A Framework for Data Standard Readiness

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Who Dis Be?

- Engineering Technical Specialist @ Boeing Commercial Airplanes
  - 18 Years @ Boeing / 3 years PLM Consultant
- US TAG Designated Expert to ISO TC184/SC4 and SC5
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Presentation Overview

Problem Statement
Causes/Effects
Solution – Framework for Assessing Readiness

Problem Statement

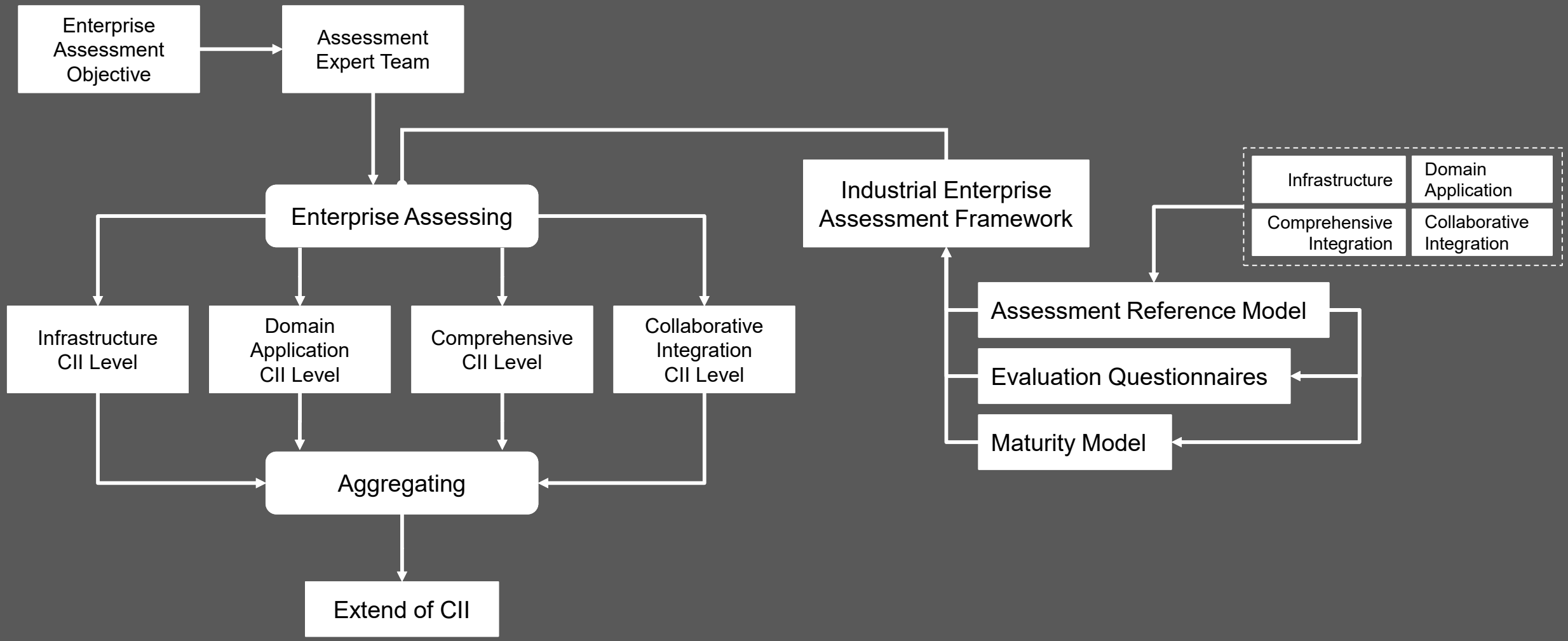
Many organizations fail to realize the full and complete benefits of using industry data standards because they have not or inappropriately implemented them.

Causes/Effects

Cause 1: Knowledge of data standard's intended use is lacking
Cause 2: Inadequate tools to create/consume the data standard
Cause 3: Data Standards do not support my business needs [usually a myth]
Cause n: …

Effect 1: Missing data in exchange leading to bad decisions and rework
Effect 2: Increase cost by mandating common processes and tools across supply chain
Effect n: …

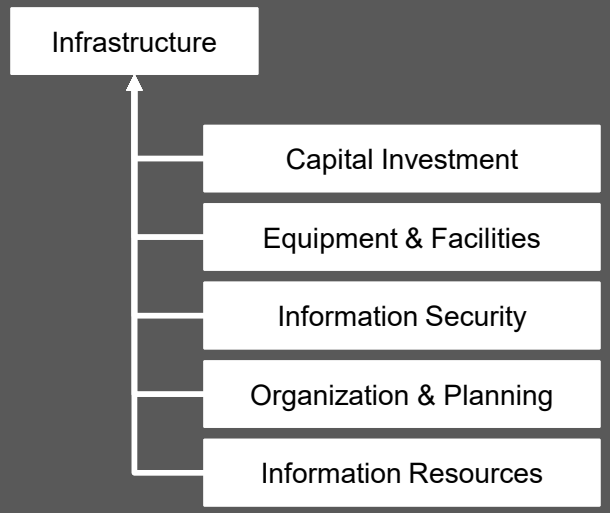
Overview of Assessment Framework

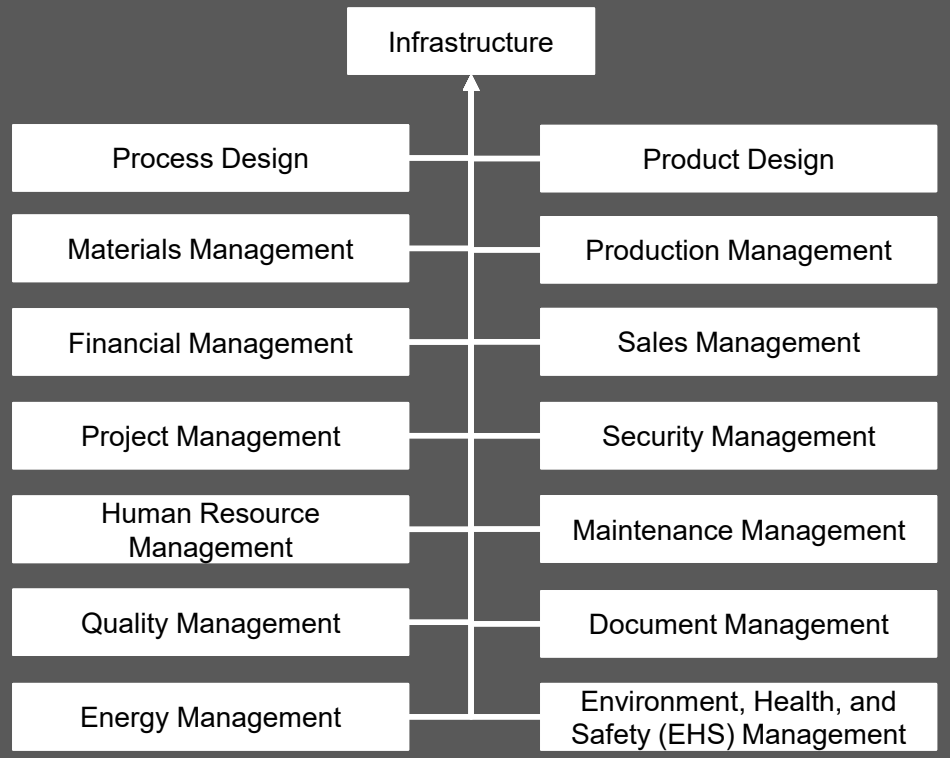


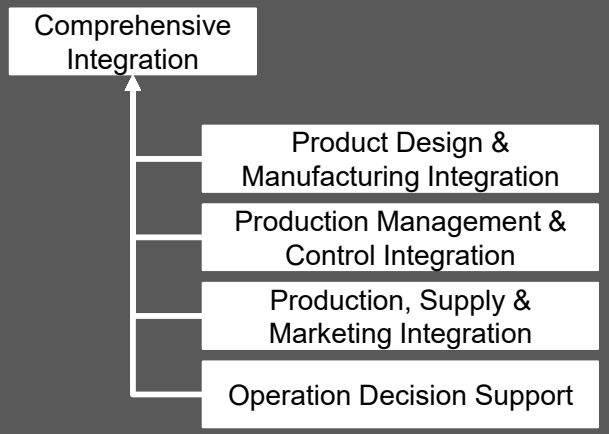
Reference: ISO/DIS 22549-1:2019

CII: Convergence of Information and Industrialization

Breakdown of the Assessment Reference Model





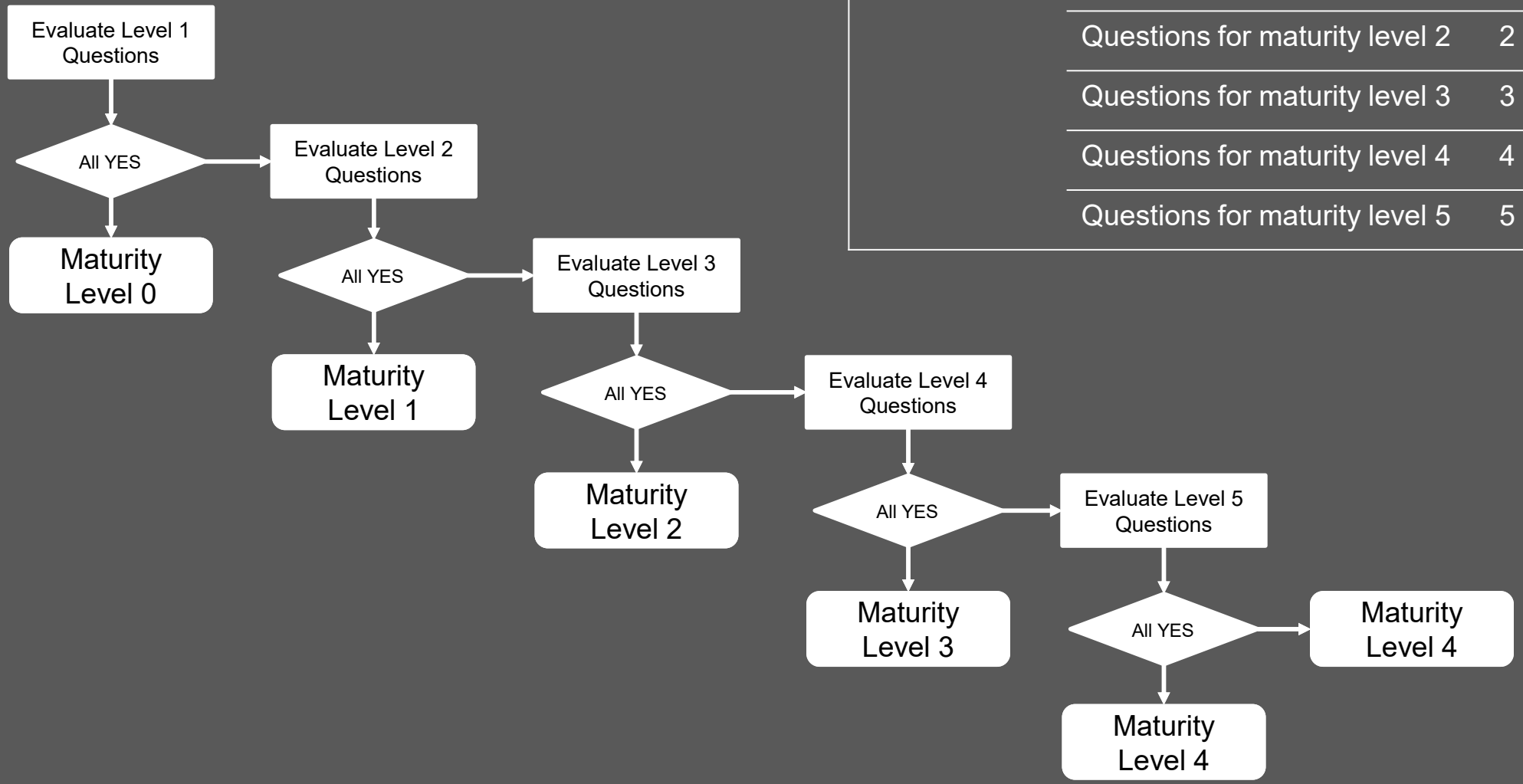


Maturity Model Definitions

Maturity Level Indicator	Descriptive Name	Characteristics
Level 0	Unidentified	Little or no systematic documentation available
Level 1	Identified	Tracking and traceability of materials, data and etc. Registration and management of data using information collection devices and systems.
Level 2	Measured	Real time data acquisition of materials, machinery, process and human roles, and data integration. Measurement, aggregation, classification and management of data using information collection devices and systems. Synchronous history of data for the same time, same lot and same product.
Level 3	Analyzed	Data analysis and optimized decision making using aggregated data.
Level 4	Optimized	Automation of processes according to optimized decision making throughout the intra-enterprise and/or the inter-enterprises.
Level 5	Customized	Self-diagnosis and self-healing through cyber-physical system [CPS], Internet of Things [IoT], artificial intelligence [AI], etc. Flexible production of customized products through autonomous control.

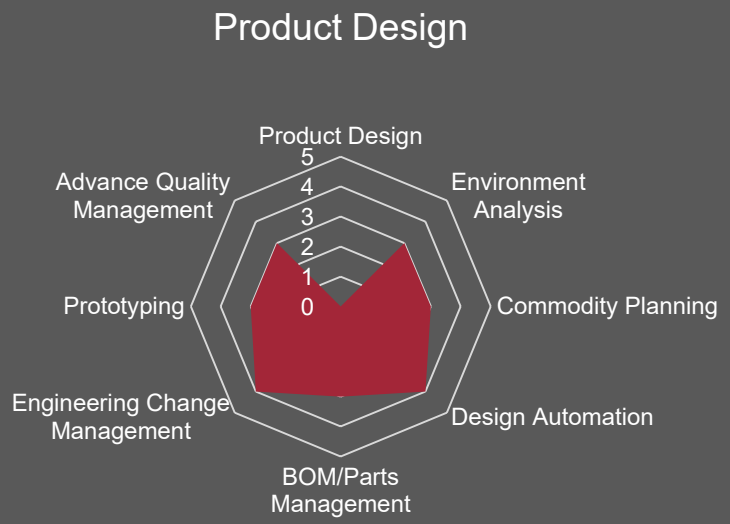
Assessment Method

Activity	Question	Maturity Level Indicator
Activity Name	Questions for maturity level 1	1
	Questions for maturity level 2	2
	Questions for maturity level 3	3
	Questions for maturity level 4	4
	Questions for maturity level 5	5



Breakdown of Activities and Sample Questions

Activity	Description
Environment Analysis	Use of IT systems and applications for environment analysis
Commodity Planning	Use of IT systems and applications supporting commodity planning
Design Automation	Use of designing software systems and smart connected technology for design
BOM/Parts Management	Use of BOM/Part management system
Engineering Change Management	Use of engineering change management systems
Prototyping	Use of IT systems and applications for prototyping and its validation
Advance Quality Management	Use of IT systems and applications for advance quality management



Activity	Description	Level
Design Automation	Do you design with 2D CAD?	1
	Do you design with 3D CAD?	2
	Do you analyze and validate with CAE?	3
	Do you design automatically with optimization solutions as one of the following? • Model-Based Parametric Design • Engineering-based Parametric design • Integrated parametrical design	4
	Do you design a product by using smart connected technology such as IoT, AR/VR	5

Activity	Description	Level
BOM/Parts Management	Do you upload the engineering BOM [E-BOM] to the system	1
	Do you integrate the E-BOM with 3D CAD? Do you generate the E-BOM automatically	2
	Do you generate the manufacturing BOM [M-BOM] automatically in PLM? Do you manage the software configuration in PLM?	3
	Do you configure the BOM according to the purpose of use such as procurement, process cost, production, and customer service for warranty, etc?	4
	Do you improve business through preliminary simulation using the BOM data according to the purpose of use?	5

References

ISO/DIS 22549-1:2019, Automation Systems and Integration – Assessment on Convergence of Information and Industrialization for Industrial Enterprises Part 1: Framework and Reference Model

ISO/CD 22549-2:2019, Automation Systems and Integration – Assessment on Convergence of Information and Industrialization for Industrial Enterprises Part 2: Maturity Model and Evaluation Methodology

ISO 15704, Industrial Automation Systems – Requirements for Enterprise-Reference Architectures and Methodologies