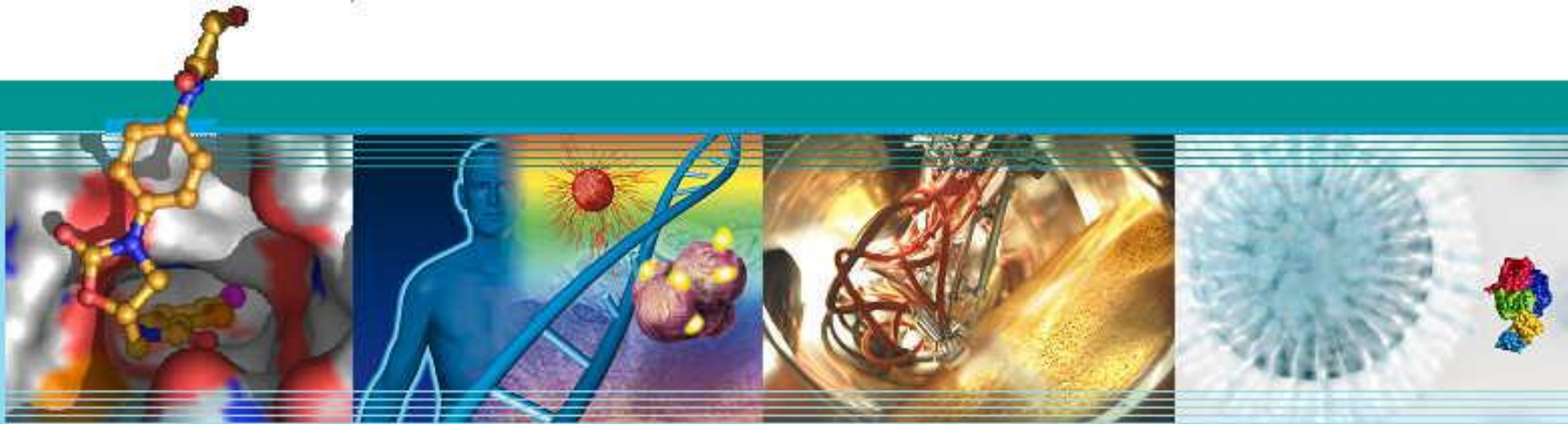




Bayer HealthCare



# Profiting from Lean Six Sigma in Biotech

Edgar Sur – Head of OE Bayer PSB / North America

- Operational Excellence (OE) Culture
- Case Study on Process Innovation, “Disposable Filter”



# Business Impact gained through OE

- Write-offs – 28% reduction
- Reserves – 73% reduction
- Deviations – 20% reduction
- Cycle time – 35% reduction

Note: Business complexity increased during this period:

- Customer base – 40% increase
- Sublots – 36% increase
- SKU – 56% increase



# What is OE?

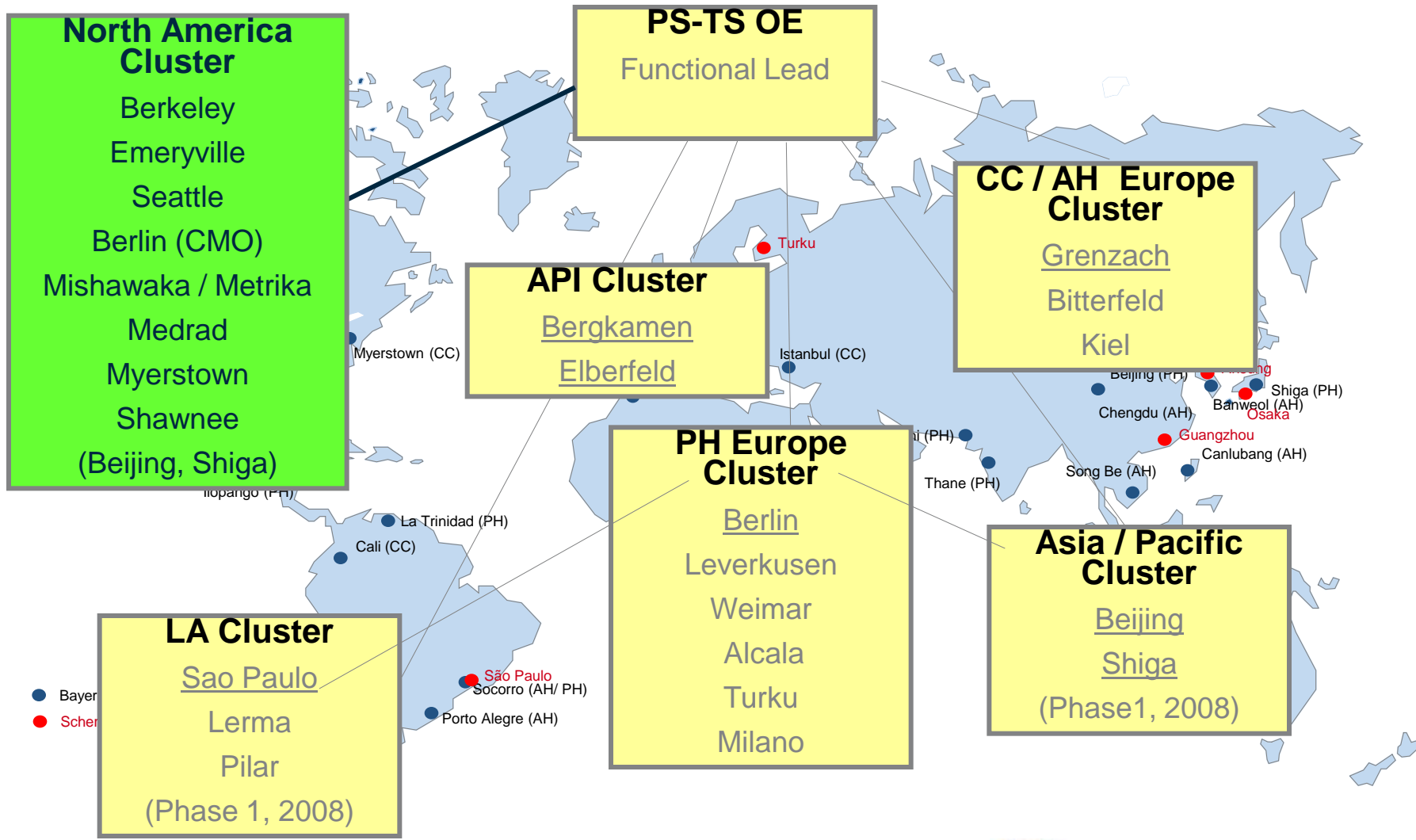
It is more than an initiative or set of tools:

- A *way of doing business...*
  - A philosophy of *always challenging the STATUS QUO...*
  - The next step in *achieving WORLD CLASS...*
- Operational Excellence helps PS to support *business growth and profitability*
  - **Change Leadership** is the largest single factor for success
  - **Empowered Employees** accelerate the change into a true OE culture

Product Supply Biotech



# OE is a Product Supply Initiative since 2006



Product Supply Biotech



Bayer HealthCare

# But for us....we have “lived” OE since 2004



**2004**  
**Berkeley**

- 5S Pilot launched

**2005**  
**Berkeley**

- Formalize process of 5S with monthly assessments
- 5S launched in 8 Areas
- Launched Lean Training Program
- OE expertise hired

**2006**  
**Berkeley**  
**Rosia**

- 5S level of 97% sustain.
- 1<sup>st</sup> OE Fair
- Launched OE Fundamentals Training
- Launched Wave 1 and 2 of Lean Six Sigma (LSS) Black Belt (BB) and Green Belt (GB) training
- Start of PS OE WW

**2007**  
**Berkely**  
**Rosia**  
**Emv**  
**Seattle**  
**Berlin**

- Implemented Kanban systems in 7 production areas
- 2<sup>nd</sup> OE Fair
- 1<sup>st</sup> OE Storyboard Competition
- W3 and W4 of LSS GB training
  - Myerstown + Mishiwaka participating

**2008**  
**Berkely**  
**Rosia**  
**Emv**  
**Seattle**  
**Berlin**  
**Beijing**  
**Shiga**  
**BMS**

- 3<sup>rd</sup> OE Fair
- 2<sup>nd</sup> OE Storyboard Competition
- W5 and W6 of LSS Green Belt training
  - Myerstown + Mishiwaka + Beijing + Shawnee + BTS, BMS participating
- W7 of LSS GB training in Myerstown with BMS and BTS
- 2<sup>nd</sup> place in IQPC

**2009**  
**NA Cluster:**  
**PSB Supply Centers**  
**Beijing**  
**Shiga**  
**Medrad**  
**Mishiwaka**  
**Myerstown**  
**Shawnee**  
**BMS**

- 4<sup>th</sup> OE Fair
- 3<sup>rd</sup> OE St. Board Competition
- 3 Waves of LSS GB training
- 1 Wave of LSS GB training (Asia)
- Launch Lean Master Program
- Bayer CCT Platform OE - exchange: BMS, BCS and BTS
- Benchmark within the Industry

**Only Bayer site that delivers Internal Lean Six Sigma Green Belt and Black Belt Training**

# Cultural Change Starts at the Top

**Investment  
in  
Employee  
Training  
was one of  
the key to  
Success!!!**



Top Management in OE Fundamentals Training

## **Current Status:**

4 Master Black Belts  
7 Black Belts  
41 active Green Belts  
98+ trained (GB/BB)

**PSB OE delivers  
internal LSS training  
for Champion/BB /  
GB/YB including:**

BMS, BTS,  
Shawnee (AH),  
Myerstown (CC),  
Mishiwaka (DC),  
and Beijing (PH)

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# Showing what's Important

4 OE Fairs (2006, 2007, 2008, 2009) and Reward and Recognition Events



# Summary

**Operational Excellence** is successfully integrated into PS-Biotech and North America:

- Leadership commitment is visible, setting directions and priorities
- Employee involvement is given through:
  - Training, Kaizen Events, Workouts, OE fair, Best Practice Sharing, Storyboard competition.....
- Other Sites leverage our Lean Six Sigma Black Belt / Green Belt Training and view us as a benchmark
- Business Growth and Profitability by results supported

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Back Up Slides



# Fermentation

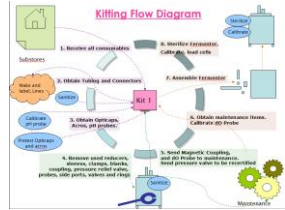
## Process improvement

- Avg. Fermenter Turnaround was reduced by 50%

### Benefits:

- Idle time reduced by 60%
- Increased productivity by 10%
- Increased capacity of KGFS to support KGF transition plan

### Examples of Visuals



Area Owner(s) Turnaround Check List Fermenter K01

Area	Item	Frequency	Responsible	Status
Substrates	Substrate 1	100% available	Assistant Operator	Met
	Substrate 2	100% available	Assistant Operator	Met
	Substrate 3	100% available	Assistant Operator	Met
	Substrate 4	100% available	Assistant Operator	Met
	Substrate 5	100% available	Assistant Operator	Met
	Substrate 6	100% available	Assistant Operator	Met
	Substrate 7	100% available	Assistant Operator	Met
	Substrate 8	100% available	Assistant Operator	Met
	Substrate 9	100% available	Assistant Operator	Met
	Substrate 10	100% available	Assistant Operator	Met

Fermenter Turnaround May 2007

## 1. Visual Tracking / Accountability

A visual tracking tool has been established to track huddles and shift hand-offs – tool will have responsibility assigned for each major task of a turnaround and

Prep	Day 1	Day 2	Day 3	Day 4	Day 5
Preparation of media	Preparation of media	Preparation of media	Preparation of media	Preparation of media	Preparation of media
Preparation of seed	Preparation of seed	Preparation of seed	Preparation of seed	Preparation of seed	Preparation of seed
Preparation of inoculum	Preparation of inoculum	Preparation of inoculum	Preparation of inoculum	Preparation of inoculum	Preparation of inoculum
Preparation of fermenter	Preparation of fermenter	Preparation of fermenter	Preparation of fermenter	Preparation of fermenter	Preparation of fermenter

Fermenter Turnaround May 2007

## 2. Communication Plan

Operating mechanisms have been established to drive communication before turnarounds, during and after turnarounds

**Operating Mechanisms**

MEETING	PURPOSE	WHO	COMMENTS
Pre Turnaround CAB Meeting - Weekly	To discuss cell availability with Scale-up	Scale-up manager, Fermentation Director and Manager	Already exist 8:15 am daily
8:30 am Daily			
Pre Turnaround Meeting - Two Weekly - Led by Fermentation Manager	Ensure that we fully grasp all maintenance activities are scheduled and responsibilities are defined, update an activity log on maintenance that will be performed or planned or due to quality concerns	Key Floor operators, Supervisors, Manager, Director, Maintenance, Scale-up, Engineering, Operations, Scale-up of maintenance and general worker, operations should be involved	Start putting tool in place, review all material and plan and progress maintenance work to be scheduled on a daily basis. Start a pre-turnaround communication log on maintenance
When			Where
Operating Huddle Meeting - Daily	Cross Functional communication - core responsibilities for each day - review program of past day - highlight challenges and maintenance	Key Floor operators, Supervisors, Manager, Director, Maintenance, Scale-up, Engineering, Operations	To be held in designated area, room. To be used with hand tools and a controlled area for all communication
Shift Meeting - Daily	Review all activities - hand-off of maintenance - update program - communicate changes to support groups	Key Floor operators, Supervisors	Review production area - review all activities - review and plan day based on activity huddle findings
Shift hand-off - Daily			
Who			
Who-up review - Daily	Share in huddle to read, what was not completed, what still to be improved, how data reflects to improve performance. Quantified by time, equipment up or down, materials, plus to calculate cost/oz	Key Floor operators, Fermentation Manager, Scale-up, Engineering, Operations, Scale-up of maintenance	To be held in war room - review and plan day based on activity huddle findings

Fermenter Turnaround May 2007

## 3. SMART Goals

Clear goals and objectives have been established to communicate to the operators prior to each turnaround helping establish direction and a

## 4. Rewards

Team has established a rewards and recognition plan to reward good behavior and help make successful turnarounds a habit

### Rewards and Recognition

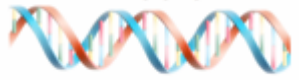
- Target Achieved
- Pizza Party
  - \$100 On-the-Spots or gift cards, raffle prizes for nominees (ex. VIP parking, day off, IPODS, etc.)
- Stretch Goals
- Pyramid Party or Bowling
  - Marine world / Magic Mountain - Family event
  - Rec Tickets - non-taxed
  - Raffle Prizes for nominees

Fermenter Turnaround May 2007

SMART Goals and Objectives

- 0 days - fermenter termination to of fermenter
- No Type 2 error after sterilization
- Complete turnaround related 10 JSBOs,
- 0 days - fermenter termination to of fermenter
- No Type 2 errors
- SBO, 3 SEE Cards

Fermenter Turnaround May 2007



Safety: Unsteady Position (1)

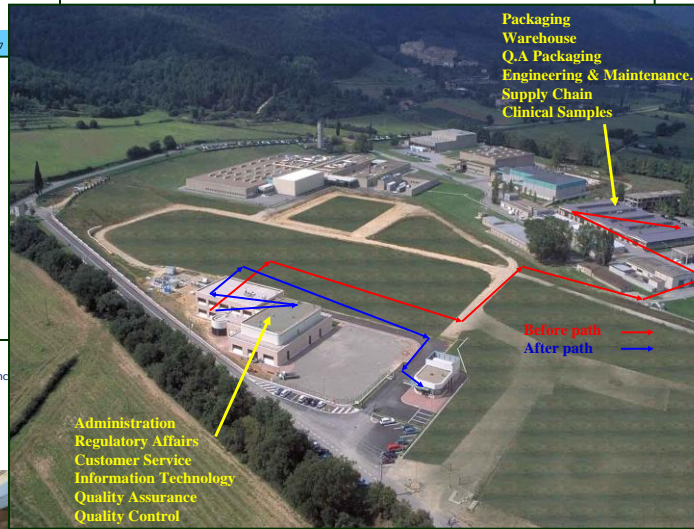
Maintenance Area

Vertical saw  
Unsteady

It is secured on the floor

Product Supply Biotech    Organizational Update    Bayer HealthCare    11/7/2007

# 5S Initiative in Rosia led to OHSAS Certification



Safety – Extinguisher out of position

Maintenance Area

Previous situation

Current situation

The area is outlined and the extinguisher is correctly signaled.

Product Supply Biotech    Organizational Update    Bayer HealthCare    11/7/2007    38

Sort, Sweep and Safety - Storage Room

Maintenance Area

Previous situation

Current situation

The filters were stored without organization. Some boxes were also on the floor.

The area has been cleaned and re-organized

Product Supply Biotech    Organizational Update    Bayer HealthCare    11/7/2007    40

Simplify - Spare Parts

Maintenance Area

Previous situation

Current situation

The spare parts are organized and labelled.

Product Supply Biotech    Organizational Update    Bayer HealthCare    11/7/2007    39

# “Increase of Efficiency in Production “

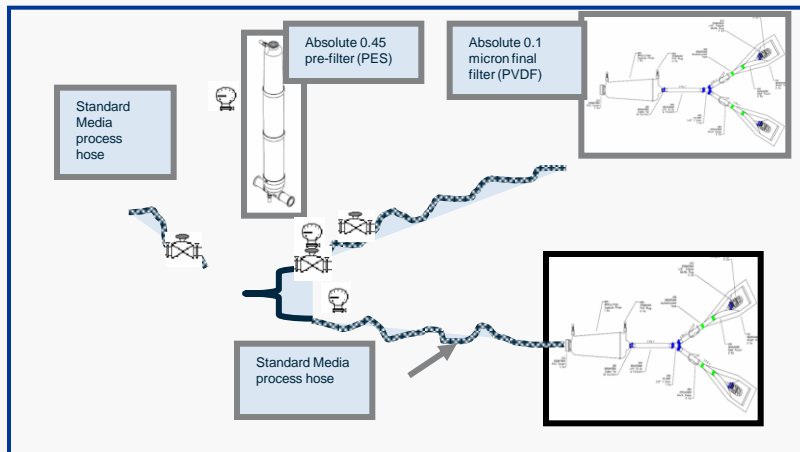
## Example from Fermentation

### Process improvement

- Moved from a 0.2 micron to a 0.1 micron for added mycoplasma safety
- Sterilization cycles cut 3 hrs → 0 hrs
- Clean-up and prep cut 2.5 hrs → 20 min
- Eliminated safety risk of large stainless steel housings

#### Benefits:

- ~ \$1,113,921 annually in savings



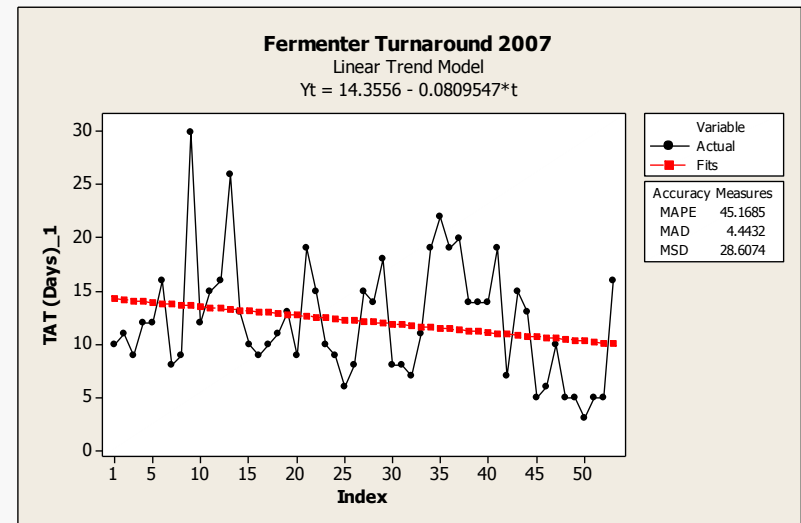
## Example from Fermentation

### Process improvement

- Avg. Fermenter Turnaround was reduced 13.2 days → 6.3 days/fermenter

#### Benefits:

- Idle time reduced by 60%
- Increased productivity by 10%
- Increased capacity of KGFS to support KGPF transition plan



# “Increase of Efficiency in Production “

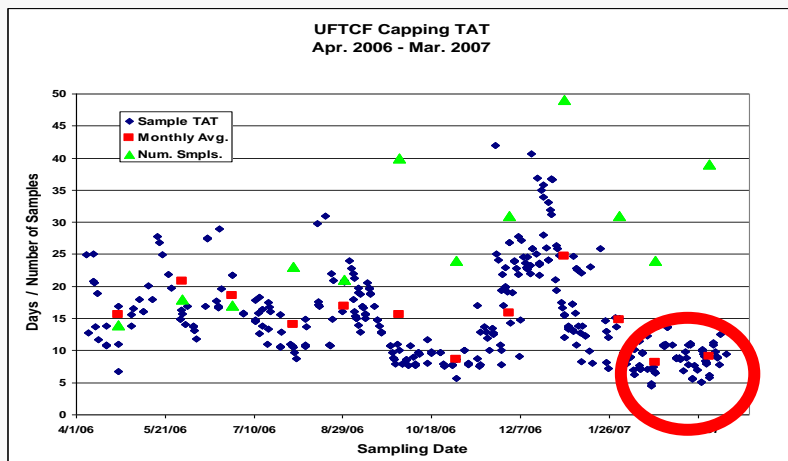
## Example from QC Labs

### Process improvement

- A Kaizen improved the TAT of Capping Assay
- Reduced TAT from Median of 15.3 Days to 3.5 Days (Current Performance ~9 Days)
- Reduced sample volume (~30L of UFTCF annually)

#### Benefits:

- Cost avoidance: ~ \$2.5 million less exposed material



## Example from QC Labs

### Process improvement

- Reduced/Eliminated select QC Testing Benefits:

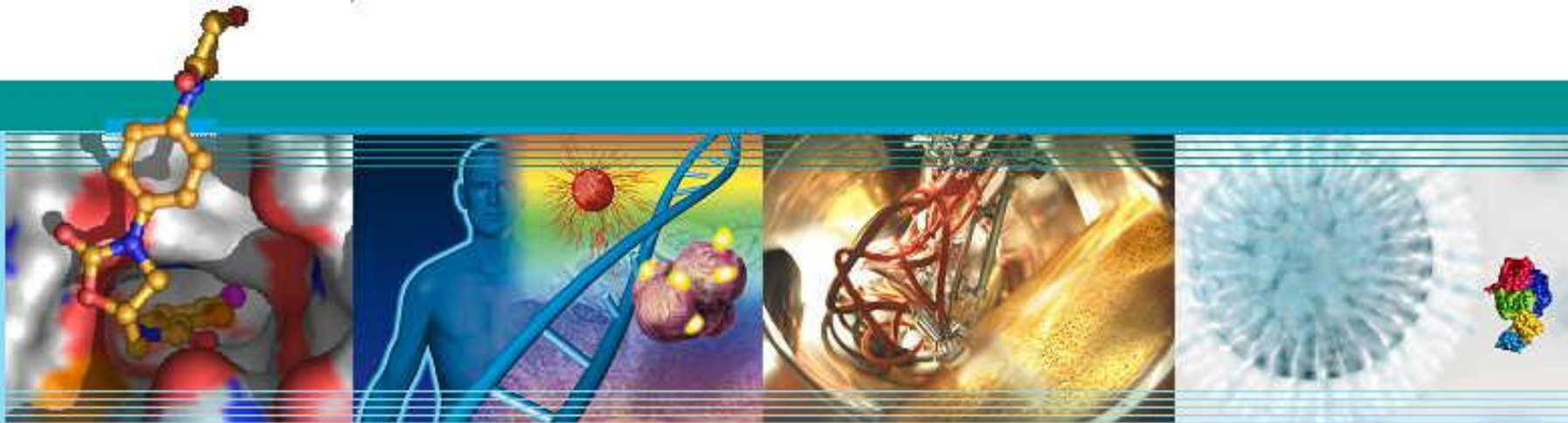
#### Annual Results:

- Fermentation Solutions (1500 samples)
- Vimentin Direct/Harvest (1800 samples)
- Picogreen (1100 samples)
- HPPS Post-pasteurization Micro sample (Eliminated)
- Benefits: ~ \$300,000





Bayer HealthCare



## A Disposable Filter Case Study

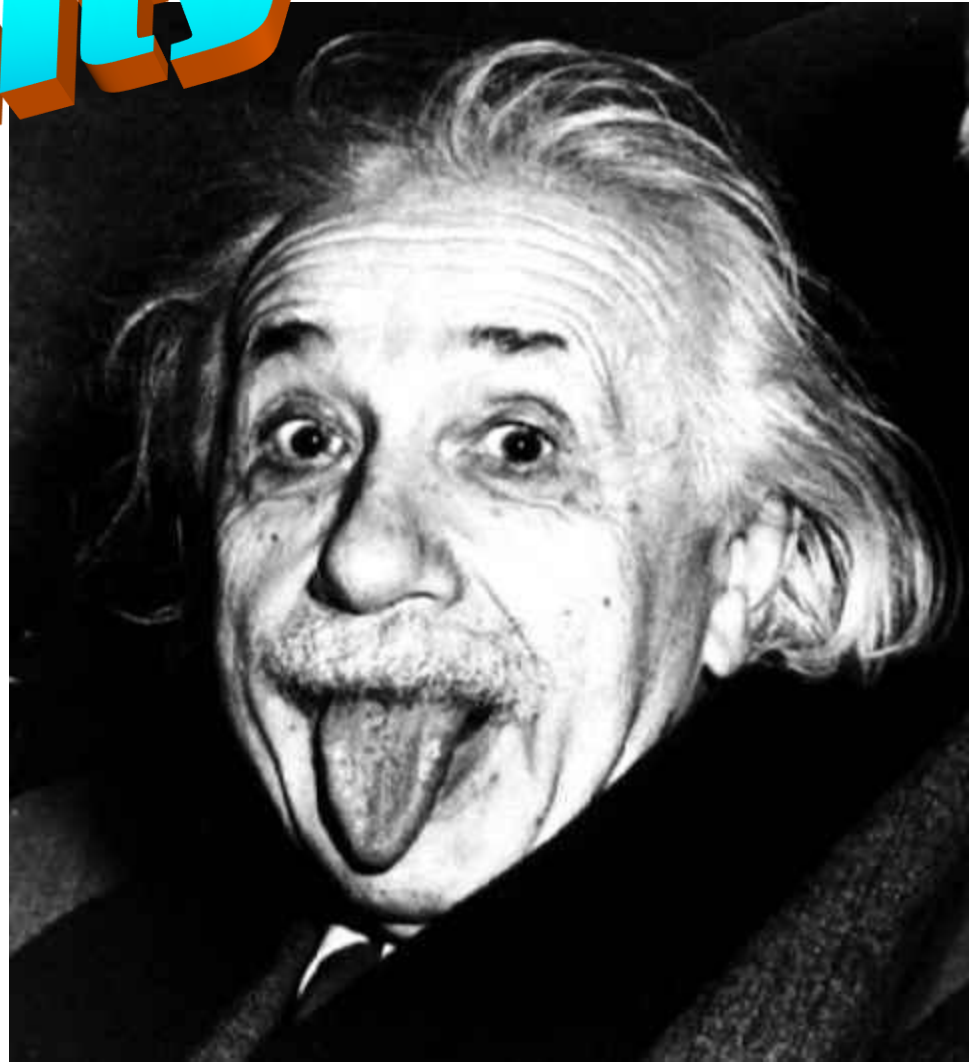
Jennifer Maynard – Head of OE SC Berkeley

# Insanity

Doing the same thing over and over again and expecting different results.

Albert *Einstein*

Innovation in its simplest form is thinking and doing things differently (opposite of insanity)



Product Supply Biotech



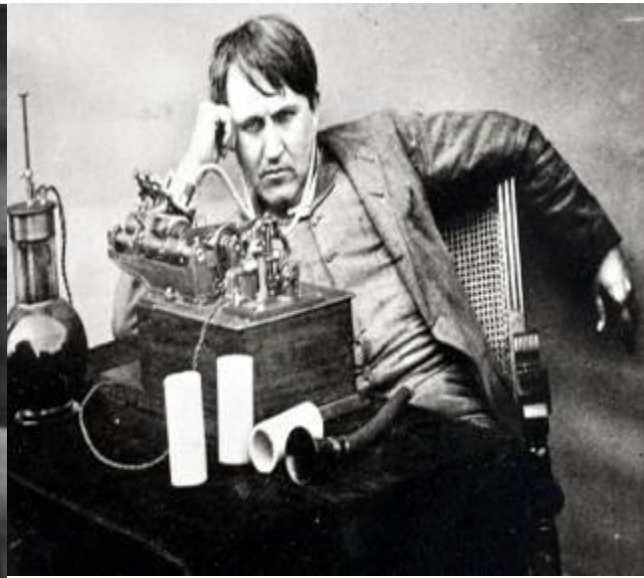
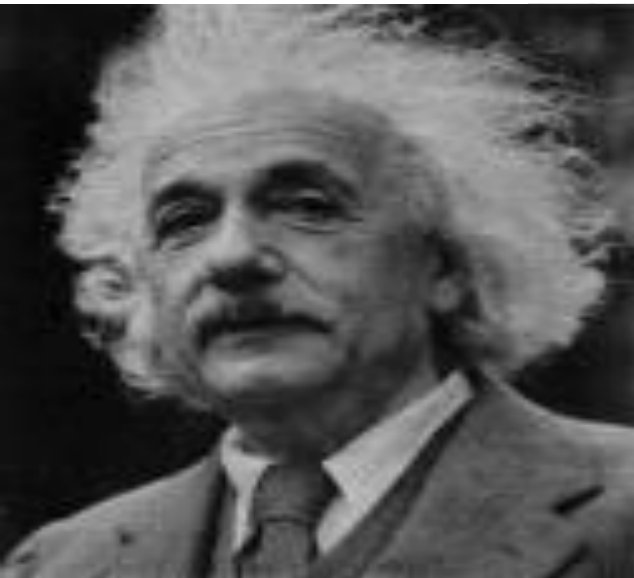
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# Same wheels turning or Re-inventing

Einstein Innovation  
<1%  
Pure Genius  
Resources – High  
Adaptive Challenge  
Development  
Scientists, R&D  
Product Innovation

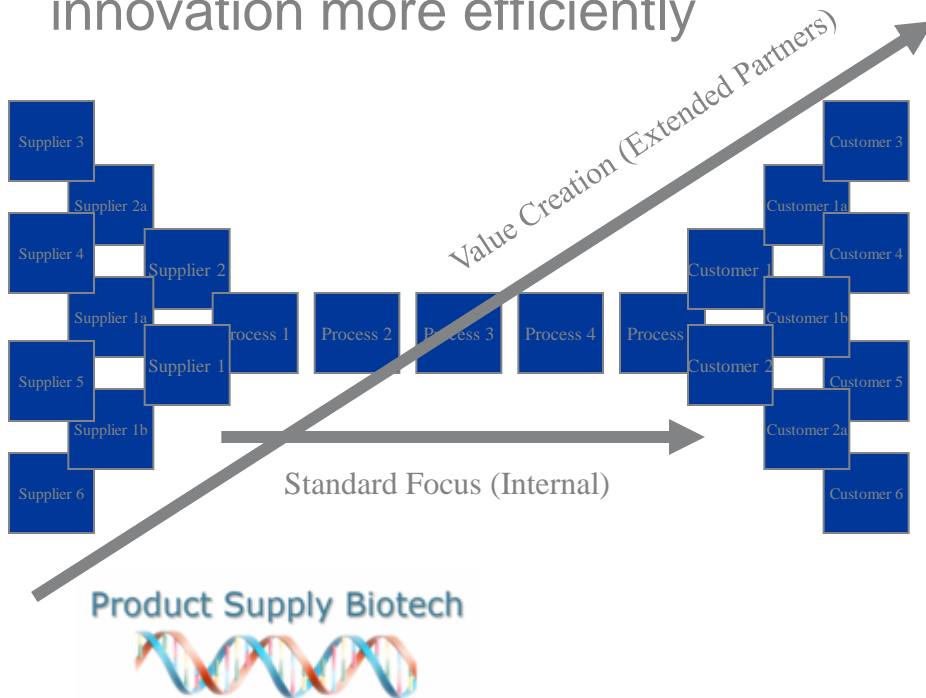
Edison Innovation  
>30%  
Systematic  
Resources – Medium  
Technical Problem  
Six Sigma  
GB BB MBB Projects  
Process Innovation

Everyone Innovation  
>70%  
Collaborative  
Resources – Low  
Technical Solutions  
Lean Workouts/Kaizens  
Process Innovation



# Value Networking & Forms of Innovation

- Value Networking is all about extending our network beyond our current perceived boundaries
- By doing so we immediately increase our knowledge base, are able to leverage critical resources, and as a result can achieve innovation more efficiently



- Product Improvements and New Products
- Service Improvements and Breakthroughs
- Technology Improvements and New Core Technologies
- Forecasting Improvements
- Productivity Improvements
- Quality Improvements
- Speed / CT Improvements, including Faster Adaptation
- Effective Use of Information
- New Services Delivery Capacity
- Integration of Solutions & Systems
- New Delivery Mechanisms
- Technology Breakthroughs

# Points to Consider

1. In our Fast Moving Global Industry, **Knowledge and Innovation** are the most sustainable competitive advantage
2. We must drive innovative ways of reducing costs of existing products to feed our pipelines – focusing on process innovation

**You Cannot just Cost-Cut your way to Prosperity – Learn from other industry's mistakes**

3. Most organizations emphasize innovation as their top priority but they rarely have a roadmap to act on it
4. Innovation from Suppliers is typically the *least costly, least risky,* and often the fastest to implement
5. Most Initiatives driving innovation in our organizations are central focused and leave a large gap to the potential benefits

**Vision without Execution is Hallucination**

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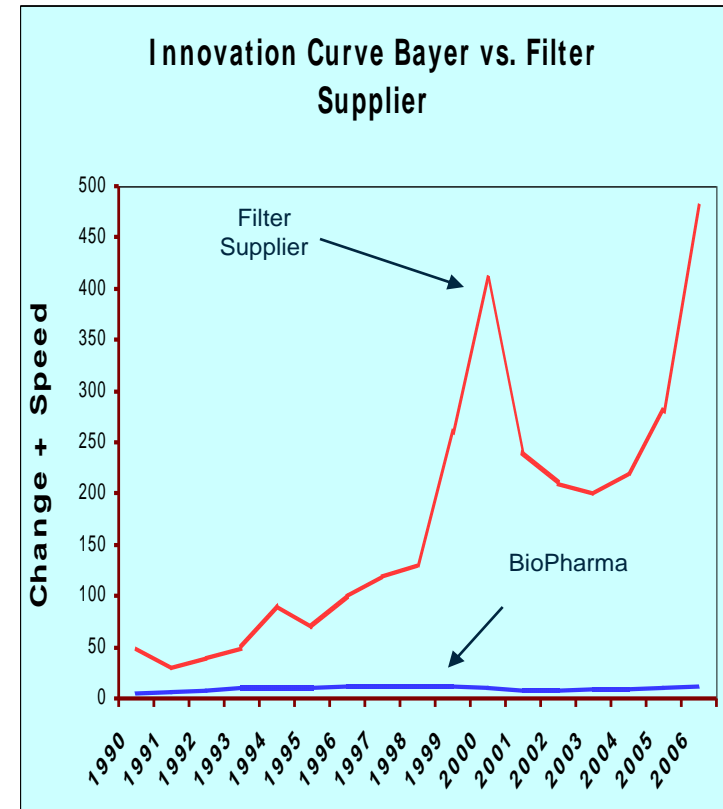
Bayer HealthCare

# Project Why?

Most Biopharma and Biotech organizations have existing product lines that are mature in their pipelines. For these products we need to focus efforts on process innovation to streamline and reduce total cost for our current manufacturing. Filter Supplier Innovation can be leveraged to drive this type of process innovation because:

- We often have limited internal resources who could focus on other areas of improvement
- Filtration is not our core competency
- Suppliers are driving innovation in the service area such as validation support and delivery/replenishment systems which most organizations have minimally leveraged

Product Supply Biotech



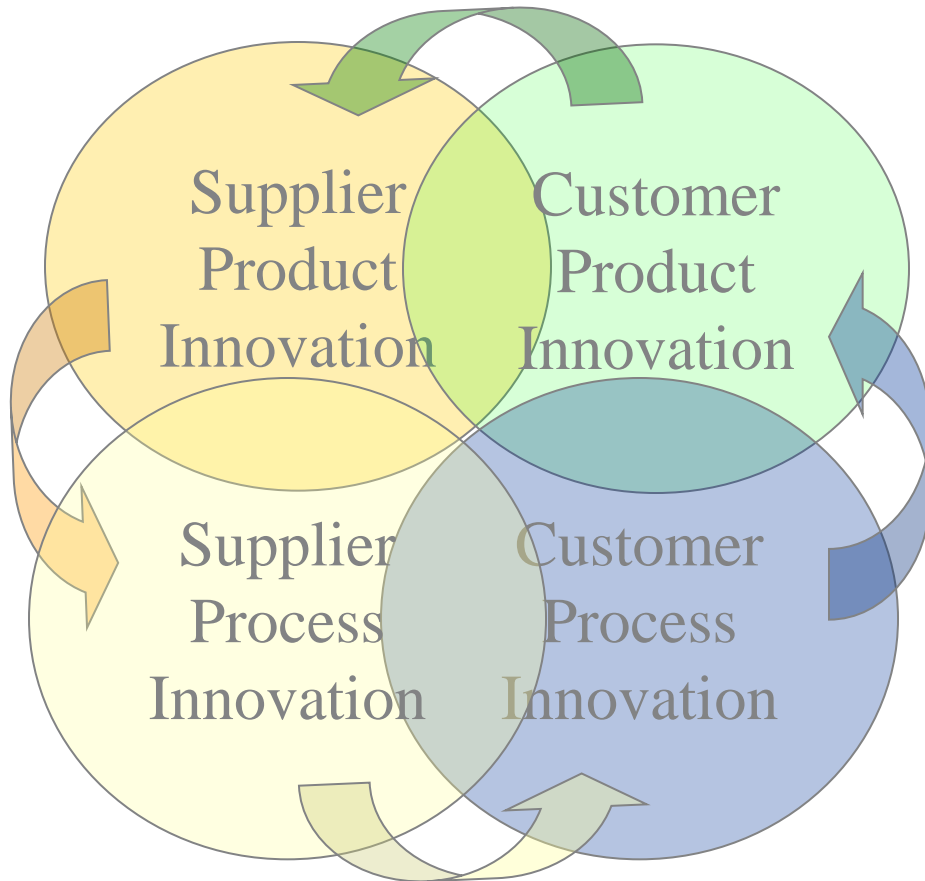
# And

- Filters are a high cost component which can be reduced significantly by bringing in new technology (i.e. reduced filter sizes, combination filters, replacement of columns, etc)
- It allows us to make non-biased decisions with all strategic filter suppliers side by side – looking at Total Cost of Ownership (TCO) rather than unit costs
- Filter suppliers innovation is increasing at an exponential rate (1.5 new products/week) – in order to keep up with the technology and get the most out of our suppliers we need to challenge them and work as a team to drive innovation in our systems
- It builds better working relationships with our suppliers
- It allows us to have an overall site-wide filter strategy which can be aligned with global strategy for filter negotiations

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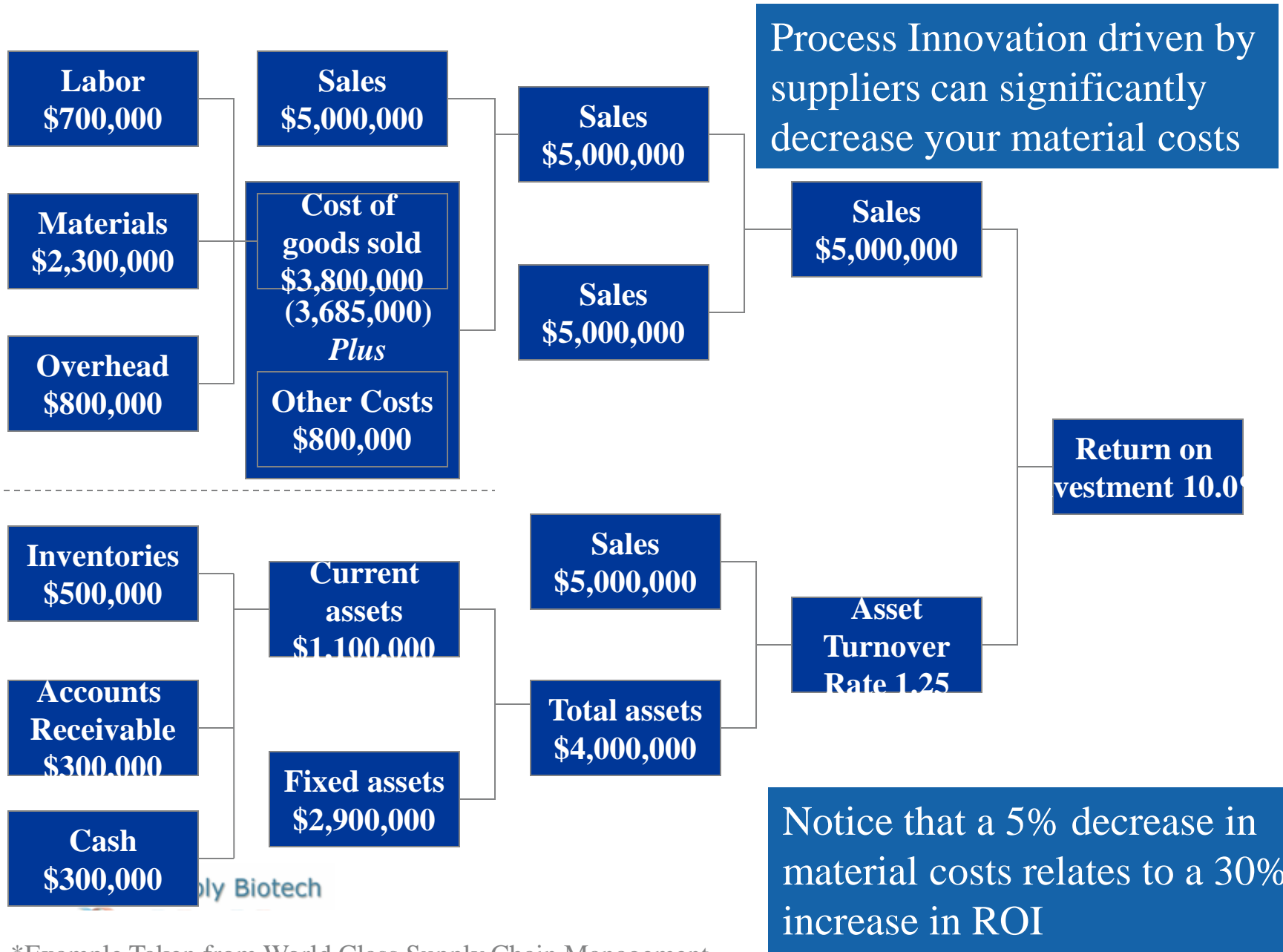


# Making the Link



- Leveraging Supplier Innovation gets the ball rolling
- This helps provide process innovation for the customer's products
- The process innovation drive total cost down which increase revenues
- The increased revenues are used to feed the product pipeline or customer product innovation
- This process is like a closed circuit – if the loop is broken the current stops





\*Example Taken from World Class Supply Chain Management

# Process Innovation - TCO

Process Innovation drives down total cost which can dramatically impact bottom line

- Better Process Design
- Acquisition Cost
- Processing Cost
- Better Asset Utilization
- Quality Cost
- Downtime Cost
- Risk Cost
- Cycle Time Cost
- Conversion Cost
- Non-Value Added Cost
- Supply Chain Cost
- Post Ownership Cost
- Transaction Cost
- Inventory Carrying Cost

## TCO Savings Examples

Savings of Media Filter Application			
		Before Optimization non-disposable	After Optimization disposable
<b>Filter Element Cost</b>			
	Quantity	5 x 20"	1 x 30"
	Pre	\$275	\$850
	Quantity	4 x 20"	2 x 10"
	Final	\$350	\$550
	Total	\$2,775	\$1,950
<b>Operations Hours</b>			
	prep lines	90 min	5 min
	cleaning	150 min	10 min
	sanitization	510 min	0 min
	teardown	45 min	5 min
	Total	\$775	\$25
<b>Processing Time</b>			
	Total	~4 hrs	<2 hrs
		\$3,550	\$1,975

<b>Transactional Costs</b>				2,500	\$691,250
<b>Supplier Audits</b> based on 2 auditors and 2 sites/supplier					
Audit Labor:	\$85/hr	x 20 hrs	\$1700/site	\$6,800	\$27,000
Prep/Follow-up	\$85/hr	x 20 hrs	\$1700/site	\$6,800	
Travel:	\$2250/site			\$9,000	
Room/Board	\$1000/site			\$4,000	3,500
					2,500
					6,000
<b>Procurement</b>					
Business Meetings	\$85/hr	x 5hrs/month x 3	\$15,300	8,500	\$691,250
				7,250	
<b>Purchase Orders</b>					
	5hrs/order	\$85/hr	\$450/trans	\$5,400	
<b>Shipping / Handling</b>					
	\$500/order			\$6,000	
<b>SAP p/n Maintenance</b>					
	2 hrs/part	10 parts	\$85/hr	\$20,400	
<b>Total annually</b>				\$73,700	

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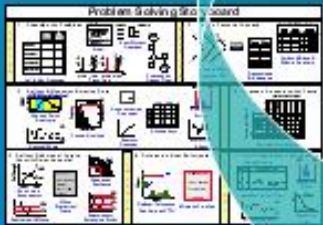
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**5. Share Best Practices and Restart process**

**4b. Validation and Execution**



**4a. Optimize processes**



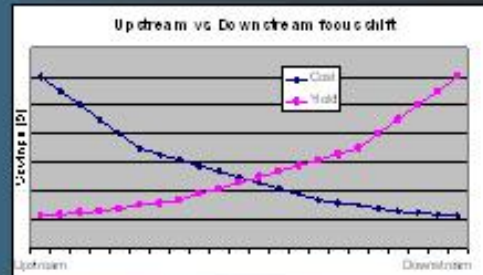
**3c. Draft Site Plan (CP, VMP and Strategic Procurement Plan)**



**1a. Select Product Line and Cross Functional Team**



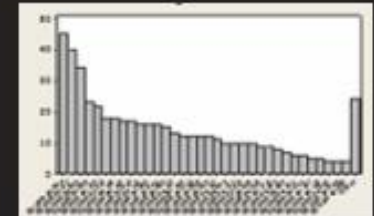
**Savings and Improved Performance realized**



**3b. Analyze Results**



**1b. Select Critical Raw Materials to Focus On**

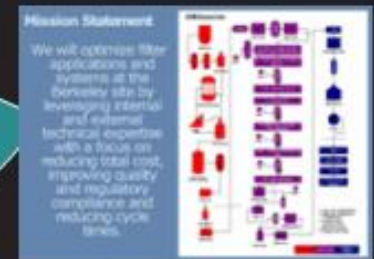


**2a. Select and Contact Strategic Suppliers to perform assessment**

**2b. Perform assessments**



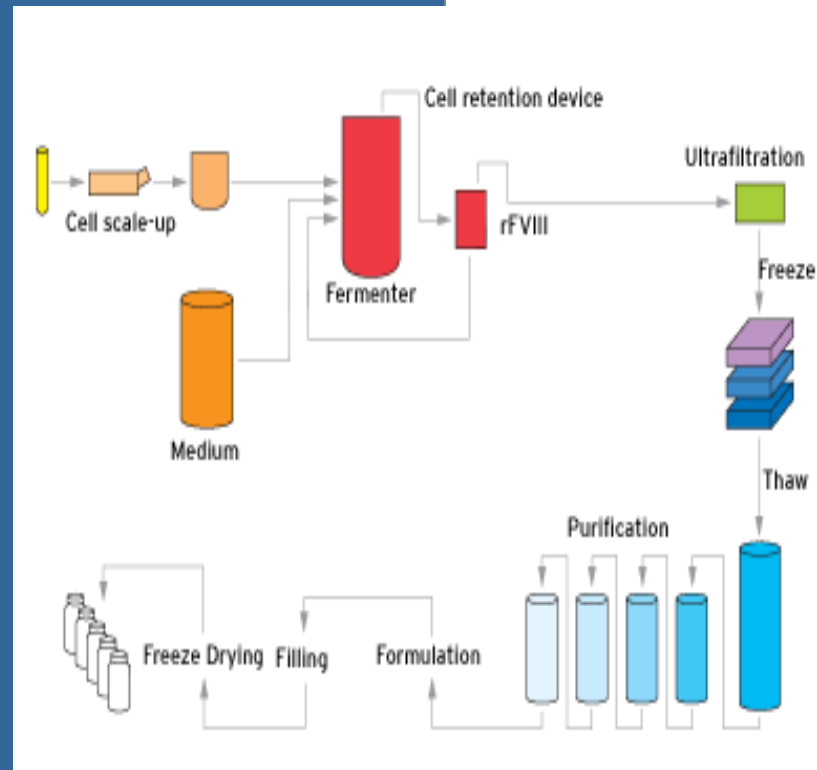
**3a. Present Results**



# Filtration Case Study:

## Team Mission:

We will optimize filter applications and systems at the Berkeley site by leveraging internal and external technical expertise with a focus on reducing total cost, improving quality and regulatory compliance and reducing cycle times.



# Define – Business Case/Objectives

## 1. Reduces Cost

- Proven results of 50% for applications that have not been significantly changed in last two years

## 2. Drives Process Innovation

- Reduce adsorption of critical inputs
- Increase yield of critical outputs
- Improve safety
- Reduce space
- Improve cycle time



RESEARCH  
SOLUTIONS

# Define – Business Case/Objectives

## 3. Leverage Resources and Expertise

- Suppliers are the experts of their products
- Suppliers can provide a different perspective and outside eye
- Suppliers have validation expertise – one of the limited resources for most projects – leveraging their resources can improve project cycle times
- Many validation services are already part of total service package price

## 4. Second Sourcing

- When we are single sourced not only do we incur risk but we lose negotiation leverage



# Measure - Filtration Assessment/Selection

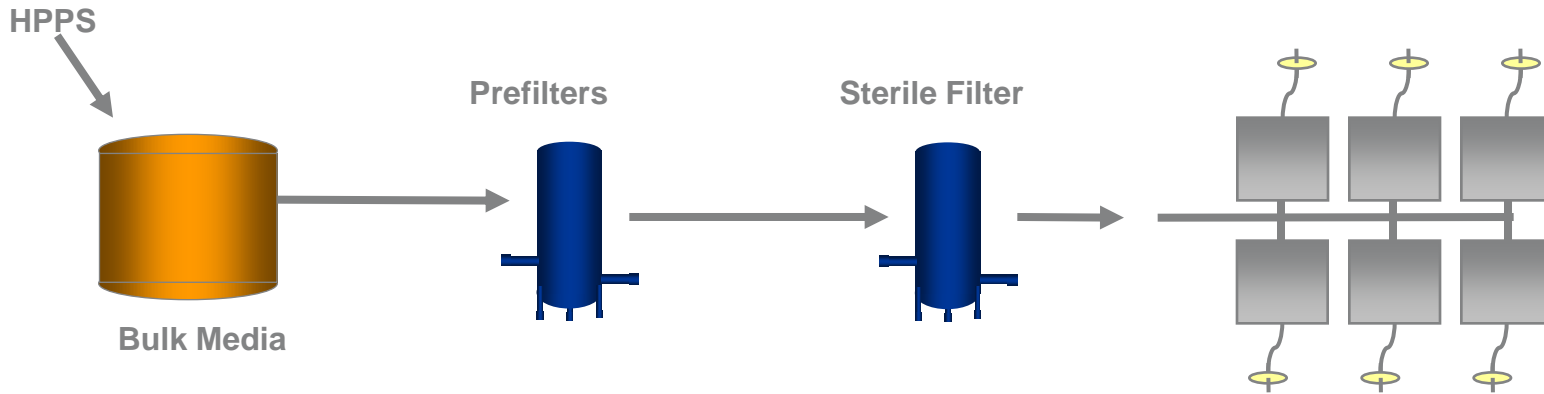
- Full Kogenate site assessment performed Assessment presentations to Leadership team and key stakeholders
- Included TCO analysis of each filtration step:
  - Current filter and cost
  - Proposal from each supplier and BTS where available
  - Tier 1, 2 and 3 savings / costs
  - Regulatory requirements
  - Validation requirements
  - Timeline
  - Support/resources required
- Additional Projects/savings
- Further recommendations / next steps
  - Tubing assessments
  - Further – in-depth filter assessments
  - Assessment – Early supplier involvement in protein free process
  - Inventory Replenishment systems
  - Validation support

Matrix Example

Filtration Assessment Matrix																	
Step	Filter Type	Current Supplier	Current Cost	Current Flow	Current Life	Current Filter			Proposed Filter		Regulatory	Validation	Timeline	Support/Resources	Additional Projects/Savings	Further Recommendations/Next Steps	
						Material	Performance	Cost	Material	Performance							Cost
1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

RELEASE

# Measure - Media Process



Bulk Media  
Prefilter

Bulk Media Final  
Filter

Current  
Process

4 x 20:

2 x 20:

0.2 micron pore size

New  
Process

1 x 30:

2 x 10: assembly

0.1 micron pore size

- **Significantly tighter pore size**
- **8 log mycoplasma reduction rating**
- **50% reduction in square footage**
- **Fully Disposable System**
- **\$1.1M hard savings**

**Media**



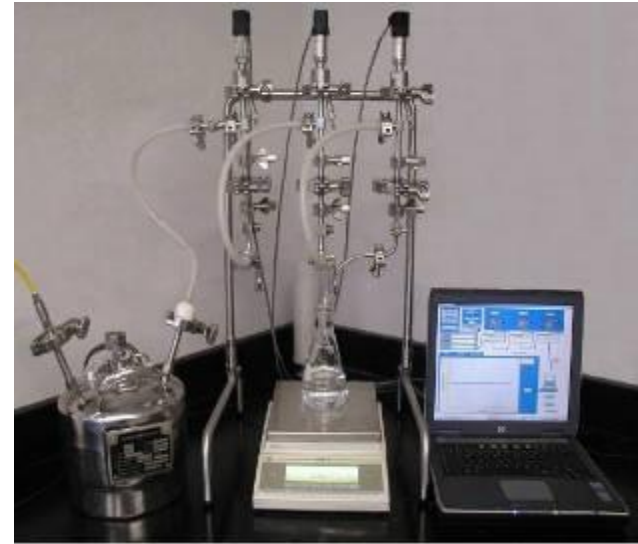
Bayer HealthCare

REPLACEMENT

# Analyze - Filterability Trails

## Media Filterability trials

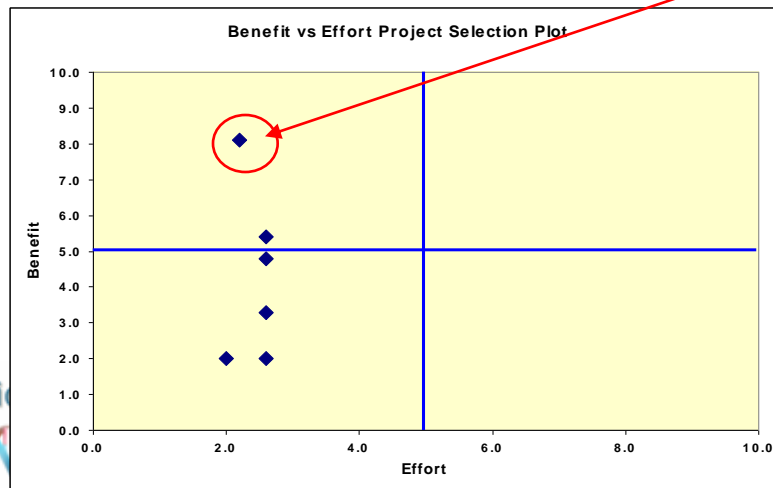
- Two suppliers selected per project
- Min five membrane types tested
- 100 different trains/configurations were tested in five areas
- Small disc and medium capsule trials were conducted



- Both suppliers recommended similar trains confirming their original recommendations in all areas
- Both suppliers had similar results and both showed a >50% reduction could be achieved in most areas
- Minimal in-house validation was required due to disposable system
- Minimal regulatory impact (annual reportable) therefore no hold of product or waiting for approval to implement
- Team could implement and realize savings this year with full support

# Analyze - Decision Matrix

			Benefit						Effort					
I.D No.	Level of Importance →	Project Type	Supplier	Tier 1 savings	Tier 2 savings	Tier 3 savings	Customer Service	Quality / Safety	Total Benefits	Regulatory Impact on project	Validation Impact on project	Risk to Business	Realized Savings	Total Efforts
	Identified Goals ↓			0.25	0.10	0.10	0.10	0.45	1.00	0.20	0.30	0.20	0.30	1.00
1	Same Filter Media - Reduced Surface Area	Media	X	1	3	1	9	3	2	1	3	3	1	2
2	Different Filter Media Type and Reduced Surface Area	Media	XY	1	3	1	3	3	2	1	3	3	3	2.6
3	Different Filter Media Type and Reduced Surface Area - Keep separate but move pre-filter to capsule	Media	X	3	3	9	9	3	3.3	1	3	3	3	2.6
4	Combined Pre and Post Use Filter - Eliminate Pre-Filter	Media	Y	9	9	3	3	3	4.8	1	3	3	3	2.6
5	Combined Pre and Post Use Filter in Capsule	Media	Y	9	9	9	3	3	5.4	1	3	3	3	2.6
6	Combined pre and post use and 0.1-micron final filter to improve safety	Media	Y	9	9	9	3	9	8.1	1	3	1	3	2.2



Narrowing Down the focus and experiments



# Improve - Results

## Media Filters

- 0.2 micron to a 0.1 micron
- Sterilization cycles 3 hrs – removed
- Clean-up currently 2.5 hrs – cut to 20 min
- Safety risk stainless steel housings – removed
- Reduced square footage and haz waste >50%
- Material Savings ~\$1,000K annually

## HPPS Filters

- Moved entire train disposable
- Eliminated 3.5 hrs prep and cleaning time
- Reduced square footage and haz waste by >45%
- Safety risk SS and HWFI – removed
- Material Savings ~\$250K

## Vent Filters

- Reduced column tanks vent change out frequency from each run to every 6 months.
- Reduced usage and haz waste by >75%
- Reduced setup, clean-up time 1344hrs
- Material Savings ~\$150K annually



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# Control - Sustainability

- Berkeley Site:
  - New Media, HPPS, Cell Sep and Vent filter trains fully validated, Media and Vent fully implemented
  - Revised Documentation to proceduralize change
  - Project fully commissioned to process owner
  - Performance of filter being tracked for effectiveness for 30 day and 60 day report out period
  - 3 additional filter projects have been launched or scoped with a combined savings opportunity of >\$5M
    - Purification, PF process, UF API Projects launched after proof of concept was achieved



MSAC  
FARM

# Control - Sustainability

- Berkeley Site:
  - New ergonomic holders were fabricated for new filters
    - Eliminated past safety concerns
  - Waste Reduction achieved and monitored - eliminated nearly 2 tons of hazardous waste
  - Supplier training sessions being scheduled to further optimize processes
    - Better partnering with suppliers and better mutual understanding of their products
  - Team received visual recognition with story board posted on site and internal website
  - Team was a 2007 Berkeley Project of the Year Winner
  - Team was a Bayer Special Recognition Award Winner
  - Team was honorable mention at 2007 IQPC Process Excellence Awards
  - Team was selected to present to Bayer Board of Directors 2007 Global OE Project of the Year Finalist

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# Control - Sustainability

- Other Site:
  - Project was shared with multiple sites once pilot project was complete and results were achieved
    - Other sites are planning to start assessment phase of projects in 2008 and 2009
- Industry Wide:
  - The success and methods for this project were also shared with the industry
    - Bioprocess International Sept 2007 Issue: *Supplier Innovation is an Imperative*
    - Speaker at Feb 2008 APICS Golden Gate Chapter Forum “*Supplier Innovation is an Imperative*”
    - Key presentation at Feb 2008 PDA Annual Conference in Colorado Springs “*Accelerating Innovation Through Value Networking*”
    - Guest Speaker APICS Biotech Conference Sept 11 2008 “*Improving Healthcare Quality and Cost with Six Sigma and Lean Manufacturing*”
    - Speaker BMD Summit, Dec 8-9 2008 “*Leveraging Supplier Innovation – a Disposables Case Study*”
    - Filtration Supplement Biopharm Manufacturing Dec 2008 “*Utilizing Supplier Assessments to Accelerate Innovation*”

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# Where to Now – Next Steps

Standardized the process and repeat the process

- Partnered with Product Supply Biotech Procurement to formalize Supplier Innovation Roadmap in two step workout
  - Formal process and tool box for driving supplier innovation
  - Formal operating mechanisms to support high level projects
  - Launched two new initiatives following roadmap
    1. Calibration Services Consolidation – In-Progress
    2. Warehouse dock to stock

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