



KOBALT AUTOMATION / NS YAZILIM A.Ş.

Factory Digitalization Maturity Criteria Framework

A reference framework for assessing manufacturing facilities' digital transformation readiness — built on 25+ years of field experience

Version	Scope	Target Audience	Published
1.0 — 2026	All manufacturing sectors	Production & IT managers	kobaltauutomation.com

Table of Contents

- 1.** Introduction & Purpose
- 2.** 5-Level Maturity Model
- 3.** Assessment Dimensions
- 4.** Sector Profiles
- 5.** Self-Assessment Questions
- 6.** Roadmap Recommendations
- 7.** Kobalt Automation Approach
- 8.** Contact

1. Introduction & Purpose

The manufacturing sector is under increasing pressure to digitally transform. As Industry 4.0 concepts have become mainstream, dozens of vendors now claim to offer 'ERP integration', 'OEE monitoring', and 'smart factory' services. Yet there is no independent reference framework to help manufacturers determine their actual maturity level, which step to take next, and how to select the right partner.

This document is based on over 25 years of field experience and observations across 90+ manufacturing facilities by NS Yazılım A.Ş. / Kobalt Automation, spanning food & beverage, defense, automotive, textile, white goods, and electronics manufacturing sectors.

This document has three core objectives:

- ① Enable production managers to objectively measure their facility's digital maturity level.
- ② Prevent budget and time waste through correct prioritization.
- ③ Define the right questions to ask when selecting a technology partner.

2. 5-Level Maturity Model

The model below evaluates a manufacturing facility's maturity across data infrastructure, data management, and decision-making on a five-level scale. Levels are prerequisites of each other; skipping from Level 3 to Level 5 leads to technical debt and project failure.

Level	Name	Description
Level 1	Initial	Paper & intuition. No data collected; decisions based on experience.
Level 2	Awareness	Some data collected but in isolated systems; no integration.
Level 3	Structuring	OEE or productivity metrics defined; partial automation in place.
Level 4	Integration	Production data integrated with ERP/MES; real-time visibility achieved.
Level 5	Optimization	AI & predictive analytics; continuous improvement loop established.

Level 1 - Initial

Production data is tracked on paper forms or Excel. Breakdown records are not kept or, if kept, not analyzed. Decision-making relies entirely on operator or supervisor experience.

- Systematically digitize all data (the first step of digitalization).
- Simple numerical indicators: production count, scrap rate, shift-based records.
- Recommendation: Define what data you want to collect before taking any action.

Level 2 - Awareness

Some data is collected, but systems operate in isolation. MES, ERP, or SCADA may be installed, but there is no automatic data flow between them. Reporting is manual and delayed.

- Build at least one data bridge between isolated systems.
- Begin automatic collection of loss/downtime data from production lines.
- Recommendation: Measure the time your staff spends manually entering data into ERP.

Level 3 - Structuring

OEE or similar KPIs are defined and regularly calculated. Some PLC/SCADA data is collected. Integration is partial — some processes are automated, others still manual.

- Monitor OEE components (Availability, Performance, Quality) separately.
- Deploy a real-time dashboard on at least one production line.
- Recommendation: Build a system that can automatically answer 'Why are we stopped?'

Level 4 - Integration

Production floor data is integrated with ERP/MES in real time or near real time. Work orders, material consumption, and quality data flow automatically. Managers have live performance visibility.

- Validate end-to-end data integrity: PLC → SCADA → MES → ERP chain.
- Correlate energy consumption with production output.
- Recommendation: Identify decisions you are making due to data excess, not data shortage.

Level 5 - Optimization

Machine learning or statistical models are applied for predictive maintenance, dynamic scheduling, or quality forecasting. Continuous improvement loop is automated; human intervention is focused on strategic decisions.

- Predictive maintenance model running live.
- Anomaly detection and automated alarm management.
- Recommendation: Do not invest in 'AI' before reaching this level.

3. Assessment Dimensions

Maturity cannot be measured on a single axis. The following eight dimensions assess a facility's true digital readiness from different angles. Position your current status between L1–L5 for each.

Assessment Dimension	L1	L2	L3	L4	L5
Data Collection & Sensor Infrastructure	Paper/none	Manual entry	Partial automation	Full automation	Smart sensors
ERP / MES Integration	No integration	File transfer	Partial API	Real-time	Bidirectional
OEE / KPI Visibility	Undefined	Calculated	Dashboard	Live monitoring	Predictive
Maintenance Management	Wait for failure	Periodic plan	CMMS in use	Predictive	Auto work order
Energy & Sustainability	Invoice-based	Meter-based	Line-based	Machine-based	Carbon optimization
Quality & Traceability	Inspection form	QC system	SPC applied	Auto rejection	AI-powered
Cybersecurity & Network	No security	Basic security	VLAN separation	IDS/IPS	Zero Trust
Reporting & Decision Support	Manual Excel	Standard report	BI tools	Live dashboard	AI recommendation

Note: Not all dimensions need to be at the same level. Many facilities are advanced (L4–L5) in some dimensions while lagging (L1–L2) in others. This asymmetry is critical data for prioritization.

4. Sector Profiles

The following sector observations are compiled from facility visits and implementation projects across Turkey and international markets. These profiles reflect average tendencies; individual facilities may be above or below their sector average.

<p>Food & Beverage</p> <p>Traceability demands are high (ISO 22000, BRC), but energy and OEE optimization are often neglected. Excel-based production tracking and paper batch records are common.</p>	<p>Typical Profile: Level 2</p> <p>Common Project Type: Production-ERP integration, lot traceability, energy dashboard</p>
<p>Defense & Aerospace</p> <p>Quality and traceability infrastructure is strong due to public procurement requirements (AS9100, AQAP). Document management is mature. Production efficiency optimization remains secondary.</p>	<p>Typical Profile: Level 4</p> <p>Common Project Type: OEE improvement, predictive maintenance, digital work orders</p>
<p>Automotive Tier Suppliers</p> <p>Quality systems are in place (IATF 16949) due to OEM pressure, but the bridge between PLC data and ERP is usually missing. Shift reports are still recorded manually.</p>	<p>Typical Profile: Level 3</p> <p>Common Project Type: PLC-ERP bridge, shift efficiency dashboard, SPC</p>
<p>Textile & Apparel</p> <p>Order tracking and shipment planning run through ERP; production line data is mostly count-based and collected with delays. Energy monitoring infrastructure is weak despite high energy costs.</p>	<p>Typical Profile: Level 2</p> <p>Common Project Type: Line-based OEE, energy meter integration, WIP tracking</p>
<p>White Goods & Electronics Manufacturing</p> <p>Large facilities have MES and SCADA infrastructure; data collection is mature. However, converting data into meaningful KPIs and management reporting is typically weak.</p>	<p>Typical Profile: Level 3</p> <p>Common Project Type: Real-time KPI dashboard, supplier integration, energy optimization</p>
<p>PCB & Electronics Assembly</p> <p>Quality and traceability infrastructure (traceability, AOI) is relatively mature. Dynamic scheduling and MES-ERP integration are yet to be implemented in most facilities.</p>	<p>Typical Profile: Level 3</p> <p>Common Project Type: Dynamic scheduling, predictive maintenance, MES-ERP integration</p>

5. Self-Assessment Questions

The following questions help you quickly identify which level your facility is at. Answer each with 'Yes / Partially / No'. Your answers will determine your maturity level and shape your roadmap.

Data & Infrastructure

#	Question	Yes	Partly	No
1	Is data automatically collected from machines on your production line?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Do you have a PLC or SCADA system? Is this data written to a database?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Is energy measurement done via sensors or meters?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Is production data automatically transferred to your ERP?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Visibility & Reporting

#	Question	Yes	Partly	No
1	Can you track OEE or a similar productivity indicator in real time?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Can managers see production performance in real time?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Does the system automatically record downtime reasons?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Is scrap/waste data automatically reported?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Integration & Process

#	Question	Yes	Partly	No
1	Can work orders be automatically transmitted from ERP to the production floor?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Does material consumption automatically update ERP stock records?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Are quality control results stored systematically?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Can the maintenance team access historical breakdown data?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Advanced Analytics

#	Question	Yes	Partly	No
1	Do you receive failure predictions or maintenance recommendations based on historical data?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Is there a model that can simulate production line efficiency?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Can you trace quality issues back to their root cause?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Scoring: Those who answer 'Yes' to all questions are in the Level 4-5 range. Those who answer 'No' to more than half are in the Level 1-2 range. Contact us for a detailed assessment.

6. Roadmap Recommendations

Digital transformation is a linear process. The roadmap below prioritizes the steps to take regardless of which level you start from. Each step requires the previous one to be solidly completed.

L1 → L2

Basic Digitalization

- Document what you want to measure on the production floor.
- Identify and prioritize manual data entry points.
- Begin meter or sensor-based data collection on at least one line.
- Activate the 'production actuals' module in your ERP.

L2 → L3

Visibility & KPIs

- Define OEE components (Availability, Performance, Quality).
- Deploy an automated downtime recording system.
- Generate a weekly automated performance report for management.
- Build the first data bridge between isolated systems.

L3 → L4

Full Integration

- Validate end-to-end data flow: PLC/SCADA → MES/ERP.
- Automatically transmit work orders from ERP to the production floor.
- Link material consumption to automatic stock updates.
- Make the management dashboard real-time.

L4 → L5

Optimization & AI

- Accumulate at least two years of clean historical data.
- Launch a predictive maintenance pilot for critical equipment.
- Test a dynamic scheduling model at small scale.
- Deploy anomaly detection and automated alarm systems.

7. Kobalt Automation Approach

NS Yazılım A.Ş. / Kobalt Automation has delivered OEE, MES integration, IIoT, and ERP bridging solutions to Turkey's leading manufacturing facilities since 2003. Our experience across 90+ factories gives us an independent, sector-agnostic perspective.

Field First, Technology Second	Every project begins with an independent maturity assessment conducted on the factory floor. Technology decisions are made after the assessment findings.
Integration with Existing Systems	Rather than replacing existing PLC, SCADA, and ERP infrastructure, we build bridges on top. This approach significantly reduces cost and risk.
Measurable Output Commitment	OEE, downtime, and manual reporting costs are compared before and after the project. Results are documented numerically.
Long-Term Partnership	We commit to supporting the evolution and optimization of the system beyond project delivery. Average collaboration duration with clients on our reference list exceeds 7 years.

For the full reference list and case studies, visit kobalautomation.com or nucleusoft.com.

8. Contact

Digital maturity is not a destination — it is an ever-evolving journey. The framework presented in this document is designed to help you identify your facility's true position and correctly prioritize your next step.

Share your self-assessment results with us, and our experts will prepare a facility-specific roadmap at no charge. On-site preliminary assessment meetings conclude with concrete findings and a prioritized action list.

Kobalt Automation / NS Yazılım A.Ş.

- kobaltdigital.com
- Kadıköy / Istanbul, Turkey
- info@kobaltdigital.com
- Tel: +90 216 385 08 66
- WhatsApp: +90 850 433 46 71



To download the assessment form, request information, or schedule a preliminary meeting:

kobaltdigital.com/maturity

This document is published by NS Yazılım A.Ş. / Kobalt Automation and may not be reproduced for commercial purposes.
Free to use for educational and internal assessment purposes. | © 2003-2026