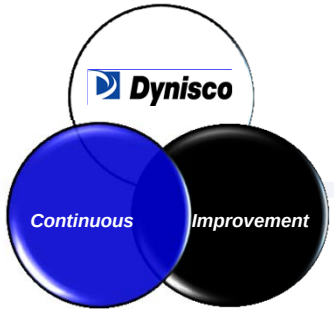

Tying it all Together: Lean, TCO, DFx, VAVE and Supply Chain & Operations

John Biagioni
Vice President Supply Chain and Operations

Agenda

- Updates on Presentations Presented
  - Profit versus Cost Savings
  - Should Costs (Clean Sheeting)
  - Competitive Benchmarking and VOC
  - Sooner vs. Later
- TCO
- Supply Chain Strategy
- Tying it All Together
- Results

Profit versus Price
Impact of Cost Savings vs. Price Increase

	DJ	Dynisco	Viatran		
Price	100	100	100		
Material as a %of Revenue	22.8	34.2	48.4		
Labor as a % of Revenue	13.5	23	10.2		
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	42.6	65.8	63.7		
Gross Margin	57.4	34.2	36.3		
Impact of 3% Price Increase	103	103	103		
Material as a %of Revenue	22.8	34.2	48.4		
Labor as a % of Revenue	13.5	23	10.2		Represents a 5% improvement in GM
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	42.6	65.8	63.7		
Gross Margin	60.4	37.2	39.3		
Impact of 3% Material Decrease					
Price	100	100	100		
Material as a %of Revenue	22.12	33.17	46.95		
Labor as a % of Revenue	13.5	23	10.2		Reprements a 1% improvement in GM
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	41.9	64.8	62.2		
Gross Margin	58.1	35.2	37.8		

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Profit versus Price
Impact of Cost Increase vs. Price Discount

	DJ	Dynisco	Viatran		
Price	100	100	100		
Material as a %of Revenue	22.8	34.2	48.4		
Labor as a % of Revenue	13.5	23	10.2		
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	42.6	65.8	63.7		
Gross Margin	57.4	34.2	36.3		
Impact of 5% Price Decrease	95	95	95		
Material as a %of Revenue	22.8	34.2	48.4		
Labor as a % of Revenue	13.5	23	10.2		**Represents a 8.7% decrease in GM**
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	42.6	65.8	63.7		
Gross Margin	52.4	29.2	31.3		
Impact of 5% Material Increase					
Price	100	100	100		
Material as a %of Revenue	23.94	35.91	50.82		
Labor as a % of Revenue	13.5	23	10.2		Reprements a 2% decrease in GM
Overheads as a % of Revenue	6.3	8.6	5.1		
Total COGs	43.7	67.5	66.1		
Gross Margin	56.3	32.5	33.9		

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What is “Clean Sheeting” or “Should Costing”?

- A systematic process of breaking down the cost components of a product including raw material, transportation, direct labor, indirect labor, scrap, productivity enhancing technologies, overhead, energy, regulations, other relevant components, etc.
- Building these components into a simple, quantitative model that can be used to understand the magnitude of costs and how they can be reduced
- That information can be used to better negotiate or leverage your spend with suppliers
- Clean Sheet is a transparent collaboration of data sharing between suppliers to customer
- Should Cost is using estimates on the data to come to a “Should Cost” build up price – Cost transparency does not exist

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BDI has a tool that captures should costs with little effort

Clean Sheet Example

ASSUMPTIONS WORKSHEET (PAGE 2)

fill pinks
check greens

			Total Cost	**$35.10**
Input Fields		**Calculated Costs**		
Item	Assumption	Item	Calculation	
Material handling labor				
Desired max WiP level (hours)	2.20 hours	Total material handling work content	1 seconds/unit	
Safety stock level (hours)	.20 hours	Number of material handlers required	0.02	
Number of delivery points	1			
Time required per delivery (seconds)	120 seconds			
Shipping labor				
Time between truck arrivals	8.0 hours	Total shipping work content	14 seconds/unit	
Number of load cycles per truck	48	Number of shipping laborers required	0.22	
Time required per loading cycle (seconds)	120 seconds			
Receiving labor				
Time between truck departures	8.0 hours	Total receiving work content	14 seconds/unit	
Number of unload cycles per truck	48	Number of receiving laborers required	0.22	
Time required per unloading cycle (seconds)	120 seconds			
Quality control labor				
Time between QC checks	1.0 hours	Total QC check work content	7 seconds/unit	
Number of stations requiring QC checks	2	Number of QC personnel required	0.11	
Time required per check (seconds)	180 seconds			
MRO costs				
Maintenance personnel/shift	1.0			
Scrap costs				
Defective material rate (%)	0.05%	Defective materials cost per month	$421/month	
First-time yield rate	99.00%	Defective materials cost per year	$5,054	
Rework time required per defective unit	0.10 hours	Number of reworkers required per shift	0.05	
Materials cost				
		Total material/component costs	$25.39	
Fixed asset assumptions				
Plant floor space lease rate per year	$7.00			
Floor space required	25,000 sq ft	Total equipment costs	$825,000	
Dunnage	$200,000	Equipment expense per year	$117,857	
Useful life for equipment and dunnage	7 years	Dunnage expense per year	$28,571	
Total tooling costs	$50,000	Tooling expense per year	$7,143	
Useful life for equipment tooling	7.0 years			

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Source:McKinsey

Competitive Benchmarking and VOC
DFMA – Sooner vs. Later

- Competitive Benchmarking and VOC
  - VOC is NOT only talking to your own customers. (Your market vs. Available Market)
  - VOC must be a group exercise and include competitive products as a representation of value that customers find in designs other than your own.

- DFMA – Sooner vs. Later
  - What does 62 Parts versus 1 Part mean…
    - Supply Base
    - Capital Investment
    - Labor
    - Support Costs/Overheads…

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What is the Right Formula for Evaluating Your Low-Cost Country Sourcing Options?

"Off-shoring, Near-shoring, Re-Shoring..."

- Break down the cost into **Piece Part**, **Landed Cost** and **Total Cost of Ownership**
- Understand the **Total Cost of Ownership**
- Identify the **Risks** of moving to an LCC
- Calculate the **One Time Costs** and the **Recurring Costs**
- Understand the **True Cost** – "clean sheet" / "should cost" your product.

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Breaking Down The Cost

- Piece Part Cost?
  - *Labor + Overhead + Materials*
- Total Landed Cost?
  - *Commonly, the total cost of a landed shipment—including **purchase price**, **freight**, **insurance**, and **other costs** up to the **port of destination**. In some instances, it may also include the **customs duties** and other taxes levied on the **shipment**.* -
    www.businessdictionary.com
- Total Cost of Ownership?
  - *Reflects not only the cost of purchase but all aspects in the further use and maintenance of the equipment, device, or system considered.*

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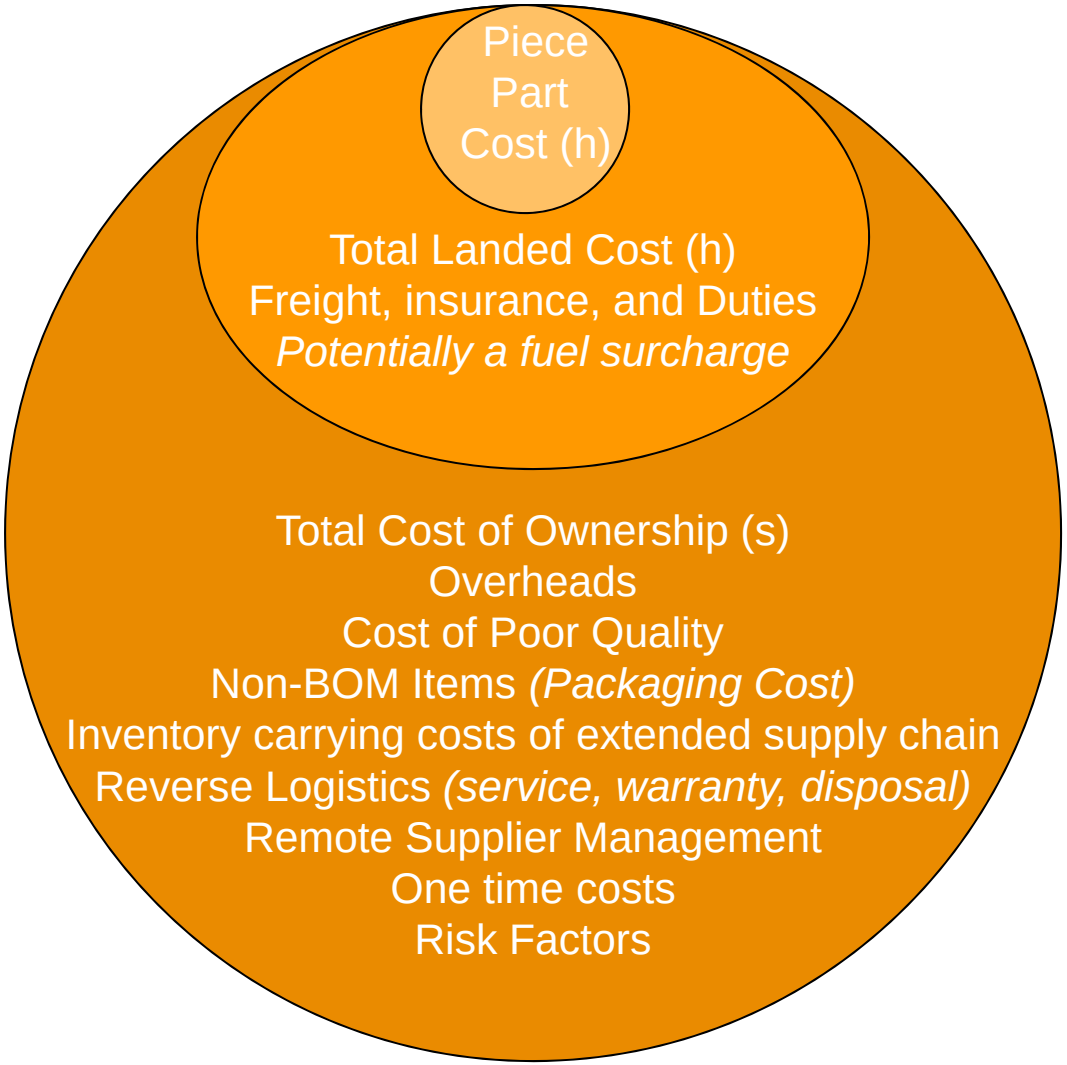
Our Model for TCO



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Risk Factors

- Inflation
  - Labor
  - Energy/Fuel
- Business Continuity
  - Health/Pandemic
  - Infrastructure
- Quality (losing the recipe)
- Customer Perception/Acceptance
- Currency
- IP Transfer
- People
  - Cultural Differences - Guanxi
  - Language Barriers
  - Skill/Experience
  - Turnover
- Financial & Legal Environment
- Service Level - Flexibility
- Trust – Corruption & Business Practices

Risk Factors – Calculating Risk

Risk Factors	Weight 1-17	% Probability	Risk %
Inflation (general)	4	100%	4.0%
Labor	12	20%	2.4%
Energy/Fuel	11	75%	8.3%
Business Continuity (general)	3	50%	1.5%
Health/Pandemic	13	100%	13.0%
Infrastructure	2	80%	1.6%
Quality (losing the recipe)	17	100%	17.0%
Customer Perception/Acceptance	1	25%	0.3%
Currency	8	100%	8.0%
IP Transfer	15	100%	15.0%
People (general)	5	75%	3.8%
Cultural Differences - Guanxi	6	75%	4.5%
Language Barriers	7	95%	6.7%
Skill/Experience	10	75%	7.5%
Financial & Legal Environment	14	75%	10.5%
Service Level - Flexibility	16	100%	16.0%
Trust – Corruption & Business Practices	9	75%	6.8%
Overall Risk Factor			**7.5%**

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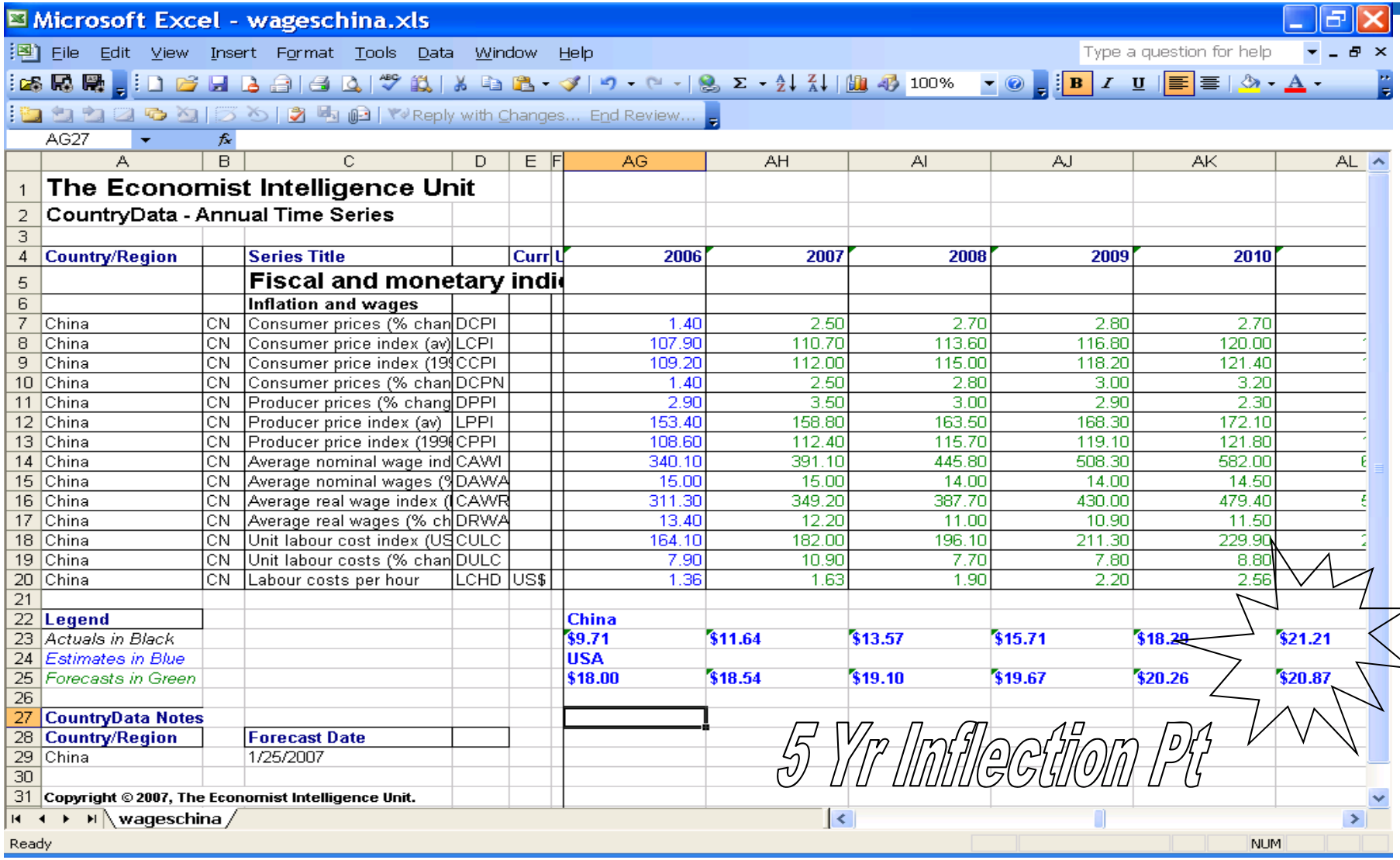
LCC Gains at Risk Over Time – Labor Inflation



	A	B	C	D	E	F	AG	AH	AI	AJ	AK	AL
1	**The Economist Intelligence Unit**											
2	**CountryData - Annual Time Series**											
3												
4	**Country/Region**		**Series Title**		**Curr**	**U**	**2006**	**2007**	**2008**	**2009**	**2010**	
5			**Fiscal and monetary indi**									
6			**Inflation and wages**									
7	China	CN	Consumer prices (% chan	DCPI			1.40	2.50	2.70	2.80	2.70	
8	China	CN	Consumer price index (av)	LCPI			107.90	110.70	113.60	116.80	120.00	
9	China	CN	Consumer price index (19	CCPI			109.20	112.00	115.00	118.20	121.40	
10	China	CN	Consumer prices (% chan	DCPN			1.40	2.50	2.80	3.00	3.20	
11	China	CN	Producer prices (% chang	DPPI			2.90	3.50	3.00	2.90	2.30	
12	China	CN	Producer price index (av)	LPPI			153.40	158.80	163.50	168.30	172.10	
13	China	CN	Producer price index (199	CPPI			108.60	112.40	115.70	119.10	121.80	
14	China	CN	Average nominal wage ind	CAWI			340.10	391.10	445.80	508.30	582.00	
15	China	CN	Average nominal wages (%	DAWA			15.00	15.00	14.00	14.00	14.50	
16	China	CN	Average real wage index (	CAWR			311.30	349.20	387.70	430.00	479.40	
17	China	CN	Average real wages (% ch	DRWA			13.40	12.20	11.00	10.90	11.50	
18	China	CN	Unit labour cost index (US	CULC			164.10	182.00	196.10	211.30	229.90	
19	China	CN	Unit labour costs (% chan	DULC			7.90	10.90	7.70	7.80	8.80	
20	China	CN	Labour costs per hour	LCHD	US$		1.36	1.63	1.90	2.20	2.56	
21												
22	**Legend**						**China**					
23	*Actuals in Black*						**$9.71**	**$11.64**	**$13.57**	**$15.71**	**$18.29**	**$21.21**
24	*Estimates in Blue*						**USA**					
25	*Forecasts in Green*						**$18.00**	**$18.54**	**$19.10**	**$19.67**	**$20.26**	**$20.87**
26												
27	**CountryData Notes**											
28	**Country/Region**		**Forecast Date**									
29	China		1/25/2007									
30												
31	**Copyright © 2007, The Economist Intelligence Unit.**											

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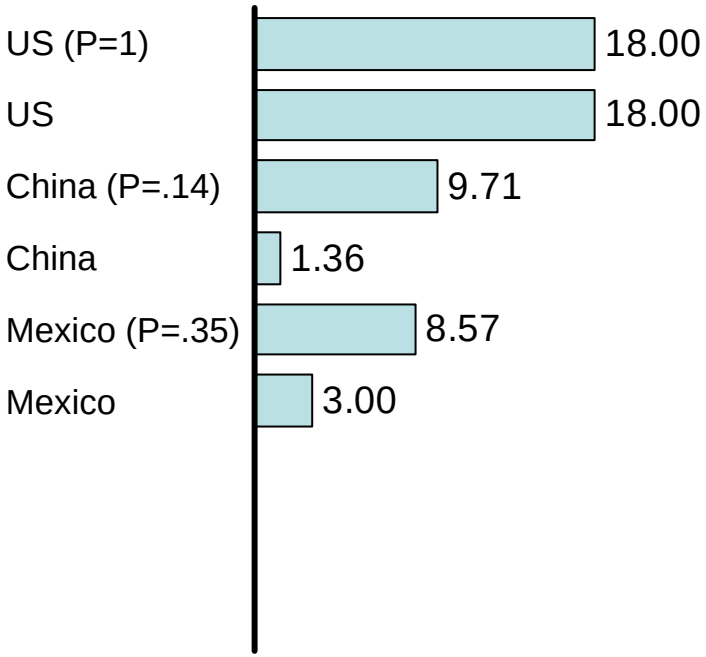
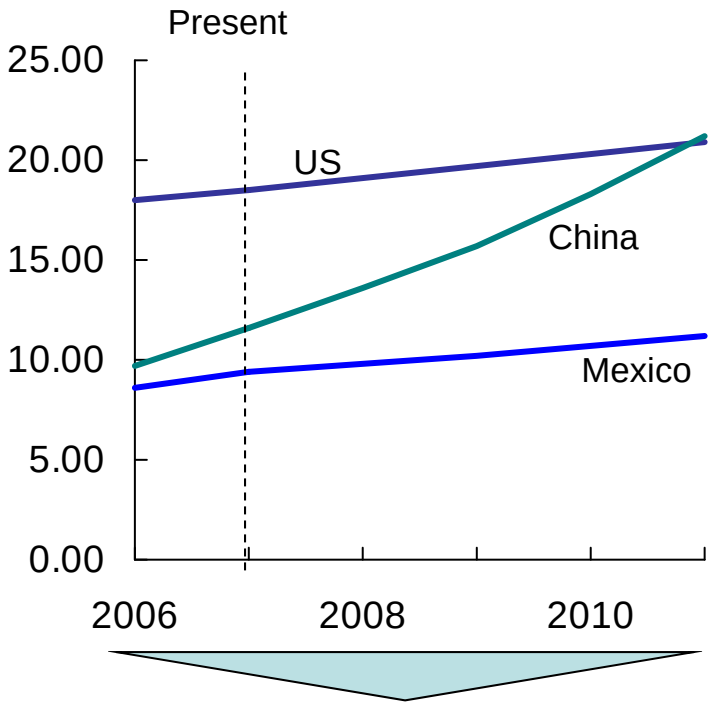
Labor Rate Comparison, Inflationary Trends and Impact of Productivity on Labor Rates

Manufacturing hourly wage, 2007 US $



Mexico's effective labor rate is lower versus China due to productivity

Manufacturing hourly wage US $



Impact of inflation on productivity indexed wages highlight risks associated with savings derived from "low cost labor"

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Source: The Economist Intelligence Unit, 2007

LCC Gains at Risk Over Time – Currency Devaluation

Year Over Year
Decline of the buying power of the USD in LCG and the EU

	Riggit (MYR)		Yuan (CNY)		Peso (MXN)		Euro (EUR)	
2005	3.7886		8.2033		10.9048		0.8045	
2006	3.6783	3.00%	7.9819	2.77%	10.9155	-0.10%	0.7970	0.94%
2007	3.4471	6.71%	7.6172	4.79%	10.9366	-0.19%	0.7308	9.06%
2008	3.2321	6.65%	7.0289	8.37%	10.5404	3.76%	0.6513	12.21%
		16.36%		15.93%		3.47%		22.21%

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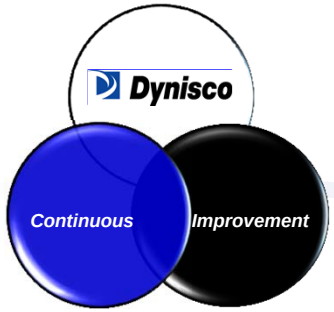

Creating a Model

Total Cost of Ownership

The Elements

- Factors
  - Volume
  - Lead Time
- Piece Part
  - Labor
    - Build Hours to complete the assembly
    - Labor rate
  - Material
- TLC (Total Landed Cost)
  - Transportation
- TCO (Total Cost of Ownership)
  - COPQ (Cost of Poor Quality)
  - Profit
  - Additional recurring costs
  - Inventory Carrying Costs
  - Risks
- Other Costs
  - One Time/Transition Cost
    - Idled resources / Assets *(have you created an impaired asset?)*

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One Time Costs

- Documenting the process
- Separation / severance cost
- Inventory
  - Carrying cost increase as a lead time de-coupler
  - One time build up
- Cost of Poor Quality (initial yields)
- Cost in transplanting processes, equipment and infrastructure to new geographies
  - Capital Investments
  - Travel & Expenses for staff
  - Freight & duties
  - Productivity impact during transfer phase

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Recurring Costs

- Change in harmonization codes
- Travel & Expense – Support
- In Country Infrastructure Costs
- Extended Inventory Pipeline
  - Have you localized?

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Worksheet

ITEM	FACTOR	Current	LCC 1	LCC 2	Definition
1	**Yearly Volume**				The Yearly Sold Quantity
2	**Lead Time (wks)**				Lead Time in Weeks
	Piece Part				
3	**Labor**				Calculate: 4 x 5
4	**Rate**				The Hourly Labor Rate
5	**Build Hours**				Number of Hours To Build One Unit
6	**Material**				Total Material Cost
7	**Total Piece Part**				Calculate: 3 + 6
	TLC				
8	**Transportation (per unit)**				Total Transportation Cost
	TCO				
9	**COPQ %**				Percentage of Labor, Materials and Transportation
10	**COPQ $**				Calculate: (7 + 8) x 9
11	**Profit %**				Percentage of Labor, Materials, Transportation and COPQ
12	**Profit $**				Calculate: (7 + 8 + 10) x 11
13	**Additional Recurring Cost**				Total additional cost including support, travel, etc.
14	**Additional Recurring Cost / Units**				Calculate: 13 / 1
15	**Inventory Carrying Cost %**				Percentage of additional inventory
16	**Inventory Carrying Cost (per unit) $**				Calculate: (((7 + 8 + 10 + 12) x 15) / 52 weeks) x 2
17	**Risk %**				Percentage of risk
18	**Risk (per unit) $**				Calculate: (7 + 8 + 10 + 12 + 14 + 16) x 17
19	**TCO Unit Amount**				Calculate: 7 + 8 + 10 + 12 + 14 + 16 + 18
20	**TCO Annualized Amount**				Calculate: 1 x 19
	Savings/Loss (units)				
21	**Net savings/loss (per unit)**				Calculate: 'Current' 19 - 'LCC 1' 19
22	**Net savings/loss (annualized)**				Calculate: 'Current' 20 - 'LCC 1' 20
	Additional Costs				
23	**One Time Cost/Transition (per piece)**				Calculate: 1 / 24
24	**One Time Cost/Transition**				One time transition and set up costs
	Savings/Loss Overall				
25	**Net savings/loss (annualized)**				Calculate: 21 - 23
26	**Net savings/loss (per unit)**				Calculate: 22 - 24

Example of a product that should stay in the USA
Start up too high & customer base in USA

ITEM	FACTOR	Current	Mexico	China	
1	**Yearly Volume**	100000	100000	100000	The Yearly Sold Quantity
2	**Lead Time (wks)**	0.2	2	11	Lead Time in Weeks
	Piece Part				
3	**Labor**	$ 54.00	$ 16.00	$ 12.00	Calculate: 4 x 5
4	**Rate**	$ 18.00	$ 4.00	$ 3.00	The Hourly Labor Rate
5	**Build Hours**	3.00	4.00	4.00	Number of Hours To Build One Unit
6	**Material**	$ 150.00	$ 150.00	$ 150.00	Total Material Cost
7	**Total Piece Part**	$ 204.00	$ 166.00	$ 162.00	Calculate: 3 + 6
	TLC				
8	**Transportation (per unit)**	$ -	$ 6.00	$ 18.00	Total Transportation Cost
	TCO				
9	**COPQ %**	1%	10%	10%	Percentage of Labor, Materials and Transportation
10	**COPQ $**	$ 2.04	$ 17.20	$ 18.00	Calculate: (7 + 8) x 9
11	**Profit %**	10%	10%	10%	Percentage of Labor, Materials, Transportation and COPQ
12	**Profit $**	$ 20.60	$ 18.92	$ 19.80	Calculate: (7 + 8 + 10) x 11
13	**Additional Recurring Cost**	$ -	$ 8,000.00	$ 50,000.00	Total unique additional cost including support, travel, etc.
14	**Additional Recurring Cost / Units**	$ -	$ 0.08	$ 0.50	Calculate: 13 / 1
15	**Inventory Carrying Cost %**	10%	10%	10%	Percentage of additional inventory
16	**Inventory Carrying Cost (per unit) $**	$ 0.09	$ 0.80	$ 4.61	Calculate: (((7 + 8 + 10 + 12) x 15) / 52 weeks) x 2
17	**Risk %**	1.0%	7.5%	7.5%	Percentage of risk
18	**Risk (per unit) $**	$ 2.27	$ 15.68	$ 16.72	Calculate: (7 + 8 + 10 + 12 + 14 + 16) x 17
19	**TCO Unit Amount**	$ 229.00	$ 224.68	$ 239.63	Calculate: 7 + 8 + 10 + 12 + 14 + 16 + 18
20	**TCO Annualized Amount**	$ 22,899,848.25	$ 22,467,549.62	$ 23,962,535.58	Calculate: 1 x 19
	Savings/Loss (units)				
21	**Net savings/loss (per unit)**		$ 4.32	$ (10.63)	Calculate: 'Current' 19 - 'Mexico' 19
22	**Net savings/loss (annualized)**		$ 432,298.63	$ (1,062,687.33)	Calculate: 'Current' 20 - 'Mexico' 20
	Additional Costs				
23	**One Time Cost/Transition (per piece)**		$ 10.00	$ 10.00	Calculate: 1 / 24
24	**One Time Cost/Transition**		$ 1,000,000.00	$ 1,000,000.00	One time transition and set up costs
	Savings/Loss Overall				
25	**Net savings/loss (annualized)**		$ (5.68)	$ (20.63)	Calculate: 21 - 23
26	**Net savings/loss (per unit)**		$ (567,701.37)	$ (2,062,687.33)	Calculate: 22 - 24

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Formulas

Labor	Calculate: Rate x Build Hours
Total Piece Part	Calculate: Labor + Material
Profit $	Calculate: (Total Piece Part + Transportation (per unit) + COPQ $) x Profit %
Additional Recurring Cost / Units	Calculate: Additional Recurring Cost / Yearly Volume
Inventory Carrying Cost (per unit) $	Calculate: (((Total Piece Part + Transportation (per unit) + COPQ $ + Profit $) x Inventory Carrying Cost %) / 52 weeks) x Lead Time (wks)
Risk (per unit) $	Calculate: (Total Piece Part + Transportation (per unit) + COPQ $ + Profit $ + Additional Recurring Cost / Units + Inventory Carrying Cost (per unit) $) x Risk %
TCO Unit Amount	Calculate: Total Piece Part + Transportation (per unit) + COPQ $ + Profit $ + Additional Recurring Cost / Units + Inventory Carrying Cost (per unit) $ + Risk (per unit) $
TCO Annualized Amount	Calculate: Yearly Volume x TCO Unit Amount
One Time Cost/Transition (per piece)	Calculate: Yearly Volume / One Time Cost/Transition

Preliminary Steps Before Making Your Sourcing Decision

- Create **standardized work** practices that document remaining labor content so it can be more easily transferred if required
- **Lean** the process out – labor accounts for 7-12% of the part cost (less for TLC & TCO)
- Focus on **"Clean Sheeting" / "Should Costing"** designs to determine what the absolute lowest cost will be based on index pricing
- **Spaghetti Map** the complete supply and demand chain from cradle to grave
- Focus on **redesigning product lines (DFx)** based on customer order winners (price and speed of delivery are big ones now)

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Supply Chain and Operations Strategy

Match our operational and supply chain capabilities in support of the Business Segment Strategies of growth, new product introductions, integration of 3rd party products, repeatability and speed of delivery.

- Short term, Lean all of our facilities helping to determine the proper course for plant and product rationalizations while providing increased inventory turns, increased productivity and decreased square footage requirements in 15 months from kick off.

Longer term develop Regional Manufacturing/Distribution Centers (RMDCs) utilizing processes and products that incorporate postponement theory providing the greatest flexibility against demand variation while providing the lowest TCO, the lowest inventory carrying cost and the quickest speed of delivery.

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End Results of Strategy

- RMDCs located close to our core customer markets ensuring speed of delivery requirements are met
- Core Manufacturing locations located near Engineering, Sales and Marketing resources allowing for quick NPI roll outs
- Fully utilized Low Cost Country manufacturing center to RMDC
- A robust, flexible and agile Operational Organization that has replicated processes in multiple regions ensuring continuity of supply

All organizations driven by ***Lean techniques***

All sourcing decisions leverage the ***TCO model***

All NPD utilizing DFx

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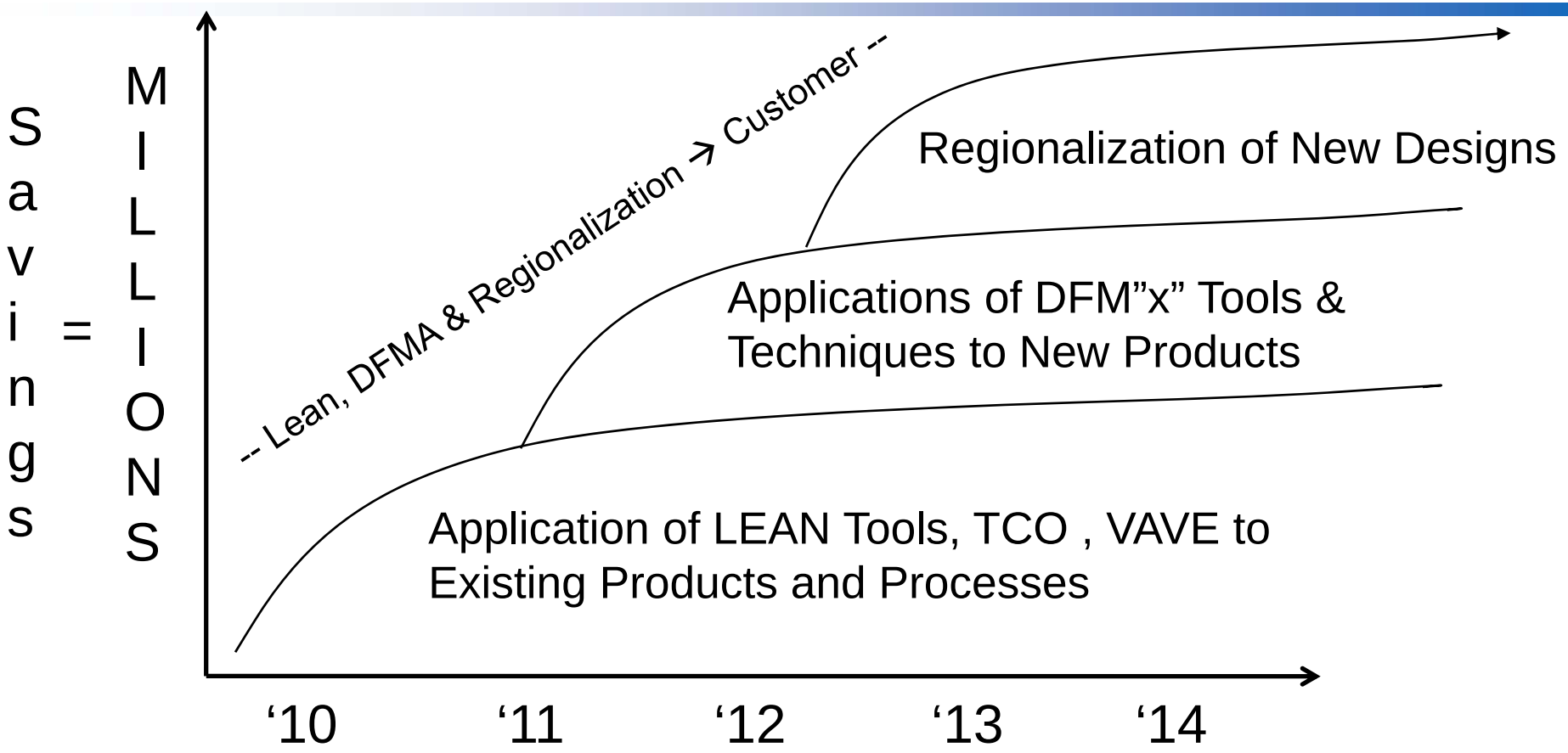
End Result

Manufacturing operations positioned globally, to support business growth initiatives, through best in class, quality, delivery and competitive cost advantage utilizing postponement theory and the Lean Enterprise, Design-to-Cost and DFx toolsets.

Tying it All Together



Working across all disciplines will drive value beyond a simple cost reduction/design and drive customer intimacy

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Thank you!

Questions?

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