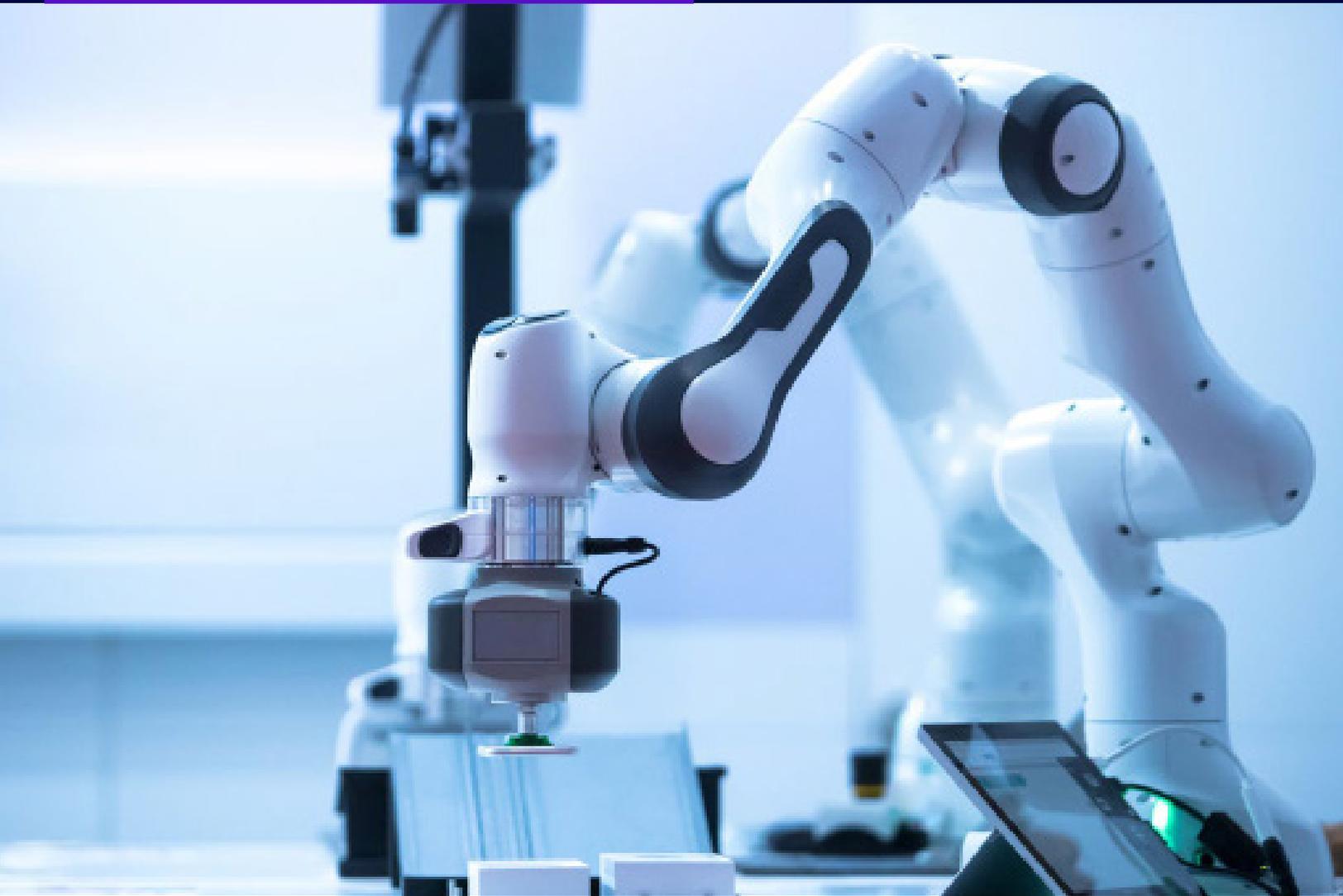# SMART INDUSTRY READINESS INDEX

A Strategic Approach to Digital Transformation in Manufacturing

This whitepaper explores the Smart Industry Readiness Index (SIRI) as a structured framework to assess and accelerate digital transformation in manufacturing environments. By examining 16 dimensions across Process, Technology, and Organization, SIRI provides a comprehensive maturity profile that helps manufacturers benchmark their current state and identify actionable areas for improvement.

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Whitepaper: Assessing Industry 4.0 Maturity using the SIRI Framework

Executive Summary

This whitepaper presents a practical approach to assessing the digital maturity of a manufacturing facility using the Smart Industry Readiness Index (SIRI) framework. It outlines the framework structure, methodology adopted, key focus areas, and a typical transformation roadmap. The goal is to benchmark current capabilities, identify gaps, and chart a data-driven course for Industry 4.0 implementation.
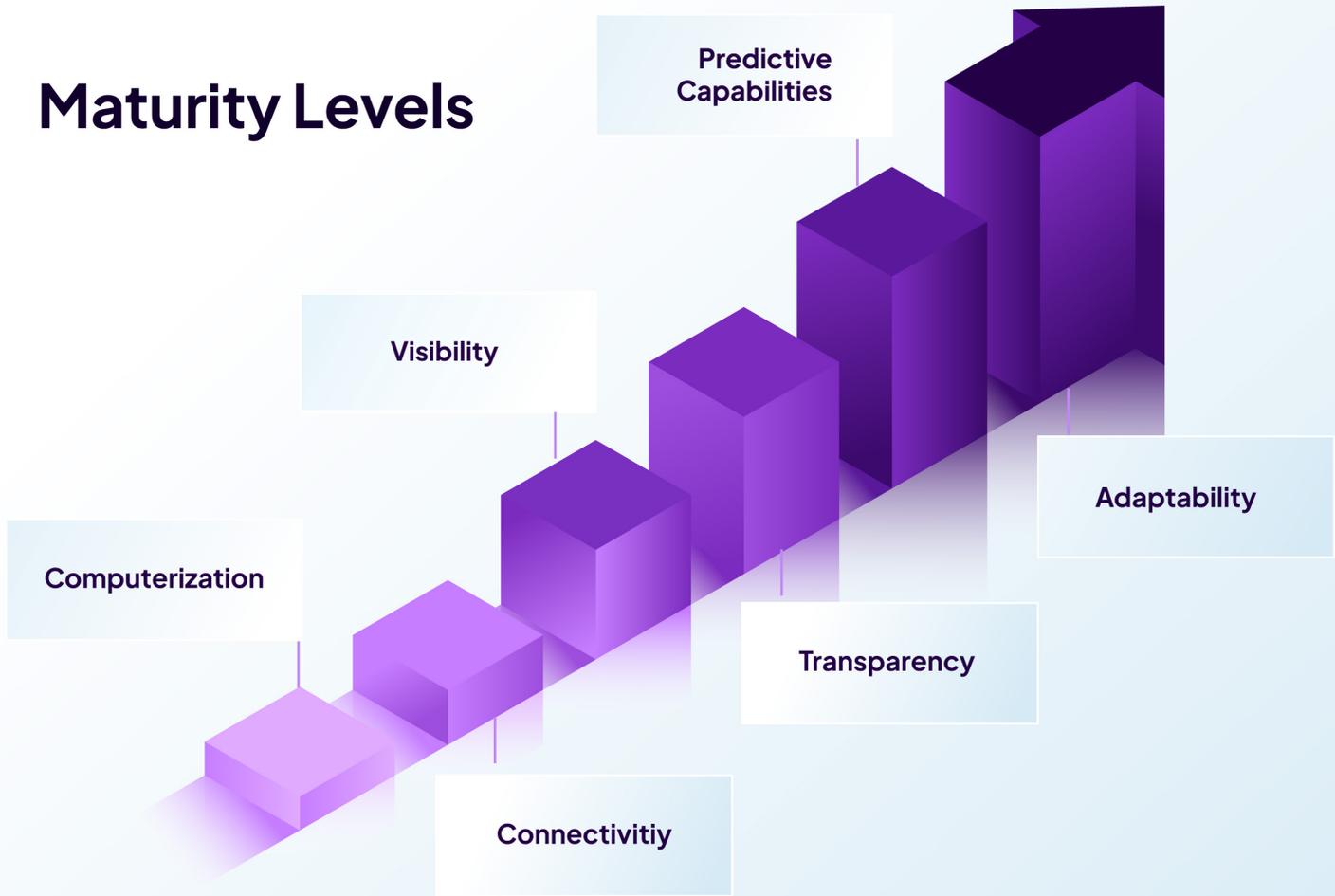
Introduction to the SIRI Framework

The Smart Industry Readiness Index (SIRI) is a globally recognized framework developed by the Singapore Economic Development Board (EDB) in partnership with leading industry players. It evaluates manufacturing readiness across three core dimensions: Process, Technology, and Organization — further divided into 16 dimensions or elements.

SMART INDUSTRY READINESS INDEX

PROCESS

Operations	Supply Chain	Product Lifecycle
▼	▼	▼
Vertical Integration	Horizontal Integration	Integrated Product Lifecycle
1.	2.	3.

TECHNOLOGY

Automation	Connectivity	Intelligence
▼	▼	▼
Shop Floor		
4.	5.	6.
Enterprise		
7.	8.	9.
Facility		
10.	11.	12.

ORGANIZATION

Talent Readiness	Structure & Management
▼	▼
Workforce Learning & Development	Inter- and Intra- Company Collaboration
13.	15.
Leadership Competency	Strategy & Governance
14.	16.

Maturity Levels

Predictive
Capabilities

Visibility

Adaptability

Computerization

Transparency

Connectivitiy

Why Assess Digital Maturity?

Understanding a plant's digital maturity enables leadership teams to make targeted investments, justify ROI, and align transformation goals with business strategy. The SIRI framework provides a structured, repeatable, and vendor-neutral approach to assess readiness and benchmark against the best global practices

| Identify Stakeholders | → | Plan Workshop | → | Gatter Inputs |
| Initiate Workshop | ← | Gather Inputs | ← | Follow-Up |

Assessment Methodology

The SIRI assessment is conducted through stakeholder interviews, plant walkthroughs, system observations, and maturity scoring. Workshops are scheduled with cross-functional teams including Operations, Quality, Maintenance, IT/Automation, HR, and Management. Data collected includes SOPs, dashboards, system screenshots, and information about existing digital tools.

Assessment Findings

The maturity assessment across manufacturing operations using the SIRI framework often reveals a pattern of uneven advancement across the Process, Technology, and Organization dimensions. While many plants have invested in automation and basic digital infrastructure, significant gaps persist in system integration, intelligence, and organizational readiness

Element	Common Current State	Typical Gaps Identified	Target Maturity Focus
Product Lifecycle	Design functions are partially digitalized and linked to MES or ERP systems	Feedback loops from production and customer use are missing	Establishing closed-loop product development cycles
Shopfloor Connectivity	Basic MES deployment; partial data visibility	Lack of machine-level integration and sensorization	End-to-end machine connectivity and data flow
Talent Readiness	Entry-level training programs and informal upskilling initiatives	Absence of skill matrices or Industry 4.0 competency frameworks	Structured learning paths aligned to digital roles
Leadership Competency	Limited involvement beyond pilot sponsorship	Lack of long-term commitment and governance frameworks	Executive ownership and dedicated digital steering groups
Intelligence & Analytics	Dashboarding is reactive and siloed	Minimal use of advanced analytics or predictive models	AI/ML-driven insights for operations, quality, and maintenance

Recommendations and Roadmap

Based on maturity assessments conducted using the SIRI framework, manufacturers can adopt a structured transformation roadmap that aligns with their current state and strategic aspirations. The roadmap typically evolves across three phases, each focusing on different levers of value creation:

Phase 1: Foundation and Quick Wins

Organizations at early maturity levels should prioritize initiatives that deliver immediate visibility and control. These include:

› Implementing real-time dashboarding for production KPIs (e.g., OEE, downtime)
› Setting up basic alerting systems for operator-level deviations
› Enhancing transparency through SOP digitization and data capture from critical assets

These steps build data confidence and prepare the ground for higher-value use cases.

Phase 2: Integration and Standardization

As maturity improves, the focus should shift to system interoperability and process harmonization. Key initiatives may include:

› MES–ERP integration to enable seamless information flow across operations and business systems
› Utility and energy monitoring for operational cost optimization
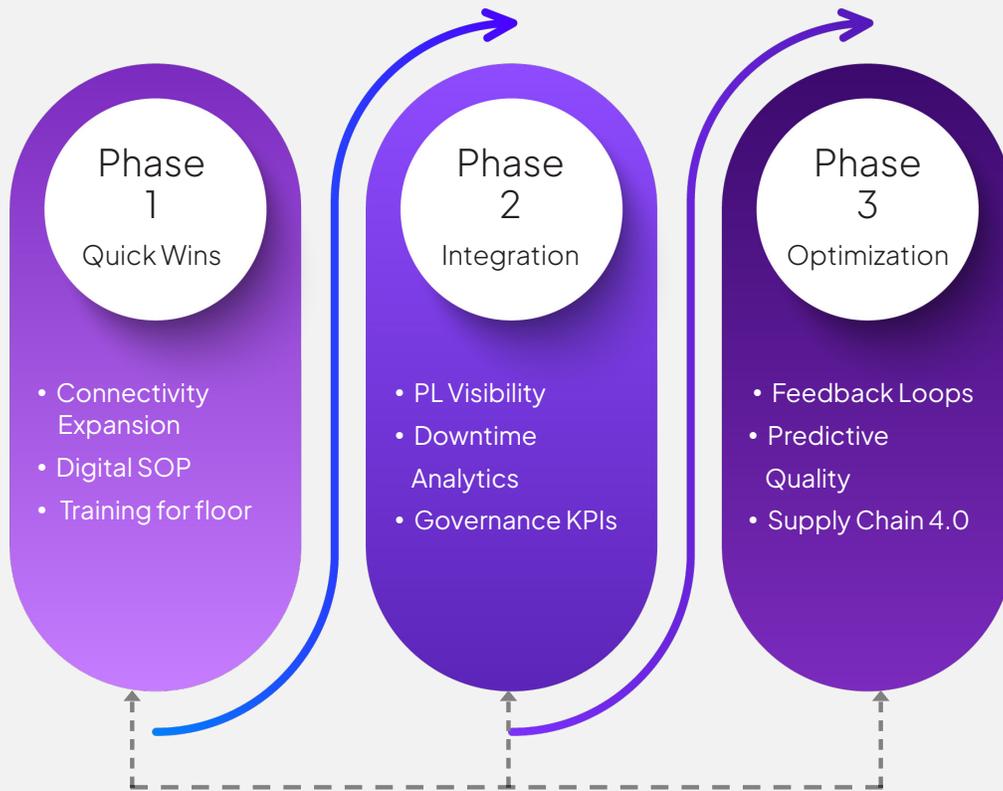› Adoption of condition-based or predictive maintenance strategies

This phase emphasizes horizontal and vertical integration to enable cross-functional insights.

Phase 3: Optimization and Intelligence

Organizations aiming to achieve predictive and adaptive capabilities should invest in:

› AI/ML-driven applications for quality prediction, demand forecasting, and resource planning
› Digital twin implementations to simulate and optimize production scenarios
› Governance frameworks with KPIs tied to digital transformation outcomes

These efforts elevate decision-making from reactive to proactive and enable scalable transformation across sites.

Phase 1
Quick Wins

- Connectivity Expansion
- Digital SOP
- Training for floor

Phase 2
Integration

- PL Visibility
- Downtime Analytics
- Governance KPIs

Phase 3
Optimization

- Feedback Loops
- Predictive Quality
- Supply Chain 4.0

Industry 4.0 Transformation Roadmap

Investments in change management, training, and governance mechanisms are key enablers for success.

CONCLUSION!

SIRI enables a comprehensive view of manufacturing readiness. By institutionalizing SIRI-based assessments, organizations can track progress, prioritize initiatives, and drive sustained Industry 4.0 transformation.

Appendix A: SIRI Maturity Levels

Level	Description
Level 1 – Computerization	Basic standalone digital tools are used (e.g., Excel, local dashboards). Processes remain largely manual and siloed.
Level 2 – Connectivity	Devices and systems are connected, allowing basic data transmission (e.g., MES to ERP sync, machine-level network).
Level 3 – Visibility	Real-time data is accessible to operators and decision-makers. Dashboards and system monitoring are in place.
Level 4 – Transparency	Root causes can be diagnosed using data. Cross-functional visibility is enabled. Digital traceability exists.
Level 5 – Predictive Capacity	Systems can forecast failures, quality issues, or demand shifts using AI/ML, trends, or simulations.
Level 6 – Adaptability	Systems respond autonomously. Decision-making is automated or semi-automated through AI-driven logic.

Appendix B. 16 SIRI Elements

Process Dimension

1. Vertical Integration – Integration across OT and IT layers (PLC → SCADA → MES → ERP).

2. Horizontal Integration – Integration across the supply chain: vendors, partners, customers.

3. Integrated Product Lifecycle – Integration of design, engineering, production, and field feedback.

Technology Dimension

4. Shopfloor Automation – Use of PLCs, robots, HMIs to automate physical processes.

5. Enterprise Automation – Digital workflows in business functions (e.g., procurement, reporting).

6. Facility Automation – Automation of infrastructure like energy, HVAC, lighting systems.

7. Shopfloor Connectivity – Connectivity between machines, sensors, and MES systems.

8. Enterprise Connectivity – Data flow between MES, ERP, CRM, and other business systems.

9. Facility Connectivity – Monitoring systems for utilities and environment controls.

10. Shopfloor Intelligence – Use of analytics and insights on operational data (e.g., OEE, downtime).

11. Enterprise Intelligence – Business dashboards and data models used at managerial levels.

12. Facility Intelligence – Data-driven optimization of facility performance and maintenance.

Organization Dimension

13. Workforce Learning & Development – Skills, training programs, and upskilling for Industry 4.0.

14. Leadership Competency – Executive involvement, vision, and sponsorship for transformation.

15. Inter- & Intra-Company Collaboration – Cross-functional cooperation and external digital partnerships.

16. Strategy & Governance – Formal digital strategy, KPIs, steering groups, and review mechanisms.

Appendix C. Sample Workshop Questions

Operations/Production

› How are daily KPIs (OEE, UPH) tracked and visualized?
› What parts of the line are automated vs. manual?

Maintenance

› Do you use preventive or predictive maintenance systems?
› How is downtime tracked and categorized?

IT/Automation

› What systems are used (MES, SCADA, ERP)?
› Are they connected? What data is shared across systems?

HR/Training

› Is there a skill matrix in place?
› How are training needs identified and addressed?

ABOUT THE **AUTHOR**

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Chandrashekhar V Deshmukh is the Practice Principal – Manufacturing Analytics at Zimetrics. With over 22 years of industry experience spanning IoT, Cloud, AI/ML, and enterprise systems, he has been at the forefront of enabling digital transformation across manufacturing environments in recent years.

He focuses on identifying gaps in vertical and horizontal integration within factory operations. His expertise spans SIRI assessments, roadmap planning, IT/OT architecture, and implementing data-driven operations that unlock measurable business value.

About Zimetrics

Zimetrics is a data-first digital engineering firm that helps organizations solve complex business challenges using the power of data, cloud, and intelligent technologies. With a deep focus on AI/ML, IoT, and cloud-native platforms, Zimetrics empowers enterprises to make smarter decisions, optimize operations, and accelerate innovation.

Zimetrics Manufacturing Analytics Practice

The Manufacturing Analytics practice at Zimetrics is purpose-built to help manufacturers unlock the true potential of their operational and machine data. As the industry evolves toward Industry 4.0 and beyond, our practice enables plants to achieve measurable improvements in quality, productivity, traceability, energy efficiency, and overall equipment effectiveness (OEE).

The Practice Focuses on

- Digital maturity assessments using frameworks like SIRI
- IT/OT convergence and real-time data integration
- Predictive analytics for maintenance, quality, and throughput
- Custom dashboards, KPI tracking, and advanced visualization
- AI-driven decision support systems

We engage deeply with manufacturers to help them move from fragmented insights to fully orchestrated, data-led operations. From brownfield MES modernization to greenfield smart factory initiatives, our solutions are tailored to fit each plant's context and maturity.

With a growing portfolio of engagements across electronics, discrete manufacturing, automotive, and process industries, Zimetrics is building a strong foundation for long-term value in manufacturing analytics.

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