DIGITAL PERFORMANCE MANAGEMENT

An operating system for continuous improvement of factory performance
Combat today’s manufacturing challenges

Limited capital and operating budgets
Do more with the same resources, postpone expansions, upgrades and hiring. Improve overall effectiveness.

Unstable supply chains and material shortages
Develop alternate sources, define flexible substitutions, modify product designs and production processes for agile manufacturing.

Limited availability of production labor
Relentless focus on worker retention, productivity, skills growth and job satisfaction.

Volatile markets and customer demand

What is Digital Performance Management? PG 3
Digital Performance Management principles PG 4
What should you measure and how? PG 7
Integrating executive reporting and continuous improvement PG 12
Complement what you have and accelerative value PG 14
What is Digital Performance Management?

Digital Performance Management is a system of closed-loop problem solving for continuous improvement.

• Digital enables new capabilities and efficiencies in established practices of factory performance improvement.

• The mission of Digital Performance Management is to return hours to production.

• In Digital Performance Management, production time is the currency of measure: All production losses and gains are expressed in hours.

• OEE continues to be applied as the familiar, common productivity metric. Production losses and opportunities for improvement are measured and tracked in hours. Effects on OEE are reported.

• Data is acquired first from automation. Manual data entry by operators is minimized.
Digital Performance Management principles

Systematic, closed-loop problem solving is a best practice of continuous improvement.

- Digital Performance Management is founded upon timeless, proven principles of data-driven process improvement and quality management drawn from Lean Six Sigma (DMAIC), Deming (PDCA) and Toyota.

Digital Performance Management (DPM)

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Current tools provide data but lack insights needed for transformation

**EXISTING LANDSCAPE**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4/L5</td>
<td>Business systems (ERP, SCM, PLM) Governance &amp; planning</td>
</tr>
<tr>
<td>L3</td>
<td>Production execution (MES/MOM)</td>
</tr>
<tr>
<td>L2</td>
<td>Process monitoring (HMI-SCADA)</td>
</tr>
<tr>
<td>L1</td>
<td>Process sensing, manipulating (PLC)</td>
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</tbody>
</table>

Metrics and reports often lack context and insights that frontline workers, CI teams, factory managers and executives require to improve performance.
With DPM, manufacturers identify, analyze and measure at scale

Consistent focus on constrained resources, standardized analysis and repeatability are key to transformation

Focused problem solving on what will impact your P&L

Accelerate time to fix using analytics on root causes and scenarios

Consistently measure improvements and repeat at scale

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Digital Performance Management principles

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Complement what you have and accelerative value
What should you measure and how?

Lead with a measurement everyone understands that can easily be translated to financial gain.

**HOURS LOST**
Reduce operating costs

- Reduce average cost per unit (numerator)
- Minimize or avoid an additional shift(s)
- Minimize or avoid an additional line(s)

**HOURS REGAINED**
Increase revenue

- Reduce average cost per unit (denominator)
- Produce more units/more volume
- Minimize or avoid an additional line(s)

**Fewer hours**

- Reduce average cost per unit (numerator)
- Minimize or avoid an additional shift(s)
- Minimize or avoid an additional line(s)

**More volume**

- Reduce average cost per unit (denominator)
- Produce more units/more volume
- Minimize or avoid an additional line(s)
SAMPLE PRODUCTION SCENARIO:
Baseline performance

1 of 20 sites for a discrete manufacturer with $5B revenue

Ideal rate = 100 assemblies/hour
4500 assemblies/week
OPTION 1

Increase revenue

Avoid 8 hours of speed loss and convert hours saved into additional capacity

$1000/PART × 800 ADDITIONAL PARTS = $800,000

Additional revenue per week

Ideal rate = 100 assemblies/hour
5300 assemblies/week
+800 parts/week!
OPTION 2
Decrease operating cost

Avoid 8 hours of speed loss and use hours saved to minimize overtime

Ideal rate = 100 assemblies/hour
4500 assemblies/week
Unchanged!
Using time as the foundation, standardize reporting for all levels

With time as the common currency, create a balanced scorecard that allows you to measure performance with consistency across lines and factories.
# Integrating executive reporting and continuous improvement

Digital Performance Management connects data, actionable insight and closed-loop continuous improvement across enterprise hierarchies.

<table>
<thead>
<tr>
<th>DIVISION FINANCIAL PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross/ Operating Revenue</td>
</tr>
<tr>
<td>RONA</td>
</tr>
<tr>
<td>Operating Margin</td>
</tr>
<tr>
<td>Growth Rate</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>FACTORY SUMMARY PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
</tr>
<tr>
<td>Productivity</td>
</tr>
<tr>
<td>Quality</td>
</tr>
<tr>
<td>On-time Orders</td>
</tr>
<tr>
<td>EH&amp;S Compliance</td>
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<tr>
<td>Wages</td>
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<tr>
<td>Material ATP</td>
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<tr>
<td>Demand Forecast</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCTION LINE METRICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runtime</td>
</tr>
<tr>
<td>Scrap Rate/FPY</td>
</tr>
<tr>
<td>Changeover</td>
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<tr>
<td>Unplanned DT</td>
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<tr>
<td>Planned DT</td>
</tr>
<tr>
<td>Speed Loss</td>
</tr>
<tr>
<td>Micro-stops</td>
</tr>
<tr>
<td>Waiting Labor</td>
</tr>
<tr>
<td>Waiting Material</td>
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<tr>
<td>Tooling/PM</td>
</tr>
</tbody>
</table>

**What is Digital Performance Management?**

**Page 3**

**Digital Performance Management principles**

**Page 4**

**What should you measure and how?**

**Page 7**

**Integrating executive reporting and continuous improvement**

**Page 12**

**Complement what you have and accelerative value**

**Page 14**
Digital Performance Management drives the balanced scorecard

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<thead>
<tr>
<th>SCHEDULE ATTAINMENT</th>
<th>PRODUCTION PERFORMANCE</th>
<th>PRODUCT QUALITY</th>
<th>WORKFORCE PRODUCTIVITY</th>
<th>FINANCIAL PLAN ATTAINMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilization of factory availability</td>
<td>Utilization of productivity time</td>
<td>Product yields at or above best demonstrated</td>
<td>Results of process improvements and lean initiatives</td>
<td>Revenues, costs, operating and net margins improve through digital performance management driven CI initiatives</td>
</tr>
<tr>
<td>Production-to-plan</td>
<td>Asset availability and performance at or above plan</td>
<td>Operation at bekido rate or better</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Digital Performance Management principles**

**What should you measure and how?**

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PG 3

PG 4

PG 7

PG 12

PG 14
Digital Performance Management drives the balanced scorecard

CURRENT

WRAP & EXTEND

DIGITAL TRANSFORMATION

L4/L5
Business systems (ERP, SCM, PLM)
Governance & planning

L3
Production execution (MES/MOM)

L2
Process monitoring (HMI-SCADA)

L1
Process sensing, manipulating (PLC)

HIGH IMPACT SOLUTIONS, AT SCALE

- Off-the-shelf solutions to accelerate deployments and scale across operations
- Speed to value by extracting data from systems you already have, deliver new insights and analytics
- Reduce costs by being standardized, but with a flexible foundation to tailor to operations

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PG 3
PG 7
PG 12
PG 14
Using a standardized scorecard for line-wide and enterprise-wide factory KPIs

- Map results of continuous improvement initiative(s) to scorecard categories, lines and work center productivities.
- Success is also demonstrated by movement of the bottleneck.
- Begin the Focus > Prioritize > Analyze > Improve cycle anew: Closed-loop problem solving.

Digital Performance Management (DPM)

- Confirm
- Focus
- Monitor
- Prioritize
- Improve
- Analyze

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PG 14