,000 annually.**	**Prevention of critical downtimes**, yielding an overall economic benefit of approximately **€650,000 per year**.

bi-rex
Big Data Innovation & Research Excellence

USE CASE

The introduction of **Xautomata** as an orchestrator for **Autonomous Mobile Robots (AMRs)** has brought tangible benefits, measurable both in terms of **logistical efficiency** and **operational savings**.

The implemented process **allows for route optimization, reducing empty trips** and monitoring **robot anomalies**, with a direct impact on the efficiency of the managed loads.

Scalable active and predictive maintenance:

For a client assembling packaging machinery, we demonstrated that it is possible to **reduce the number of empty loads by at least 2% annually.**

Estimated productivity increase of 3.15%, equating to an additional gain of €600,000 per year.

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Optimization of Customer Service and Maintenance

The Challenge

Ensuring operational continuity while reducing machine downtime and post-sales support costs, all while providing timely assistance.

For manufacturers of industrial systems, the ability to respond quickly to failures is a key competitive factor, directly impacting productivity and profitability.

Xautomata's Approach

XA agents **model the behavior of systems** to anticipate anomalies and enable predictive interventions.

The system **prioritizes and automates the management of assistance requests**, from diagnosis to spare parts logistics.

Operators are activated only when necessary, supported by specific instructions based on real-time context, reducing errors and reaction times.

Tangible Results

- 15%
Reduction in Machine Downtime

- 20%
Extraordinary Maintenance Costs

+ 16%
Efficiency of Customer Service Team

Optimization of transformation production processes

The Challenge

Reduce waste and optimize resource use in transformation processes to balance environmental sustainability and economic margins.

In production facilities, the ability to react in real-time to deviations and inefficiencies directly impacts costs, quality, and ESG results.

Xautomata's Approach

XA Agents monitor the production cycle in real-time, collecting and interpreting data directly from the line.

They automatically identify **deviations from optimal parameters**, activating corrective actions or targeted alerts.

They orchestrate **quality controls** and dynamically adjust production schedules to minimize waste, rework, and energy consumption.

Tangible Results

- 3%
Reduction of energy consumption

+ 4%
Production Team Efficiency

Behavioural Models

Xautomata is a platform for event management through the definition of **Behavior Models**.
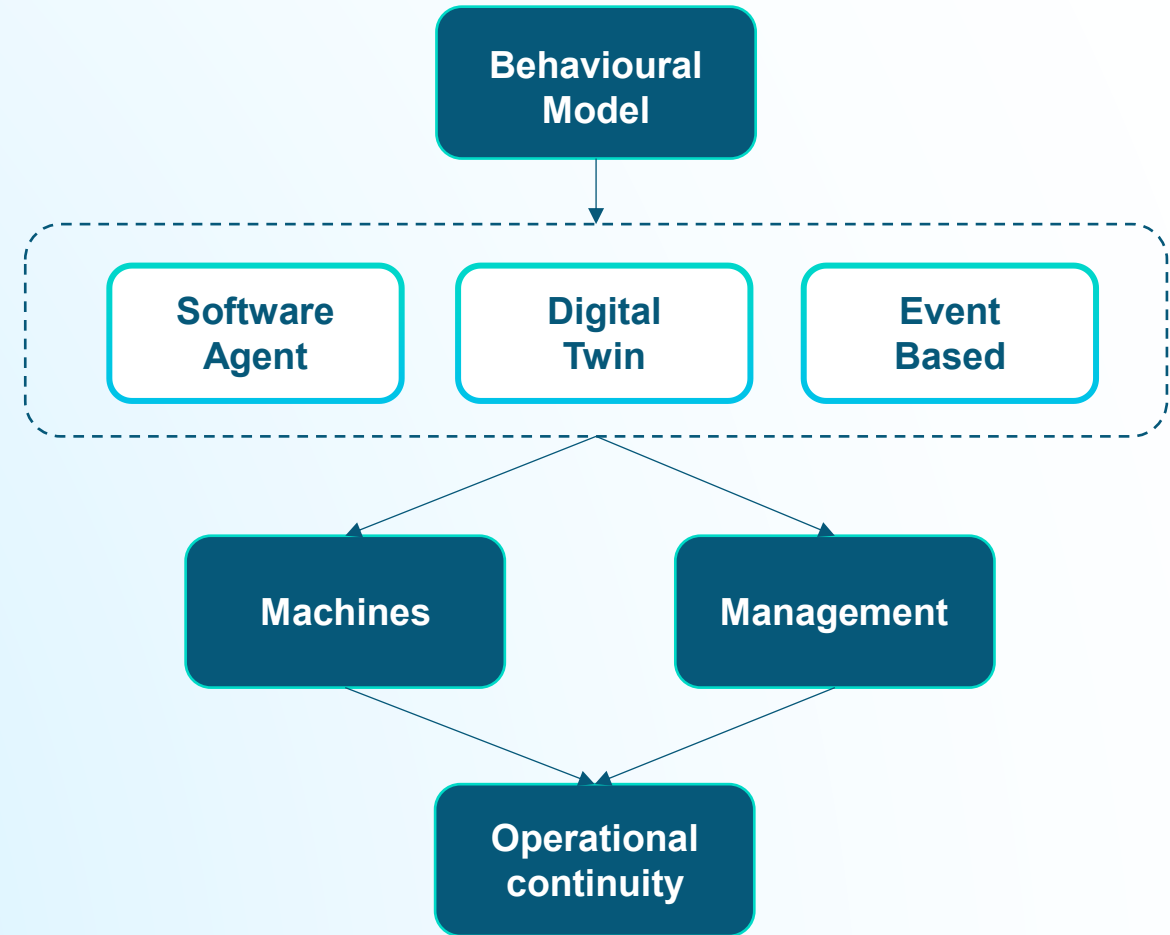
Xautomata's **Agents** detect deviations in the **production cycle** and coordinate operational managers and platforms in **real-time**, facilitating the recovery of continuity and performance.

These Agents act as a **Digital Twin of Process (DTO)**: a virtual representation that is always up-to-date, allowing for precise **analysis, simulation, and intervention** in case of anomalies.

Thanks to its modeling core, **XAL (eXtended Automata Language),** Xautomata makes the deployment of **autonomous software Agents** replicable and adaptable across various production environments, defining dynamic models that coordinate technologies and people towards goals of quality, sustainability, and operational continuity.

```
Behavioural Model
  ├─ Software Agent
  ├─ Digital Twin
  └─ Event Based
       ├─ Machines
       └─ Management
            └─ Operational continuity
```

Technological pillars of the Xautomata proposal

The effectiveness of Xautomata is based on key principles that ensure **intelligent, flexible automation governed by behavior models**, seamlessly integrable into **manufacturing** processes.

Model-driven Autonomy

Agents operate based on clear behavior models, making **contextual decisions** based on real-time data collected.

These systems are capable of learning from data and dynamically adapting the behavior of production processes, increasing responsiveness without compromising control and reliability.

Adaptive Orchestration

Dynamic selection and coordination of the most suitable technologies (RPA, GenAI, IoT, MES/SCADA, ERP) for each phase of the process.

An intelligent layer that harmonizes flows, events, and resources between OT and IT, ensuring operational continuity even in complex and ever-evolving environments.
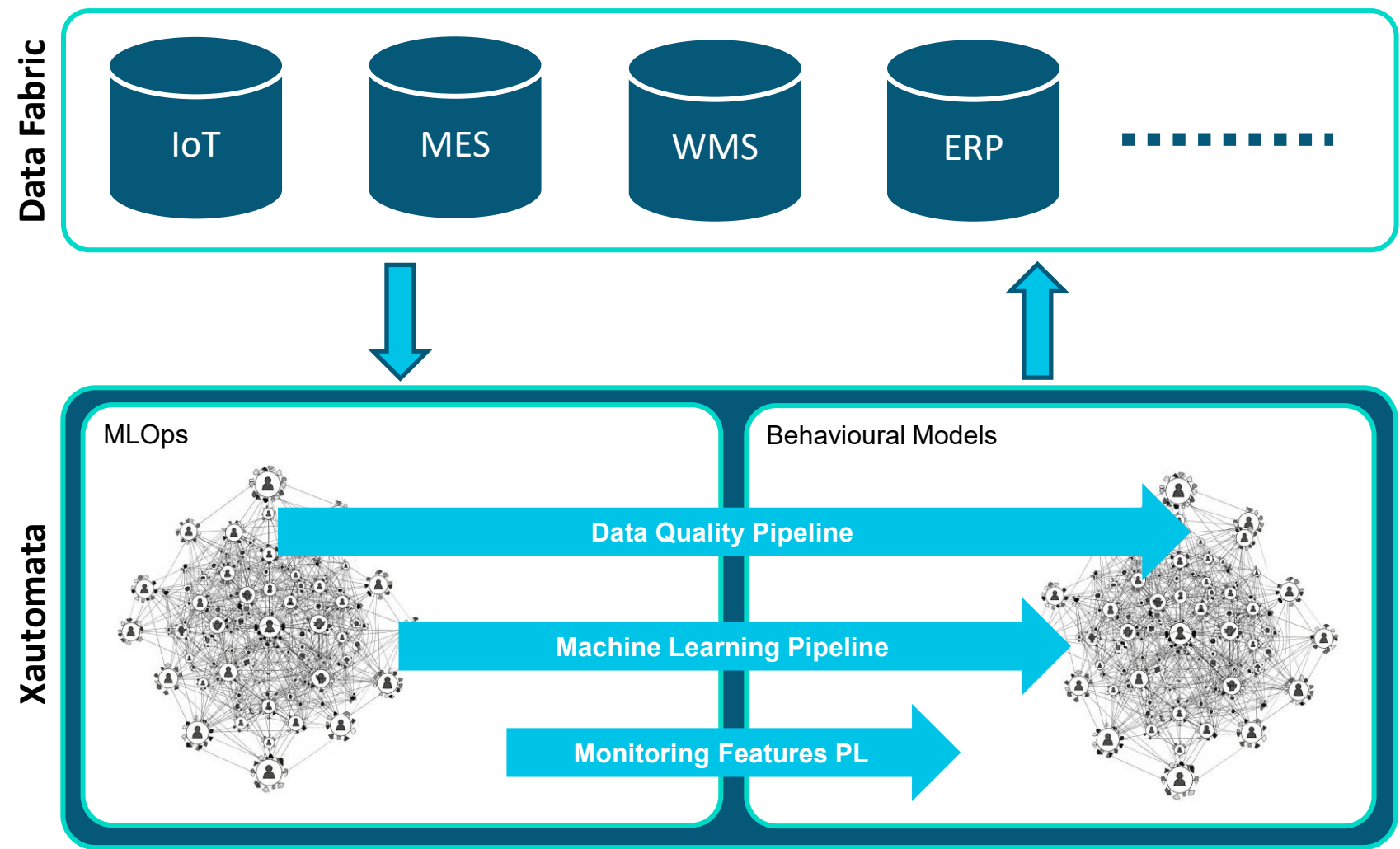
Deterministic Governance

Defined, traceable, and modifiable behavior models that ensure reliability, control, scalability, and self-consistency.

Centralized control of all logic and automation to guarantee security, compliance, and traceability even in distributed and highly variable scenarios.

Accuracy, Scalability, and Flexibility

Competitive Advantages for Manufacturing

The implementation of Xautomata translates into a series of measurable benefits that positively impact **operational and economic efficiency**, **quality**, and the **capacity for innovation** of manufacturing companies.

Improvement of **Overall Equipment Efficiency** (OEE).

Reduction of **Wastes** by optimizing material usage and enhancing quality control in the transformation process.

Enhancement of **Customer Satisfaction**.

Agile and Resilient Operations, thanks to the quick adaptation of "Behavior Models" to the changing demands of the market.

Freeing up human experts to focus on strategic improvements and solving complex problems, while Xautomata **Agents** handle monitoring and control activities.

Better resource management and reduction of waste directly contribute to **sustainability goals**.

Our Ecosystem: Integration and Shared Growth

The Future of Manufacturing Governance
Quick Take aways

1 | Xautomata utilizes **behavioral models** to orchestrate complex and strategic operations, from machinery customer service to transformation processes.

2 | **Operators**, while retaining ultimate decision-making responsibility, are **relieved** from **repetitive analysis and the execution of standardized reactions** by the models.

3 | In the absence of behavioral models that automate the entire process, the **insights** provided by Xautomata guide operators in the most critical decisions.

4 | The **simplicity** of adding, removing, and modifying behavioral models (defined with XAL) **ensures scalable continuous improvement** in governance, adapting operational intelligence to the **changing needs of the business**.
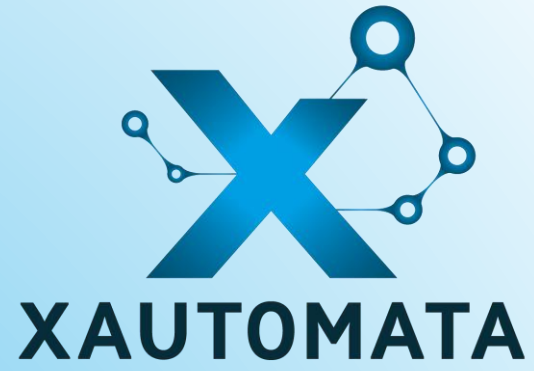
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