Module 3:
Implementation Simulation
Overview and Expected Outcomes – Module 2

**Overview**
- Simulation Structure
- Simulation Exercise

**Expected outcomes**
- Ability to balance short-term and long-term priorities in leading systems change
- Deeper understanding of interdependencies between social and technical systems
- Awareness of the impact of strategic choices – with scarce resources – on performance outcomes
Simulation Structure

- Automobile Assembly Plant
- Strategic Choices to be Made Each Quarter Over Three Years (12 rounds)
- Two Models
  - Current model in production
  - New model to be launched in Year 3
- Six Major Strategic Choice Categories With Many Options in Each
  - Product Development (10 options)
  - Manufacturing Operations – Quality (12 options)
  - Manufacturing Operations – Workforce (23 options)
  - Manufacturing Operations -- Support Functions (17 options)
  - Supply Chain (14 options)
  - Customer Order Fulfillment (7 options)
- Limited Resources
  - Can only select 25 options in first quarter (number of options available for selection will change with the market over the three years)
- Balanced Scorecard Outcomes
  - Quality, Safety, Cost, Schedule, Launch Performance
  - Initial focus on Quality – First Time Through (FTT) performance (maximum possible is 100% perfect FTT)
Primary Strategic Choice Categories

Product Development
PD1. Co-location of engineering design teams
PD2. Training in team-based operations for design teams
PD3. Machine tooling equipment strategy
PD4. Design for manufacture
PD5. Design for quality

Manufacturing Operations -- Quality
M1. Quality control "andon" system
M2. Quality inspection
M3. Quality training
M4. Quality dimensional control equipment

Manufacturing Operations -- Workforce
M5. Team implementation
M6. Team leaders
M7. Team training
M8. Team leader training
M9. Supervisor/superintendent training
M10. Union-management partnership

Manufacturing Operations -- Support Functions
M11. Preventative maintenance support teams
M12. Preventative maintenance procedures
M13. Material flow systems
M14. Information system support
M15. Continuous improvement "kaizen" system
M16. Targeted interventions

Supply Chain
S1. Supply chain value add
S2. Supplier location
S3. Supplier delivery flow
S4. E-commerce
S5. Information transparency

Customer Order Fulfillment
C1. Customer delivery
C2. Product variety -- new model
C3. Product variety -- current model
C4. Customer contact
# Product Development Strategic Choices

| PD1. Co-location of engineering design teams | PD1a=co-location of powertrain design teams for new model  
|                                           | PD1b=co-location of body/frame design teams for new model  
|                                           | PD1c=co-location of interior design teams for new model  
| PD2. Training in team-based operations for design teams | PD2a=training for all design teams in group process skills  
|                                           | PD2b=training for all design teams in "lean" principles  
| PD3. Machine tooling equipment strategy | PD3a=flexible/programable tooling for new model  
|                                           | PD3b=vendor training in use of flexible/programable tooling  
| PD4. Design for manufacture | PD4a=production workforce representation on design teams  
|                                           | PD4b=current model engineers assists production process improvements  
| PD5. Design for quality | PD5a=Design new product to incorporate in-station process control for quality  

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Manufacturing Quality Strategic Choices

M1. Quality control "andon" system
   - M1a = installation of "andon" red/yellow/green buttons on engine line
   - M1b = installation of "andon" red/yellow/green buttons on final/trim area

M2. Quality inspection
   - M2a = movement of inspectors from end of line to line-side support on engine line
   - M2b = movement of inspectors from end of line to line-side support in final/trim area
   - M2c = empowering operators to conduct in-station process control on engine line
   - M2d = empowering operators to conduct in-station process control on final/trim area

M3. Quality training
   - M3a = training for engine line in quality control principles
   - M3b = training for final/trim area in quality control principles
   - M3c = training for body shop in quality control principles
   - M3d = training for paint shop in quality control principles

M4. Quality dimensional control equipment
   - M4a = installation of dimensional control equipment in body shop
   - M4b = installation of dimensional control equipment in paint shop
Manufacturing Workforce Strategic Choices

M5. Team implementation
- M5a= restructuring engine line into teams
- M5b= restructuring body/weld shop into teams
- M5c= restructuring paint shop into teams
- M5d= restructuring final/trim area into teams

M6. Team leaders
- M6a= selection of team leaders for engine line
- M6b= selection of team leaders for body/weld shop
- M6c= selection of team leaders for paint shop
- M6d= selection of team leaders for final/trim area

M7. Team training
- M7a= team training for engine line
- M7b= team training for body/weld shop
- M7c= team training for paint shop
- M7d= team training for final/trim area

M8. Team leader training
- M8a= team leader training for engine line
- M8b= team leader training for body/weld shop
- M8c= team leader training for paint shop
- M8d= team leader training for final/trim area

M9. Supervisor/superintendent training
- M9a= supervisor/superintendent training for engine line
- M9b= supervisor/superintendent training for body/weld shop
- M9c= supervisor/superintendent training for paint shop
- M9d= supervisor/superintendent training for final/trim area
Manufacturing Support Function Strategic Choices

M10. Union-management partnership
- M10a=shared vision developed by union-management steering committee
- M10b=establishment of a joint plant implementation team

M11. Preventative maintenance support teams
- M11a=establishment of maintenance repair teams for engine line
- M11b=establishment of maintenance repair teams for body/weld shop
- M11c=establishment of maintenance repair teams for paint shop
- M11d=establishment of maintenance repair teams for final/trim area

M12. Preventative maintenance procedures
- M12a=plant-wide preventative maintenance schedule re-invigorated
- M12b=shift-to-shift maintenance hand-off intervention

M13. Material flow systems
- M13a=installation of material flow systems in engine line
- M13b=installation of material flow systems in final/trim area
- M13c=establishing of "kitting" operation for targeted supplier parts
- M13d=establishment of parts "marketplace" for targeted supplier parts
- M13e=appointing supplier contact people on all production teams

M14. Information system support
- M14a=implementation of information tracking system for quality feedback
- M14b=implementation of information tracking system for work group issues
- M14c=implementation of bar-code parts tracking system for material flow
Manufacturing Support Function Strategic Choices

M15. Continuous improvement "kaizen" system
   M15a=establishment of a continuous improvement suggestion system
   M15b=dedication of engineering resources to help implement suggestions
   M15c=dedication of maintenance resources to help implement suggestions

M16. Targeted interventions
   M16a=Targeted organizational development effort targeted at improving communication on performance measurables
   M16b=Targeted organizational development effort targeted at improving overall trust and respect in the organization
   M16c=Targeted organizational development effort targeted at improving the training support infrastructure
   M16d=Targeted organizational development effort targeted at improving the cost accounting infrastructure
   M16e=Team building efforts for the management leadership team
   M16f=Targeted efforts to prepare for executive visits
   M16g=Targeted efforts to benchmark other organizations
   M16h=Targeted efforts to prepare for benchmarking visits from other organizations
Supply Chain Strategic Choices

S1. Supply chain value add
   - S1a=Supplier agreement provide engineering design support for new model
   - S1b=Supplier assignment of contact people for production teams

S2. Supplier location
   - S2a=Location 1-3 suppliers in "supplier park" near plant
   - S2b=Location of 4-6 suppliers in "supplier park" near plant
   - S2c=Location of 7-9 suppliers in "supplier park" near plant

S3. Supplier delivery flow
   - S3a=Supplier agreement for more frequent deliveries in smaller batches
   - S3b=Supplier agreement for in-line vehicle sequencing of parts

S4. e-commerce
   - S4a=Agreement of 1-3 suppliers to use on-line pricing and logistics system
   - S4b=Agreement of 4-6 suppliers to use on-line pricing and logistics system
   - S4c=Agreement of 7-9 suppliers to use on-line pricing and logistics system

S5. Information transparency
   - S5a=Agreements with 1-3 suppliers on sharing process improvements gains
   - S5b=Agreements with 4-6 suppliers on sharing process improvements gains
   - S5c=Agreements with 7-9 suppliers on sharing process improvements gains
**Customer Order Fulfillment Strategic Choices**

C1. Customer delivery
- C1a=Improvements in road and railway logistics system
- C1b=Begin migration from forecast planning to "pull" system for orders

C2. Product variety -- new model
- C2a=Add 5 new options and features for new launch model
- C2b=Add 10 new options and features for new launch model

C3. Product variety -- current model
- C3a="Refresh" current model with 5 new options or features
- C3b="Refresh" current model with 10 new options or features

C4. Customer contact
- C4a=Establish system for customer contact phone calls from workforce