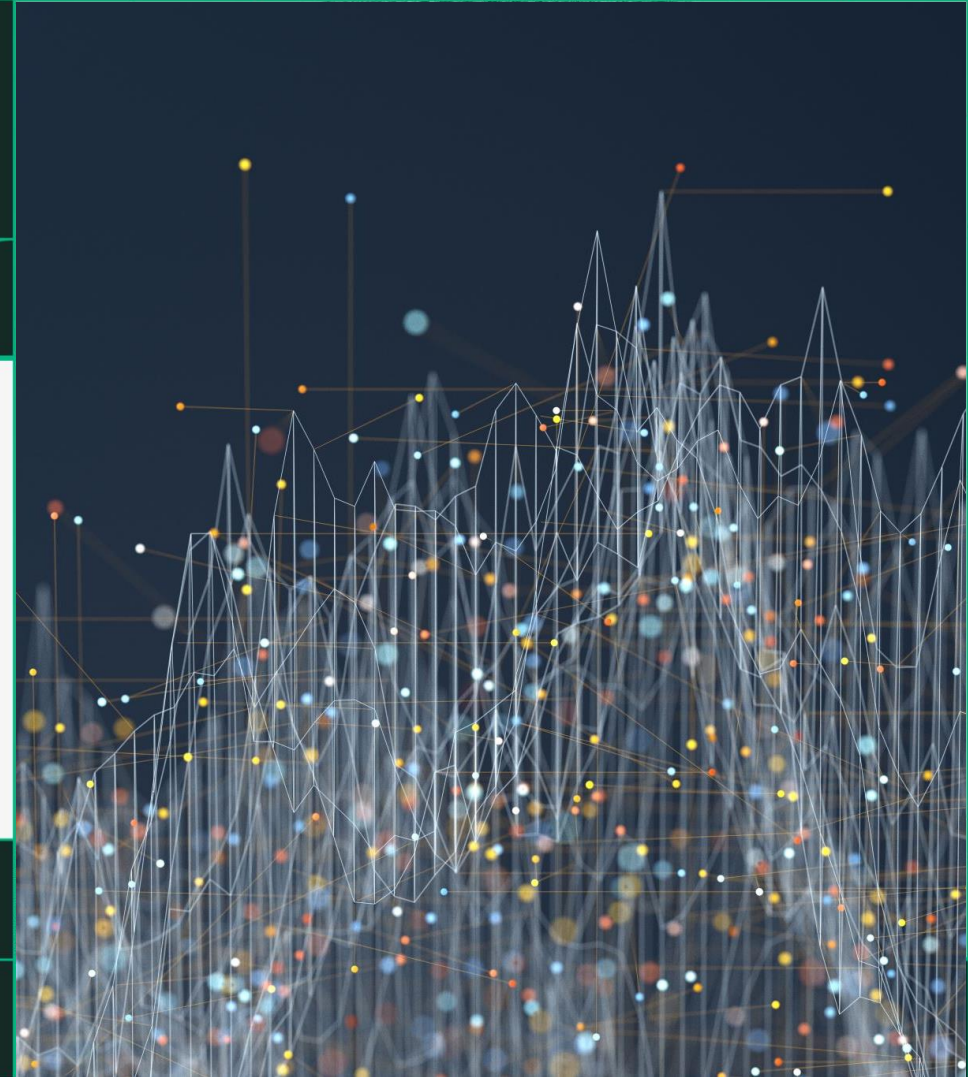


# Bringing It All Together with NI Manufacturing



Mark Moyer

John Zukowsky



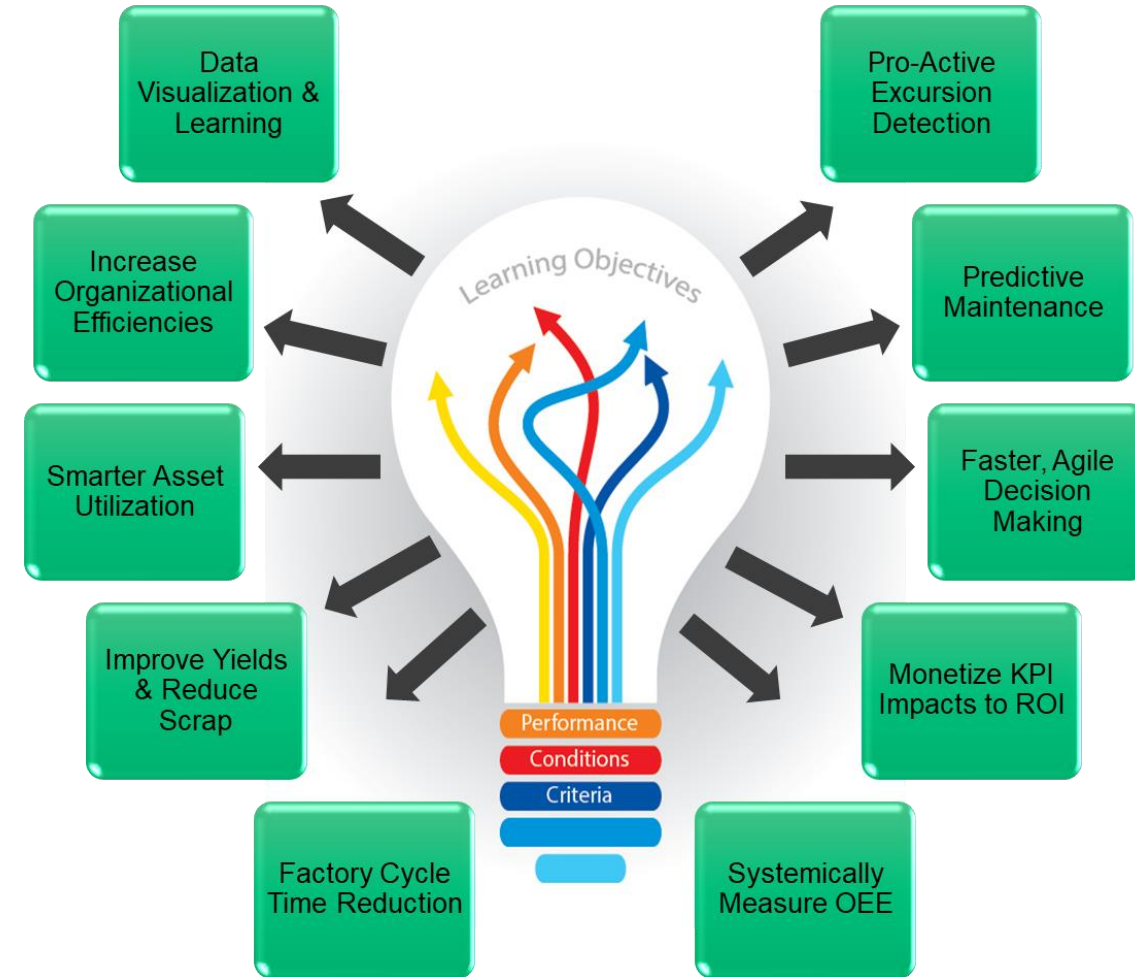
# NI Manufacturing Profile

- Two Factories:

2021 Build History	Debrecen, HU 	Penang, MY 
# of Unique SKU's	2,805	685
Product Volume	826,685	188,068
Work Orders	20,122	6,189
Avg. Lot Size	40	30
# of Test Stations	195	183

## Focus Areas for Improvement:

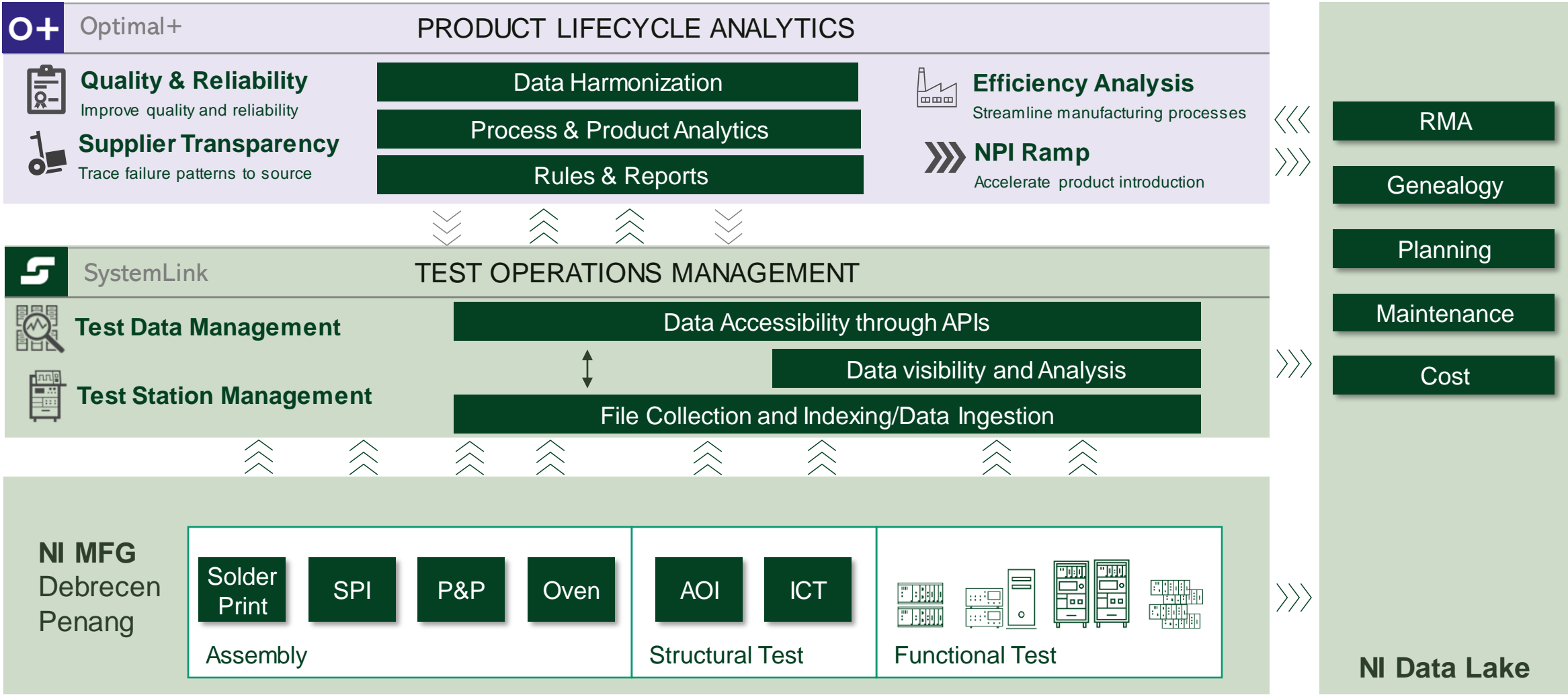
- Pivot-to-Test:** Prioritize test improvements as key mechanism for operational improvement
- Data utilization for process and product improvement projects
- Improve visibility into asset utilization, capacity calculations & project ROIs



## NI Manufacturing Digital Transformation

Continuous investment in tools, processes, and culture to migrate factory control toward a data first mentality

# NI Manufacturing Implementation



# NI Journey: 4-Steps to Becoming Data-Centric

## 1. Identify

- What problem needs to be solved
- What data is needed to solve those problems

## 2. Collect

- Identify and facilitate data sources to connect and centralize
- Prepare the data for analysis and make it automatic

## Continuous Cycle of Improvement

## 4. Act

- Integrate data-driven workflow into decision making processes
- Implement process changes to achieve desired results

## 3. Analyze

- Create dashboards and reporting for visibility of data
- Train teams to use dashboards for low-effort analysis



# Getting Started – ICT operation

## Why ICT?

- Data accessibility
- Maintenance Expense
- Contribution to COGs

## Data collection

- Rich parametric data
- Ties to genealogy

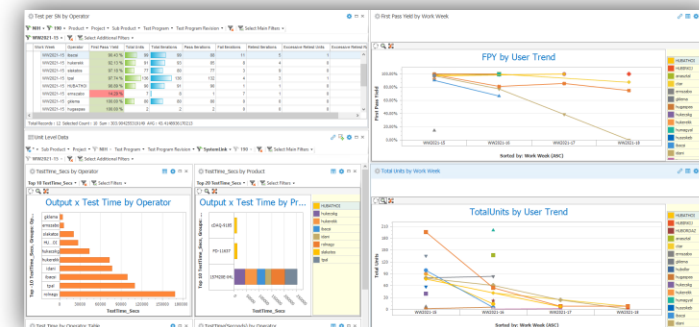
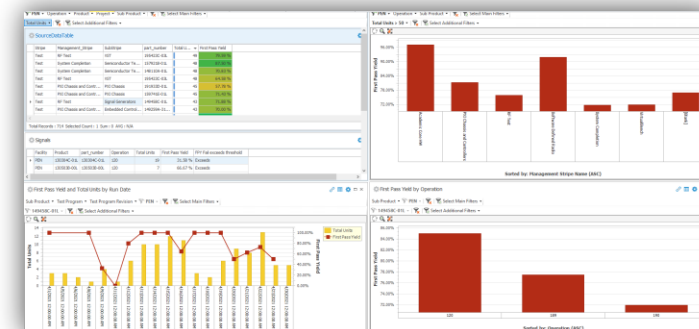
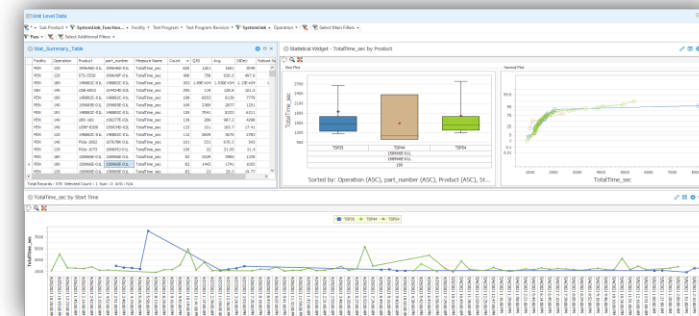
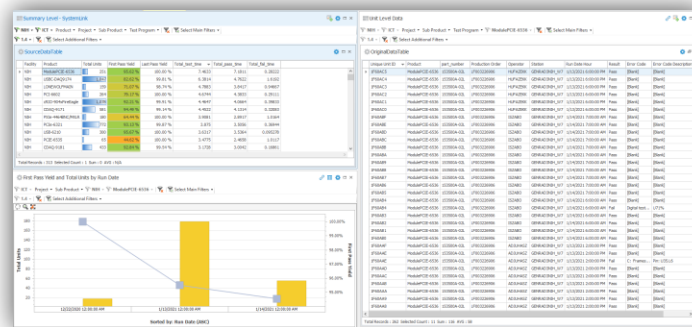
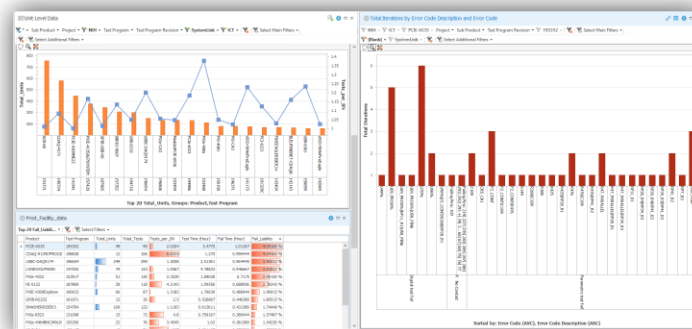
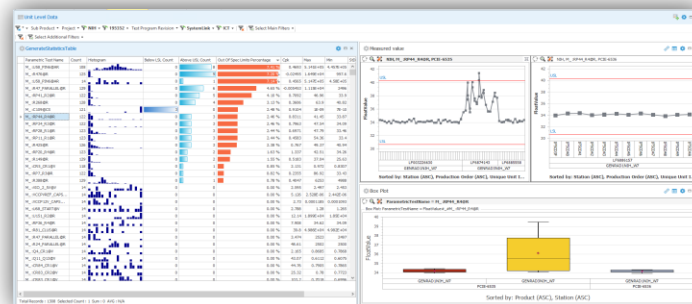
## Analysis

## Act

- Predictive Maintenance
- Retest reduction
- Apply to Functional Test

**Savings: \$174K annual at one site**

## Test Dashboard Examples



# What's Next?

## 1. Pivot-to-Test – 5 Pillars

- Understand total cost of test to influence cross-functional decisions.
- Implement a strategy to acquire, maintain, and sunset test hardware and software aligned to our financial and capacity needs.
- Optimize test investment including design coverage and cost by leveraging analytics
- Flexible test software infrastructure tailored to specific needs including the ability to apply analytics
- Benchmark NI's manufacturing test solution benchmarks against peers in the industry.

## 2. KPI Refresh and Actions

- Review and refresh key metrics used within manufacturing to drive desired outcomes
- Expand system monitoring of performance and alert user when threshold have been or will be exceeded
- Custom rules and alerts reduces the overhead burden of data mining for key metric reporting.
- Scale best practices and solution within NI Manufacturing

## 3. Predictive Maintenance

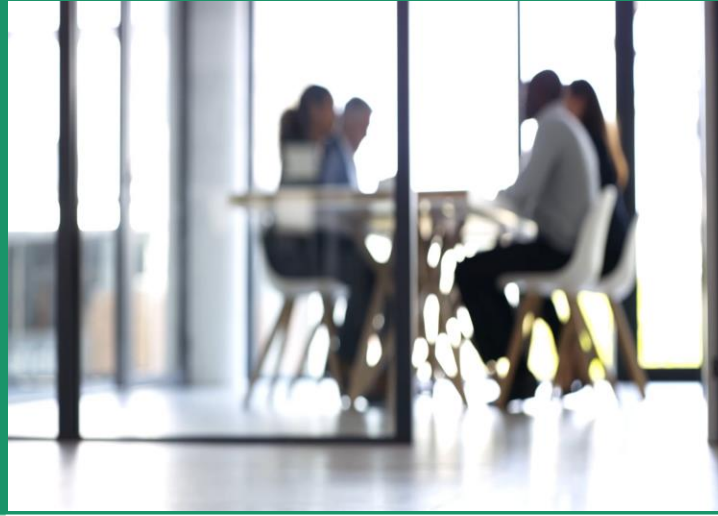
- ML model to predict operational trends
- Training of algorithm is WIP performance
- Result will catch and prevent product drift before they are outside of spec limits

# What Have we Learned?



## Data:

1. Ownership +
2. Management +
3. Accessibility +
4. Consistency =
5. Accuracy & Integrity



## Culture:

### Change Management

- Job Descriptions
- Skill Sets
- Expectations
- Cultural Norms

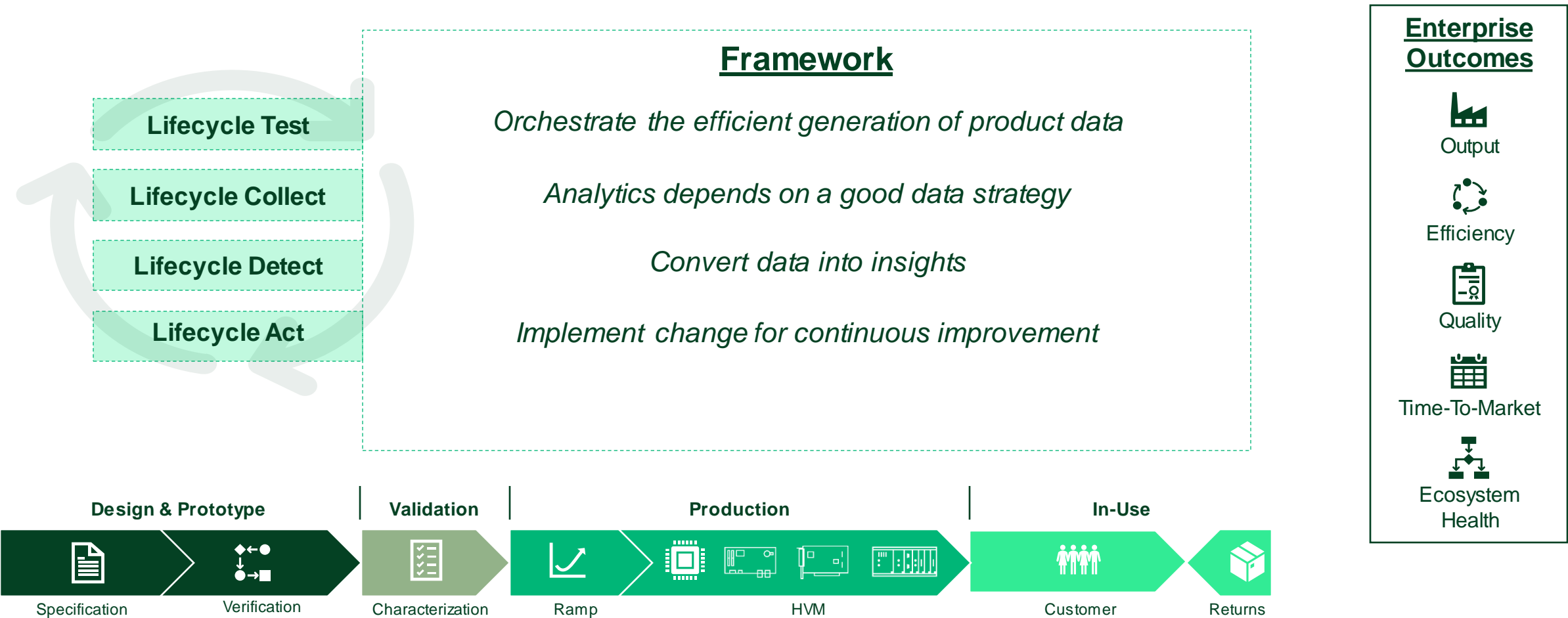


## Strategy:

### Top-Down Strategic Messaging:

- Org Alignment
- Role of the Employee
- Drive Adoption

# NI Lifecycle Solutions Framework





National Instruments  
is now NI.