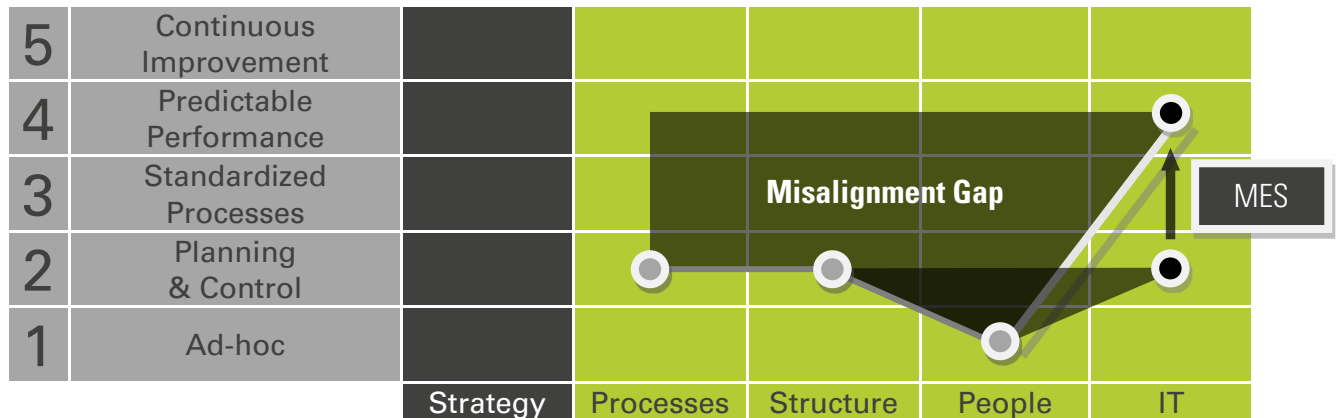*Manufacturing Maturity Model for Assessing Industry 4.0 Readiness*

Our team takes a wholistic approach to addressing misalignments in the four domains of processes, structure, people, and IT. Technology is a tool, not an end in itself. As the table below illustrates, manufacturing efficiency cannot be optimized beyond the weakest link within these four domains. For an organization to achieve continuous-improvement excellence, it must first have processes, structure, people and IT aligned with its business strategy.

Technology is an accelerator. Installing a best-in-breed MES system will not solve a process problem or a people problem. If a company attempts to solve a process problem by aligning technology to its current process, it will only accomplish performing a broken process more quickly. Our approach ensures that our customers receive more than just a state-of-the-art MES solution. Our project scoping, process mapping, KPI development, and training lays a foundation for our customers to drive a culture of continuous improvement across their factory and across their enterprise.

Manufacturing Maturity Model

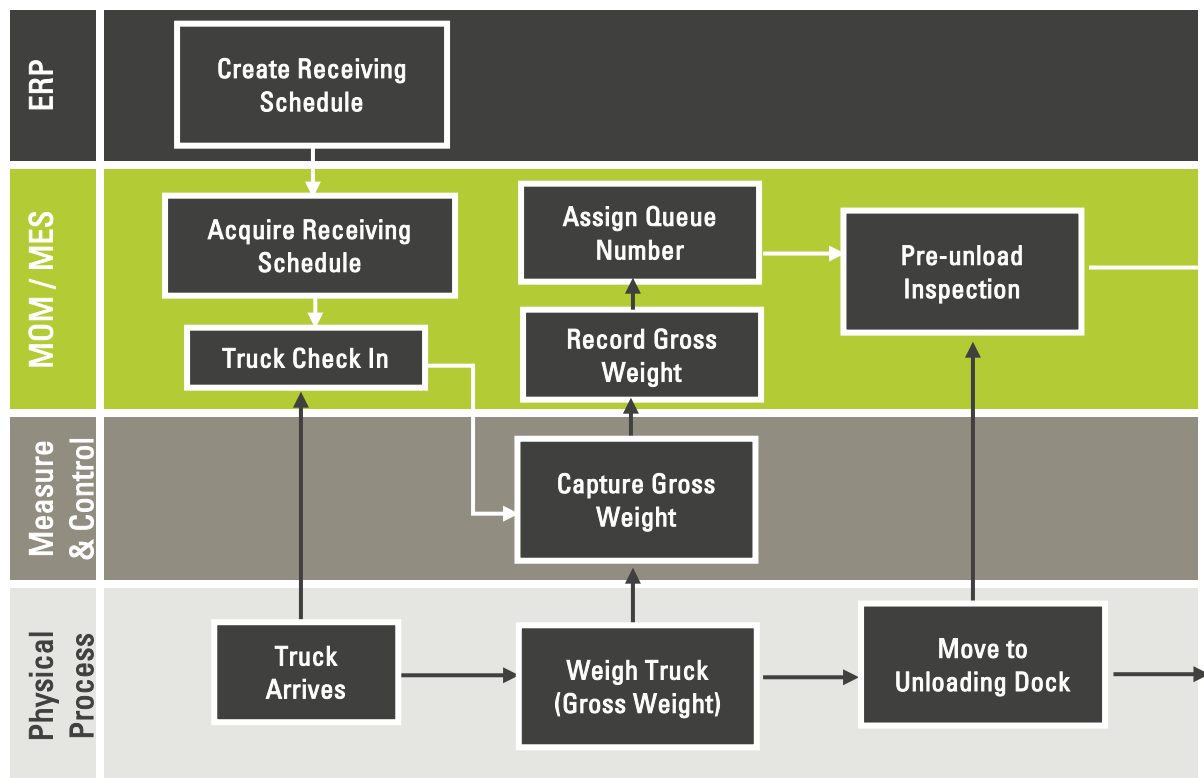|		Strategy	Processes	Structure	People	IT
5	Continuous Improvement					
4	Predictable Performance					
3	Standardized Processes		**Misalignment Gap**			MES
2	Planning & Control					
1	Ad-hoc					

Scoping Process

Process mapping is included as a part of our scoping process, which is done in three parts. During the first phase, we teach the customer our methodology for MOM mapping (Manufacturing Operations Management), where we develop a process map to have a visual understanding of processes occurring on the plant floor, what data is measured during those processes, and how that data flows across the customer's network. This process helps the customer map their "current state."

Process Mapping

The graphic below illustrates a simplified process map where the bottom layer represents the physical process occurring in the plant's receiving area. The second layer identifies

hardware used to take a measurement or control a process. In this case, the truck drives over a scale to capture the gross weight. The third layer represents the data layer showing how the data being recorded and transmitted through the MES. In this example, our system pulls the receiving schedule from the ERP to check in the truck, receives the captured weight, and assigns a queue number for pre-unload inspection.

| ERP	Create Receiving Schedule			
MOM / MES	Acquire Receiving Schedule	Assign Queue Number	Pre-unload Inspection	
	Truck Check In	Record Gross Weight		
Measure & Control		Capture Gross Weight		
Physical Process	Truck Arrives	Weigh Truck (Gross Weight)	Move to Unloading Dock	

Value-Driver Matrix

As part of the process mapping exercise, we define meaningful metrics and value drivers using a value-driver matrix. This helps our customers prioritize operational value drivers and develop measurable KPIs (Key Performance Indicators) for data-driven decision-making.

		IMPACT ON VALUE	
		HIGH	**LOW**
MANAGEMENT INFLUENCE	**HIGH**	**MANAGE ACTIVELY** **KPIs (Key Performance Indicators)**	**MONITOR**
	LOW	**DOCUMENT FOR POSSIBLE FUTURE PHASES**	**LOW PRIORITY**

Gap Analysis

A key part of the process-mapping exercise is the gap analysis, where we define our "future state." The objective is to determine exactly how we will achieve the value drivers identified in the previous phase. This includes touring the facility, proposing software solutions, hardware, process engineering and improvements, procedural improvements, etc.
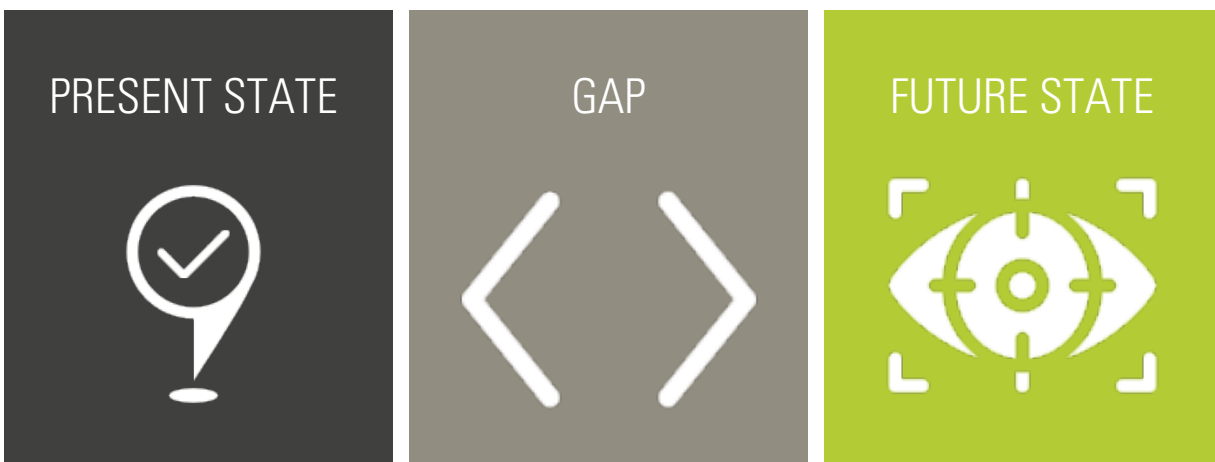
PRESENT STATE

GAP

FUTURE STATE

Acceptance Criteria

The final deliverable from the requirements-gathering process is a master statement of work defining the objectives of the project with an extremely detailed scope of deliverables, milestones and acceptance criteria. Acceptance criteria will be defined in the statement of work in its own dedicated section. The acceptance criteria should be listed by phase after the full detailed functional section. This will later be transposed in reference to acceptance criteria signoff sheets. The signoff serves are an agreement that all deliverables for the phase have been met.

Multi-Site Rollout

In a multi-site implementation, the first site is used as a template site. During the process mapping exercise described above, a great deal of time is spent analyzing operations procedures in order to normalize data and business processes. This first site sets the standard for future sites. In previous multi-site projects, we've discovered variances across plants in how they define metrics and report KPIs. Some plants measured yield differently from others, or performance metrics like "equipment availability" or "Operational Equipment Effectiveness (OEE)" were defined differently. Some plant operators use certain exceptions, like "we don't consider downtime when it is XYZ-related." Our team works to uncover these variances to achieve standardized processes with normalized data across the enterprise to make data meaningful.

Once the template site is completed, future rollouts occur more efficiently and less costly. Our software is licensed per site, not per seat. Also, we offer multi-site customers a reduced licensed fee for additional sites. Service costs tend to be less on future rollouts because the customer is able to lead part of the process based on standards designed in the templating process.

Modular Design

Our MES solution offers the benefits of modular design including:

- TARGETED INVESTMENT– Our modular design allows customers to improve processes in targeted areas and grow in phases according to their needs.

- CONFIGURABLE – The standard modules are configurable and hardware-independent, meaning our customers can configure options within our modules for plant-specific functions or regional regulatory requirements and save on implementation costs by using pre-existing hardware.

- REDUCED COST OF OWNERSHIP – Customers reduce their total cost of ownership by purchasing only the functionality they need.

- FLEXIBLE – Our MES can integrate with other standard ERPs, WMS, and homegrown systems.

MES Modules and Functionality Available by Industry

FUNCTIONAL DOMAINS

FIRST PROCESSING
- LIVE BIRD WEIGHING
- LIVE BIRD RECEIVING
- INSPECTION | DISPOSITION
- OVERHEAD SIZING
- LIVE ANIMAL RECEIVING
- CARCASS TRACKING
- SETTLEMENTS
- LIVE FISH RECEIVING

MANUFACTURING
- RECEIVING
- BATCH MIXING
- COOK-TO-CHILL

WMS & DISTRIBUTION
- PRODUCTION CONTROL
- LABELING | PACK-OUT | PALLETIZING
- WAREHOUSE MANAGEMENT (WMS)
- DIRECT STORE DELIVERY

QUALITY & SAFETY
- FOOD SAFETY & QUALITY MANAGEMENT (FSQM)
- LABORATORY INFORMATION MANAGEMENT SYSTEM (LIMS)

CONTINUOUS IMPROVEMENT
- PRIMARY YIELD MANAGEMENT
- FP YIELD
- EXECUTIVE DASHBOARD | SCOREBOARD
- FACTORY ANALYTICS | PRODUCTION EFFICIENCY MANAGEMENT
- ABC PROCESS COSTING

MAINTENANCE MANAGEMENT
- COMPUTERIZED MAINTENANCE MANAGEMENT MODULE (CMMS)

PLANNING & OPTIMIZATION
- **TACTICAL**OPS – TACTICAL PLANNING & OPTIMIZATION

TRACEABILITY
- IBM FOOD TRUST CONNECTOR
- CAT SQUARED **FOOD**TRACE
- CONSUMER TRACEABILITY PORTAL

INTEGRATIONS
- INTEGRATIONS MANAGER
- DEVICE MANAGER
- CTB CONNECT