Overview of the Performance Measurement
Linkage Analysis And Starter Set

The following describes briefly what we mean by the terms, “Linkage Analysis and “Starter Set.”

The “Linkage Analysis”

Effective lean performance measures should link cell and value stream to corporate strategies and goals. The depiction of the linkages of strategies, objectives, goals and measures from Corporate/Plant to Value Stream top Cell is called a “Linkage Analysis.”

In developing the linkage analysis, goals for the value stream are based upon what is critical for the value stream to achieve the corporate strategies and for the cell what is critical to achieve value stream goals. Performance measures are established to calibrate the attainment of these goals and “critical success factors.” In this way the performance goals and measures are linked and “cascade” from strategy to cell. The same relationships apply between the value stream and cell. Because every company is different, each company should employ such a framework to design its unique set of performance measures to achieve its strategies and goal.

In general the roles of cell and value stream measures differ:

- **Cell Level** measures enable the cell team to get done during a shift what has to be done that shift.

- **Value Stream** measures calibrate weekly how well the value stream is doing in proceeding towards the performance targets designed into the future state map.

The “Starter Set”

We recognize that each manufacturing operation is unique. Nevertheless we have found that by using the Linkage Analysis methodology, there can be designed a set of performance measurements that conform to the needs of many, if not most, lean manufacturers. This set of measures we term the “Performance Measurement Starter Set.”-- a “strawman” set of measures that can be tailored by individual companies to meet their own unique characteristics.

The following exhibits depict the BMA, Inc. *Linkage Analysis* and related *Starter Set*. 
<table>
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<tr>
<th>Strategic Objective</th>
<th>Value Stream Critical Success Factors (CSFs)</th>
<th>Value Stream Goal</th>
<th>Value Stream Measure</th>
<th>Cell Critical Success Factors (CSFs)</th>
<th>Cell Goal</th>
<th>Cell Measure</th>
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<td>Specific corporate targets; specific time for achievement. Guide value stream direction.</td>
<td>What must be done well at the Value stream if the Strategic Goals are to be achieved</td>
<td>Specific targets for the value stream to achieve the value stream CSFs; specific time for achievement</td>
<td>Measures the attainment of specific value stream objectives/targets</td>
<td>What must be done well at the cell level if the value stream objectives are to be achieved</td>
<td>Specific targets for the cell to achieve the cell CSFs; specific time for achievement</td>
<td>Measures the attainment of specific cell objectives/targets</td>
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Measure the attainment of specific corporate objectives/targets.
Performance Measurement Linkage Analysis
Order Fulfillment Value Stream

Strategic Objective—12 mo

- Grow Sales 25%
- Grow Earnings 25%
- Increase Cash Flow 50%
- Improve Customer Value
- Improve Employee Satisfaction

Strategic Measure

- Sales growth
- EBITDA
- Sales per employee
- Inventory turns
- On-time delivery
- Customer satisfaction
- Employee turnover

Value Stream CSF

- Flow and Pull
- Customer value
- Perfection

Value Stream Goal—12 mo

- Increase through put 25%
- Increase inventory turns 50%
- Increase productivity 25%
- Reduce AR days to 30
- Reduce lead time 50%
- Reduce cycle time 25%

Value Stream Measure

- Sales per person
- On-time shipments to schedule
- First pass yield
- Average cost per unit
- Accounts receivable days outstanding
- OEE at the constraint cell

Cell CSF

- Eliminate obstacles to flow
- Use standard work
- Make products on time
- Visual pull/kanban system
- Quality at the source

Cell Goal—12 mo

- Reduce cycle time 25%
- Build to schedule
- Reduce batch size to 1
- Eliminate variability
- First pass yield

Cell Measure

- Day-by-hour report
- WIP-to-SWIP
- Overall equipment effectiveness
- # of improvement projects completed
- 5S Audit
- Cross training chart
- Safe work environment
- Safety cross

# of improvement projects completed

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**“Starter Set” of Performance Measurements for Lean Mfg.**

<table>
<thead>
<tr>
<th>STRATEGIC ISSUES</th>
<th>STRATEGIC MEASURES</th>
<th>VALUE STREAM MEASURES</th>
<th>CELL/ PROCESS MEASURES</th>
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<td>Sales Growth</td>
<td>Sales per Person</td>
<td>Day-by-the-Hour Production</td>
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<td>Increase sales &amp; market share</td>
<td>Cash from Operations</td>
<td>On-Time Delivery</td>
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<td>Continuous improvement culture</td>
<td>Inventory Days</td>
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<td></td>
<td>On-Time Delivery</td>
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<td>Customer satisfaction</td>
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