The Tactical and Strategic Art of Economic Models

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Donald G. Reinertsen
Reinertsen & Associates
600 Via Monte D'Oro
Redondo Beach, CA 90277 U.S.A.
(310)-373-5332
Internet: Don@ReinertsenAssociates.com
Twitter: @dreinertsen
www.ReinertsenAssociates.com

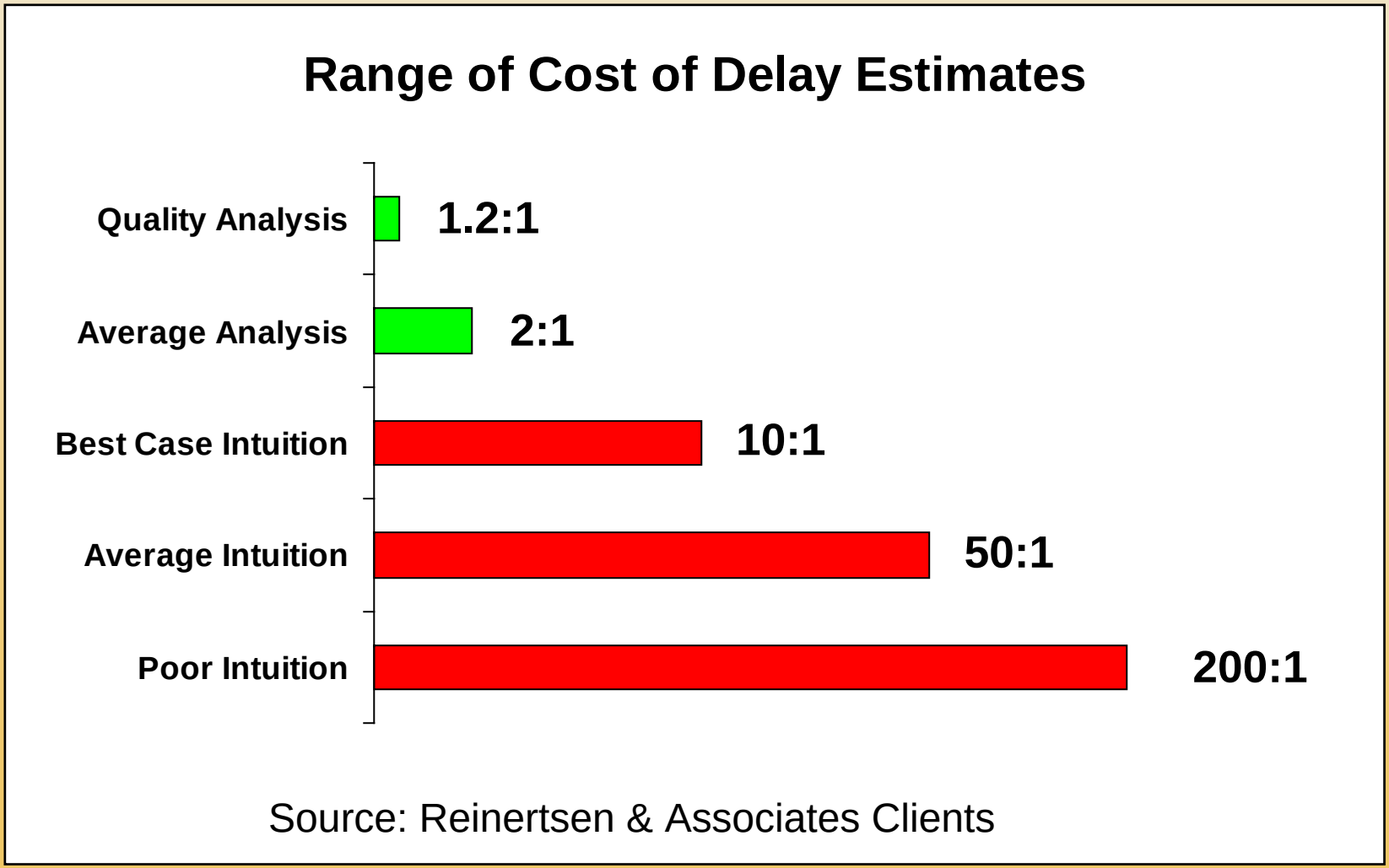
Today's Objective

- **Why do we need Economic Models?**
- **What is an economic model?**
- **How do we construct one?**
- **How do we use it?**

Why We Need It?

- **We are ignorant about our economics and unaware of our ignorance.**
- **When we learn more, we can make better economic choices.**
- **It is actually not hard to learn more.**

Just How Clueless Are We?



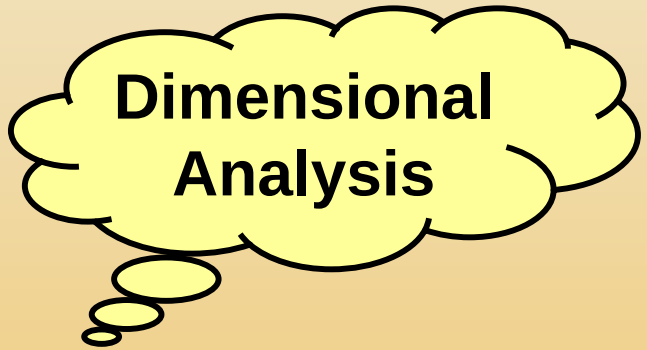
Source: Reinertsen & Associates Clients

What is it?

Time is Money.

$$t = m$$

$$t = m$$

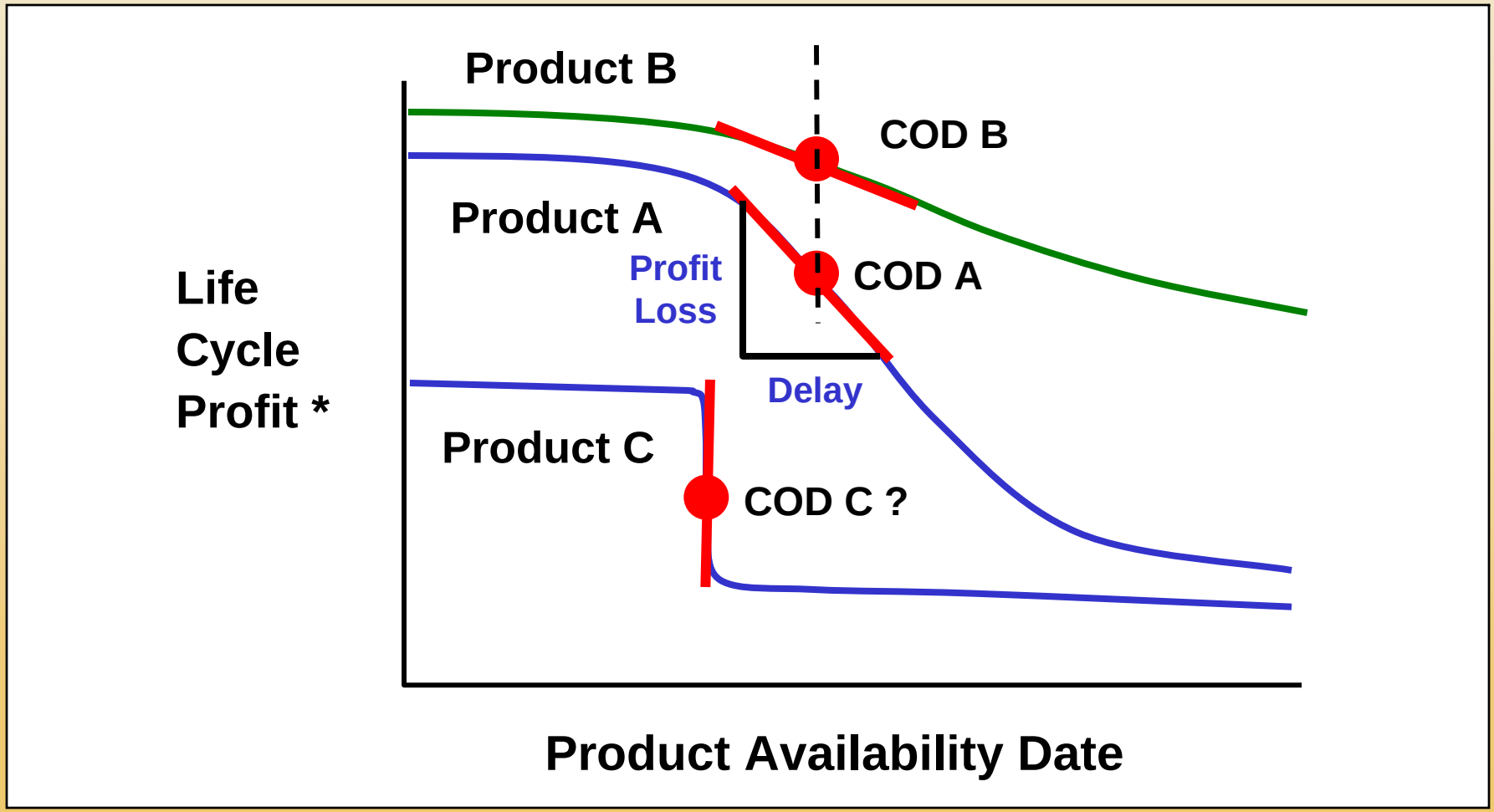


$$\Delta t = \Delta m$$

$$\Delta t \left(\frac{\partial m}{\partial t} \right) = \Delta m$$

Cost of Delay

Total Profit Depends on Availability



*** or another economic measure such as NPV**

Why do we want to know it?

Why? It Helps You Make Money!

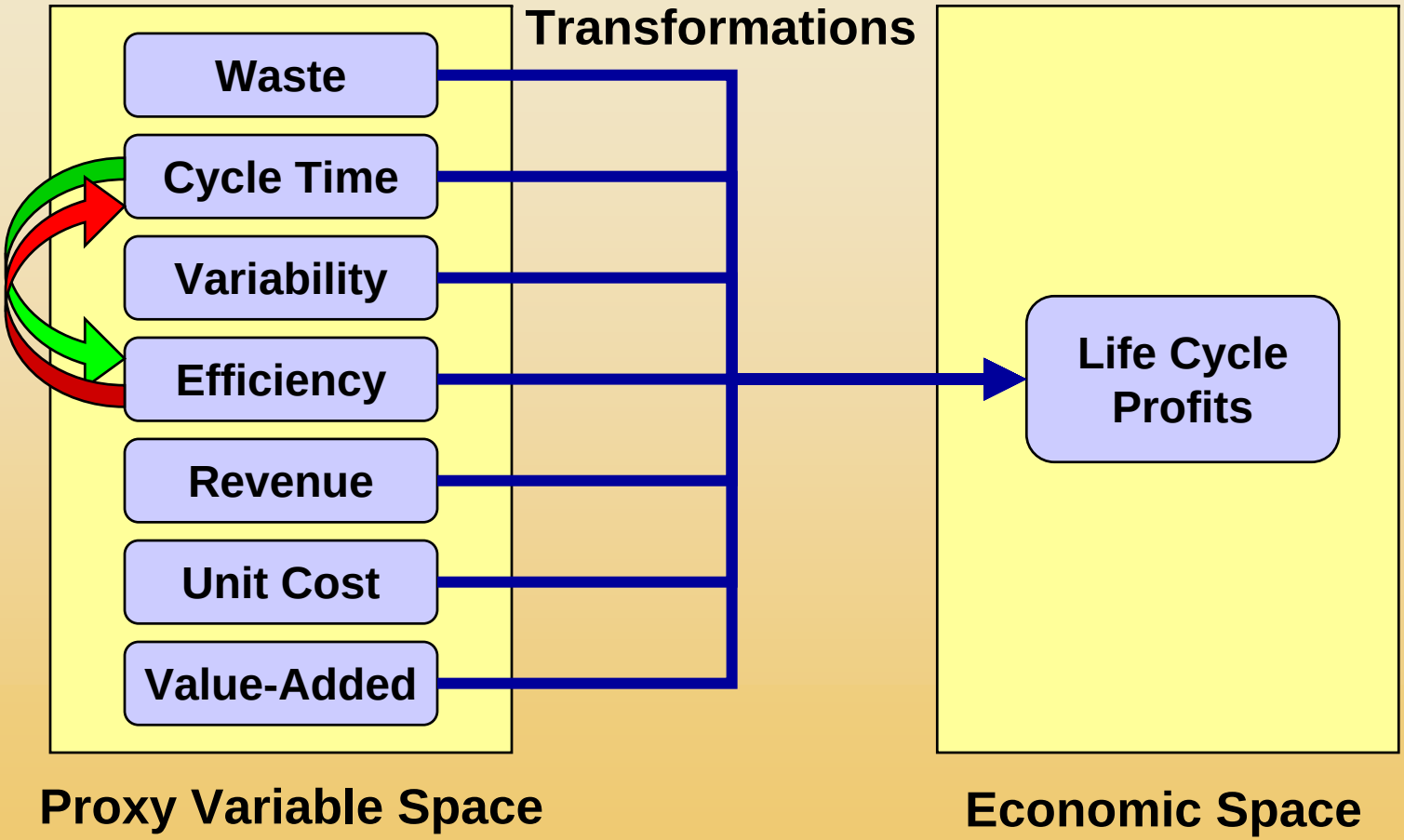
- **With an economic framework we can make economically important decisions quickly and correctly.**
  - **Project level decisions.**
  - **Portfolio level decisions.**
  - **Enterprise level decisions.**
  - **Process design decisions.**
  - **Process operation decisions.**
- **Without it, our decisions are slow, incorrect, and opaque — and they lack buy-in.**

How do we get it?

The Basic Idea

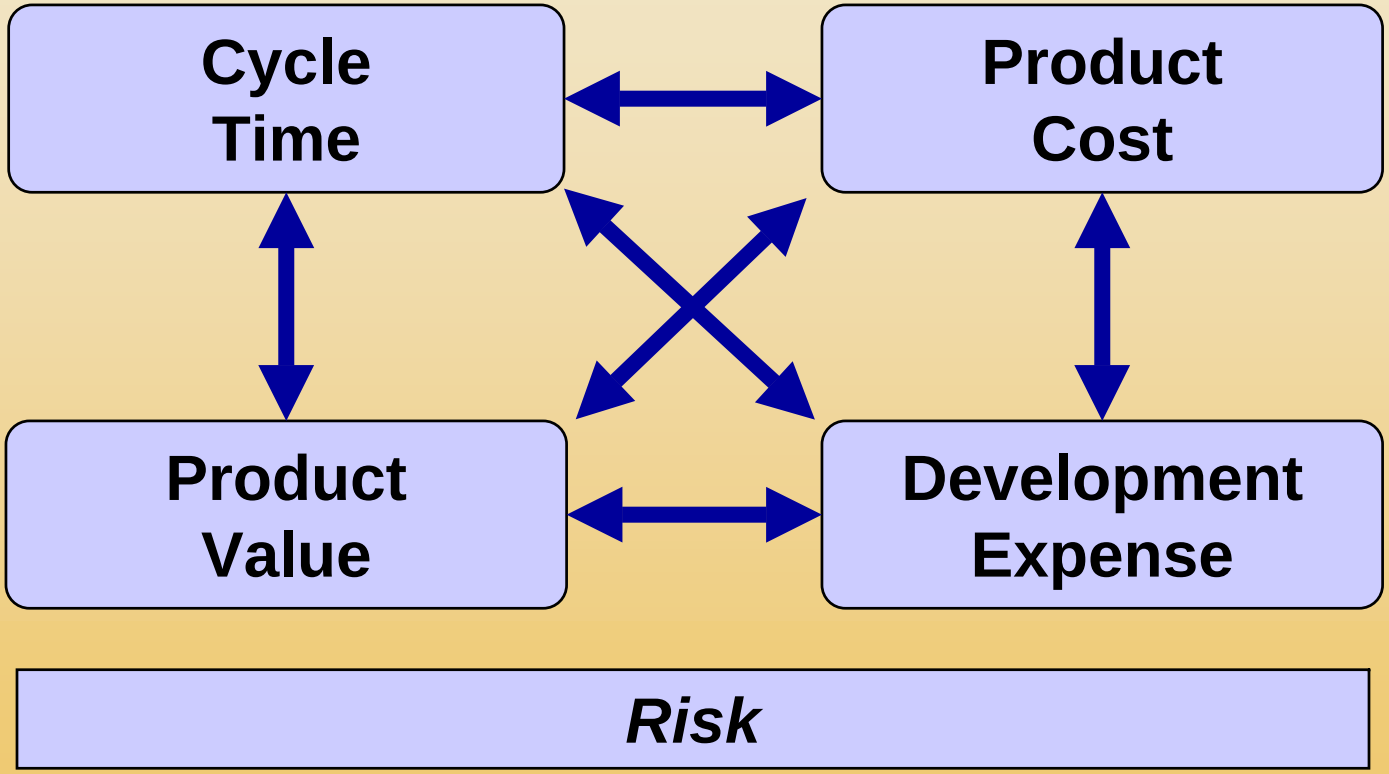
- **Identify your available currencies.**
- **Determine what each one is worth in relationship to your desired goal.**
- **Share this understanding every person who trades these currencies.**
- **Authorize them to make decisions.**
- **Try to trade things of lower value for things of higher value.**

Making Economic Decisions



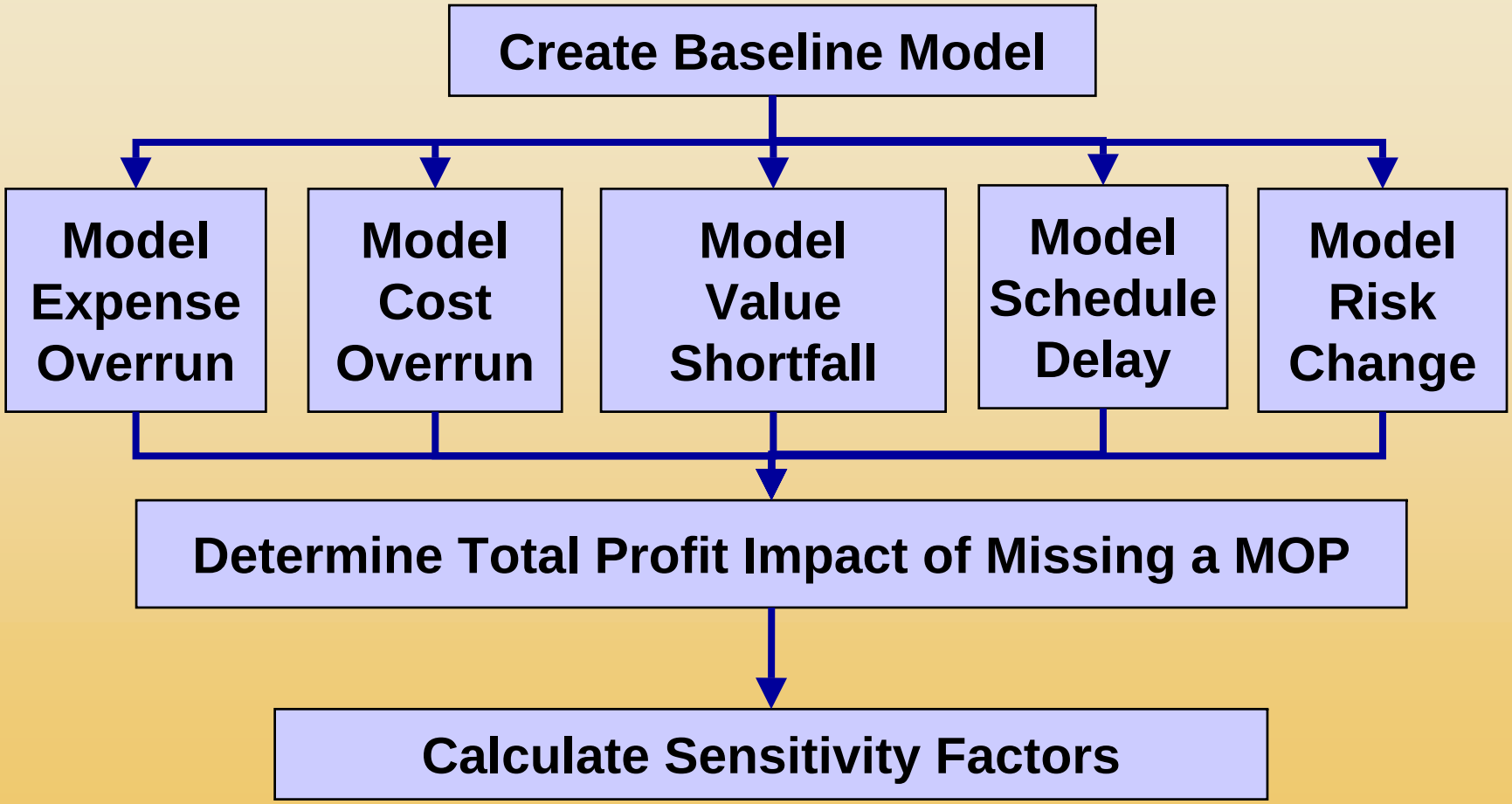
The metric of the target space must be standardized but it need not always be economic.

The Five Economic Objectives



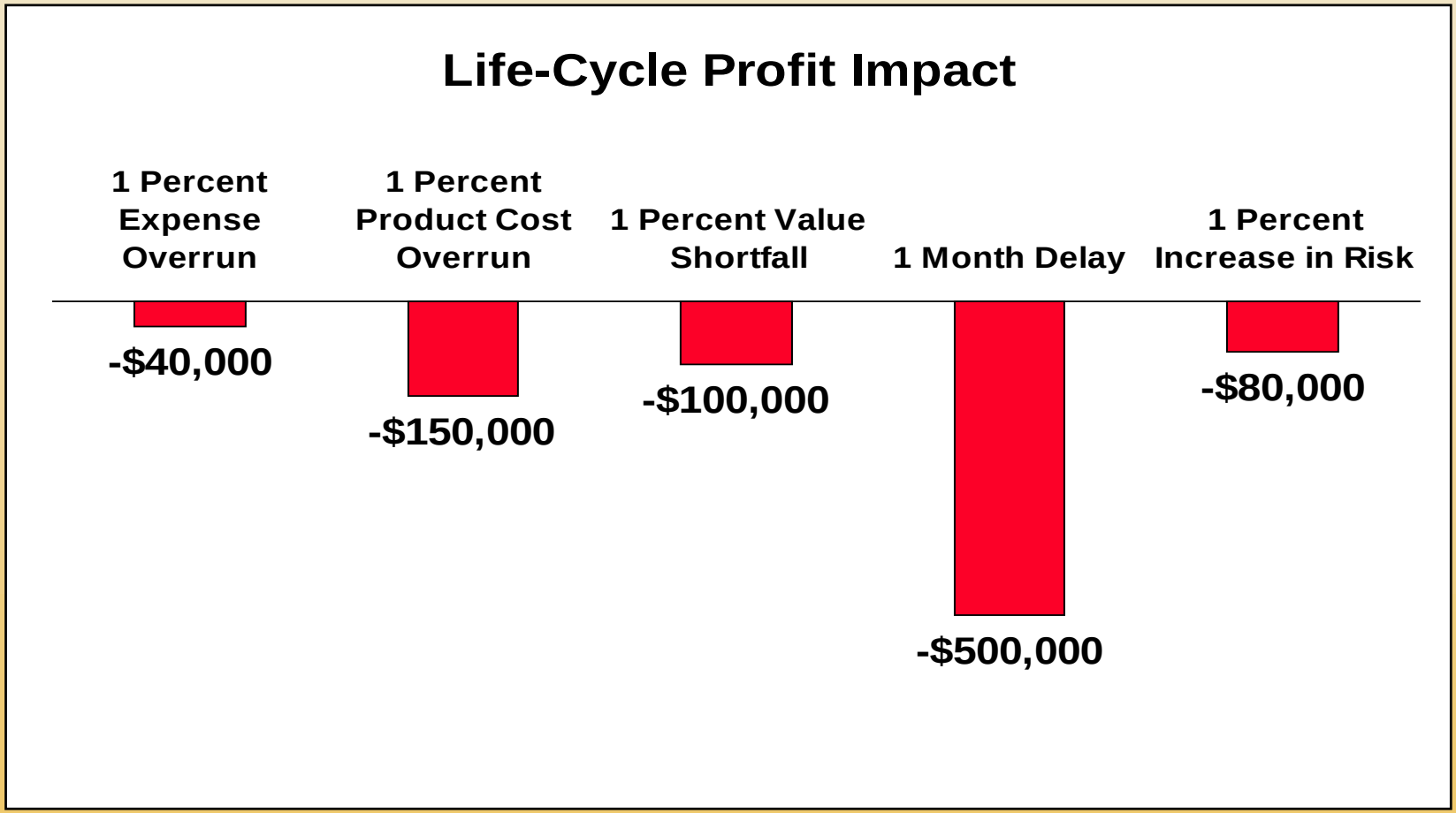
We do sensitivities on parameters that we trade for things of value.

The Modeling Process



MOP = Measure of Performance

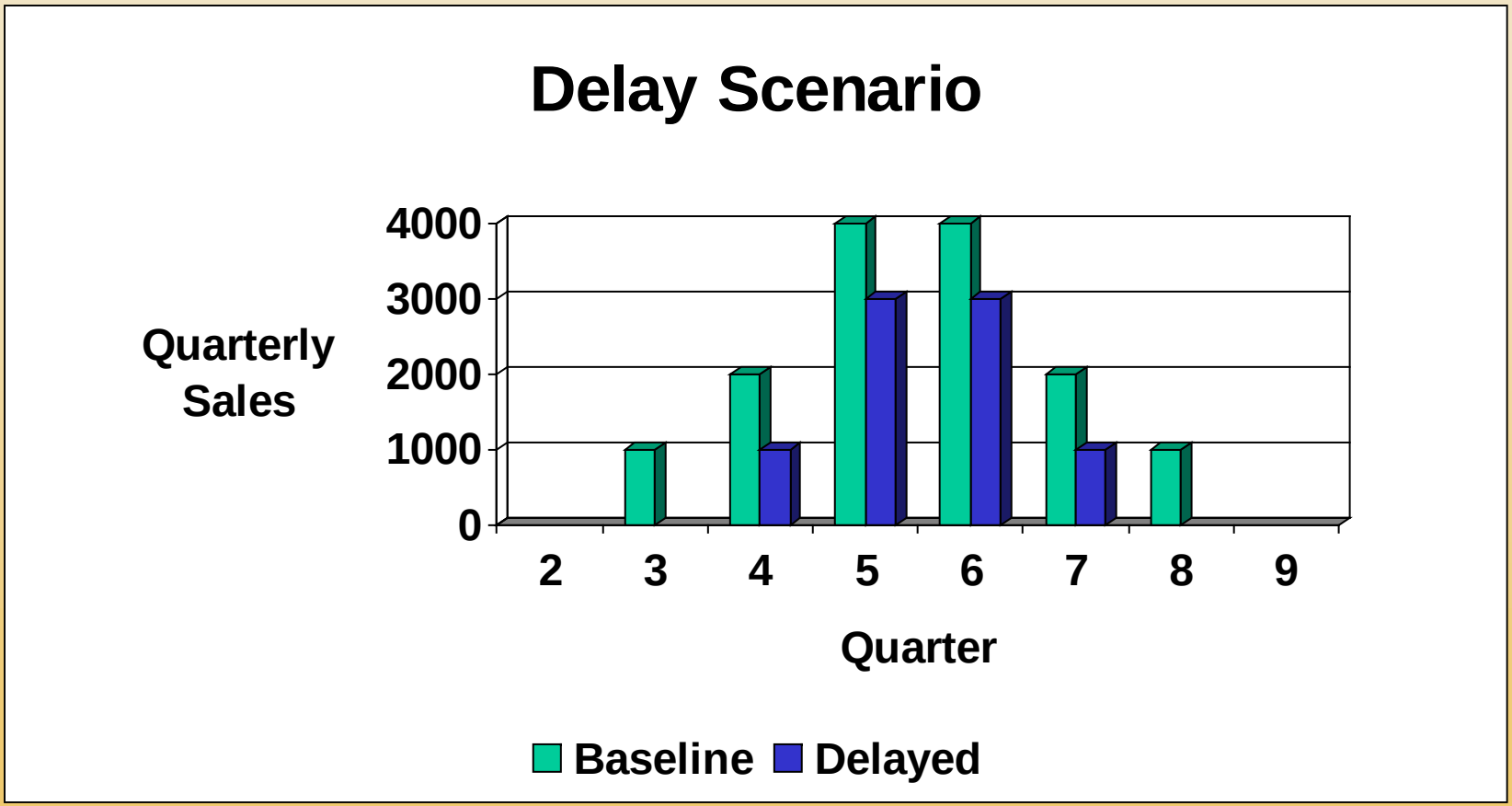
Economic Model Output



Baseline Scenario

Baseline Scenario												
			Quarter									
	Assume		1	2	3	4	5	6	7	8	9	Total
Unit Sales			-	-	1,000	2,000	4,000	4,000	2,000	1,000	-	14,000
Price Erosion Rate	-4%	Per Qtr										
Average Sales Price			$ 3,000	$ 2,880	$ 2,765	$ 2,654	$ 2,548	$ 2,446	$ 2,348	$ 2,254	$ 2,164	
Sales Revenue			$ -	$ -	$ 2,764,800	$ 5,308,416	$ 10,192,159	$ 9,784,472	$ 4,696,547	$ 2,254,342	$ -	$ 35,000,736
Cost Improvement	-0.5%	Per Qtr										
Unit Cost			$900	$ 896	$ 891	$ 887	$ 882	$ 878	$ 873	$ 869	$ 865	
Cost of Sales			$ -	$ -	$ 891,023	$ 1,773,135	$ 3,528,538	$ 3,510,896	$ 1,746,671	$ 868,969	$ -	$ 12,319,230
Gross Margin			$ -	$ -	$ 1,873,778	$ 3,535,281	$ 6,663,621	$ 6,273,577	$ 2,949,876	$ 1,385,374	$ -	$ 22,681,506
Percent Gross Margin			70%	69%	68%	67%	65%	64%	63%	61%		
Fixed Op Expenses			$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000		$ 8,000,000
Variable Op Expenses	25%	of Revenue	$ -	$ -	$ 691,200	$ 1,327,104	$ 2,548,040	$ 2,446,118	$ 1,174,137	$ 563,586	$ -	$ 8,750,184
Total Op Expenses			$ 1,000,000	$ 1,000,000	$ 1,691,200	$ 2,327,104	$ 3,548,040	$ 3,446,118	$ 2,174,137	$ 1,563,586	$ -	$ 16,750,184
Operating Profit			$ (1,000,000)	$ (1,000,000)	$ 182,578	$ 1,208,177	$ 3,115,581	$ 2,827,459	$ 775,740	$ (178,212)	$ -	$ 5,931,322
Cumulative Op Profit			$ (1,000,000)	$ (2,000,000)	$ (1,817,423)	$ (609,245)	$ 2,506,336	$ 5,333,794	$ 6,109,534	$ 5,931,322	$ 5,931,322	

Typical Delay Scenario



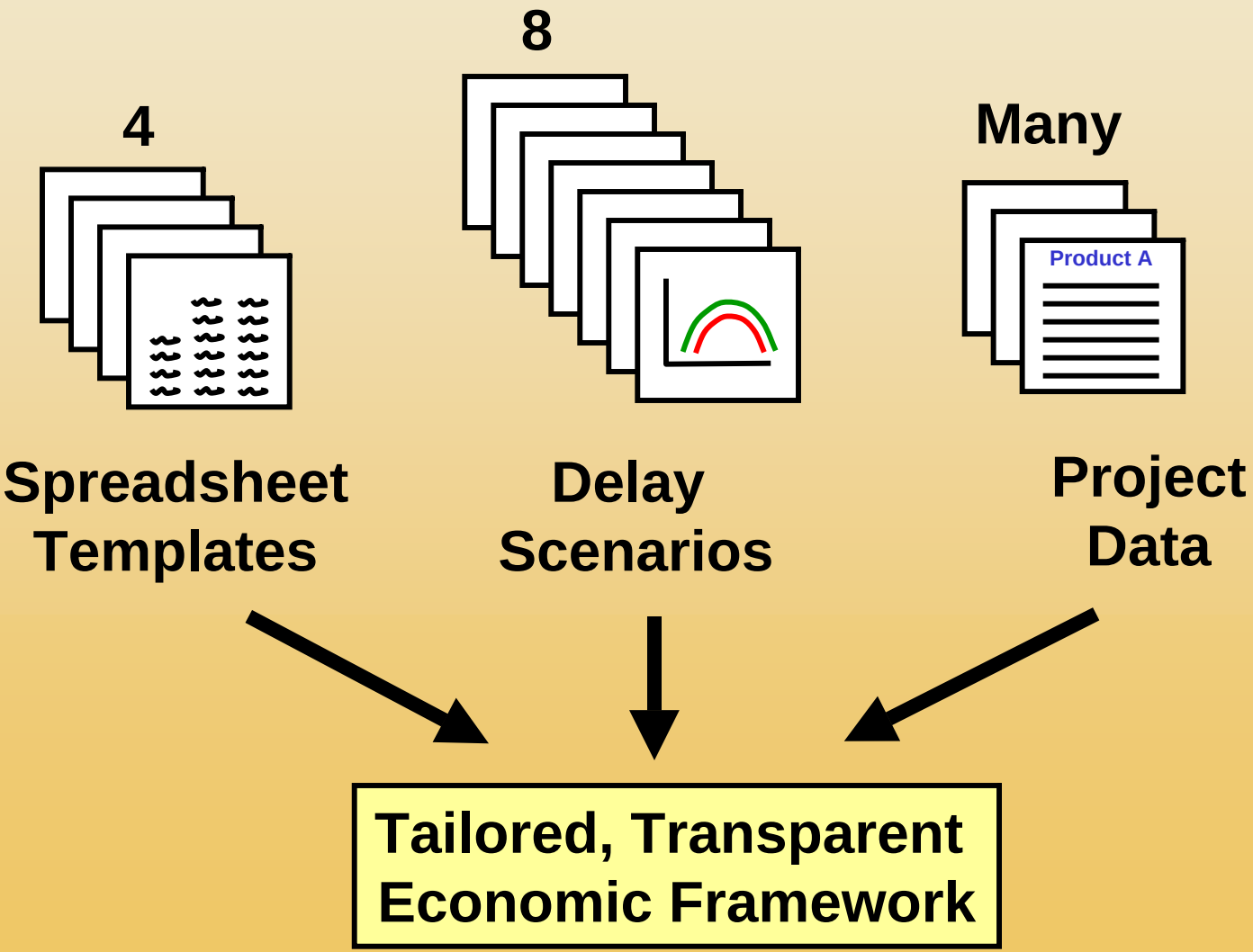
Delayed Scenario

Delay Scenario												
			Quarter									
	Assume		1	2	3	4	5	6	7	8	9	Total
Unit Sales			-	-	-	1,000	3,000	3,000	1,000	-	-	8,000
Price Erosion Rate	-4%	Per Qtr										
Average Sales Price			$ 3,000	$ 2,880	$ 2,765	$ 2,654	$ 2,548	$ 2,446	$ 2,348	$ 2,254	$ 2,164	
Sales Revenue			$ -	$ -	$ -	$ 2,654,208	$ 7,644,119	$ 7,338,354	$ 2,348,273	$ -	$ -	$19,984,955
Cost Improvement	-0.5%	Per Qtr										
Unit Cost			$900	$ 896	$ 891	$ 887	$ 882	$ 878	$ 873	$ 869	$ 865	
Cost of Sales			$ -	$ -	$ -	$ 886,567	$ 2,646,404	$ 2,633,172	$ 873,335	$ -	$ -	$ 7,039,478
Gross Margin			$ -	$ -	$ -	$ 1,767,641	$ 4,997,715	$ 4,705,183	$ 1,474,938	$ -	$ -	$12,945,477
Percent Gross Margin			70%	69%	68%	67%	65%	64%	63%	61%		
Fixed Op Expenses			$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ -		$ 6,000,000
Variable Op Expenses	25%	of Revenue	$ -	$ -	$ -	$ 663,552	$ 1,911,030	$ 1,834,589	$ 587,068	$ -	$ -	$ 4,996,239
Total Op Expenses			$ -	$ 1,000,000	$ 1,000,000	$ 1,663,552	$ 2,911,030	$ 2,834,589	$ 1,587,068	$ -	$ -	$10,996,239
Operating Profit			$ -	$ (1,000,000)	$(1,000,000)	$ 104,089	$ 2,086,686	$ 1,870,594	$ (112,130)	$ -	$ -	$ 1,949,238
Cumulative Op Profit			$ -	$ (1,000,000)	$(2,000,000)	$ (1,895,911)	$ 190,774	$ 2,061,368	$ 1,949,238	$ 1,949,238	$ 1,949,238	
											Baseline	$ 5,931,322
											Change	$ 3,982,084
											Per Month	1,327,361

Organizing the Process

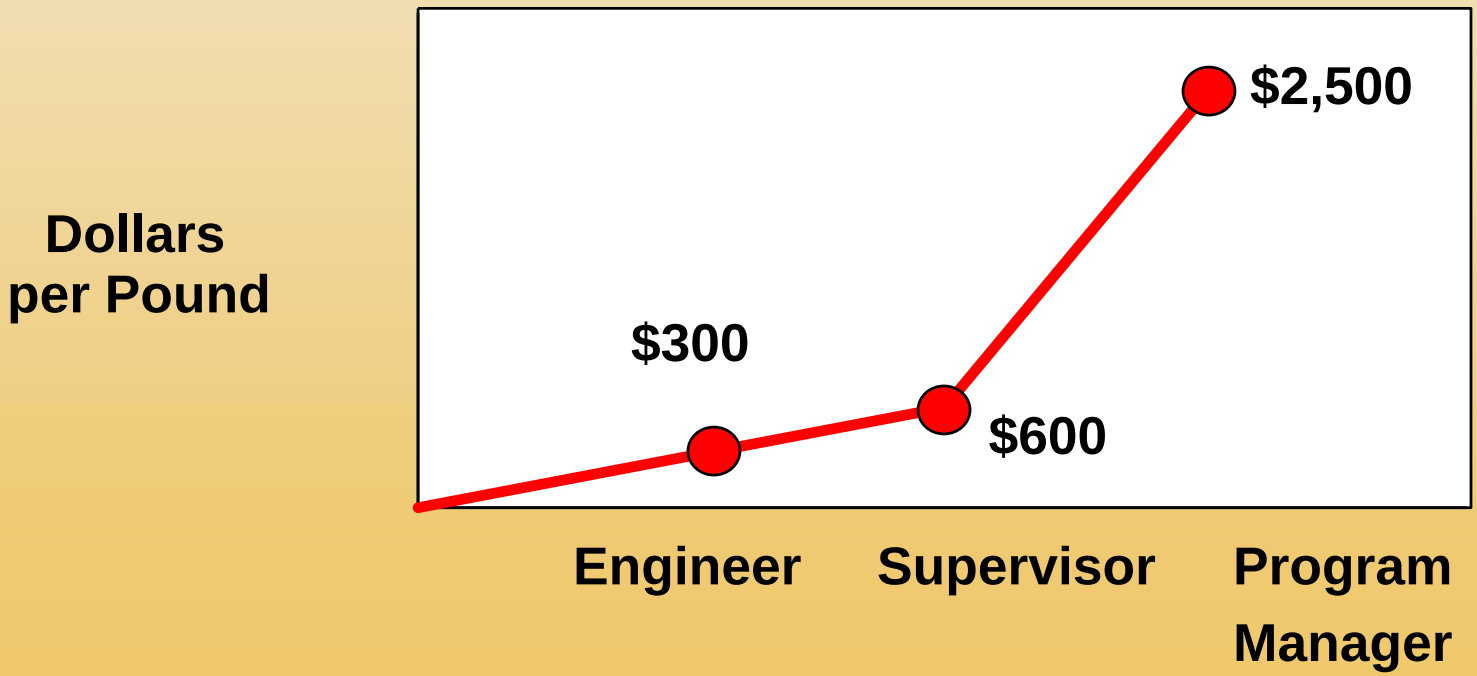
- ☐ Sell management on the need.
- ☐ Leverage existing systems.
- ☐ Ensure buy-in of Finance.
- ☐ Keep the output simple.
- ☐ Disseminate results to all decision-makers.
- ☐ Override assumptions, not answers.

Standardization



How do we use it?

Trading Weight for Product Cost Boeing 777



Use Decision Rules

- **They permit us to control the logic of decisions without delaying decisions.**
- **They enable us to promote system-level optimum decisions.**
- **They extend out influence to many more decisions because they make it easier to make good economic decisions.**
- **They make our decisions faster, easier to make, more correct, and more transparent.**

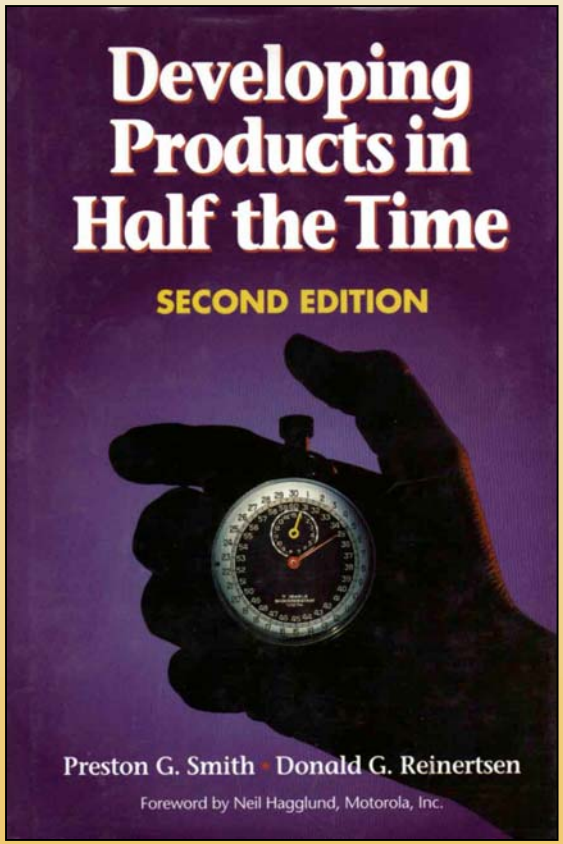
What They Did

- **Centralize the logic of the decision.**
- **Decentralize actual decision making.**
- **Buy weight at a discount by derating its calculated value.**
- **Bring lots of small decisions under economic control by “automating” the decision process.**
- **Result: Decisions are faster, easier to make, more correct, and more transparent.**

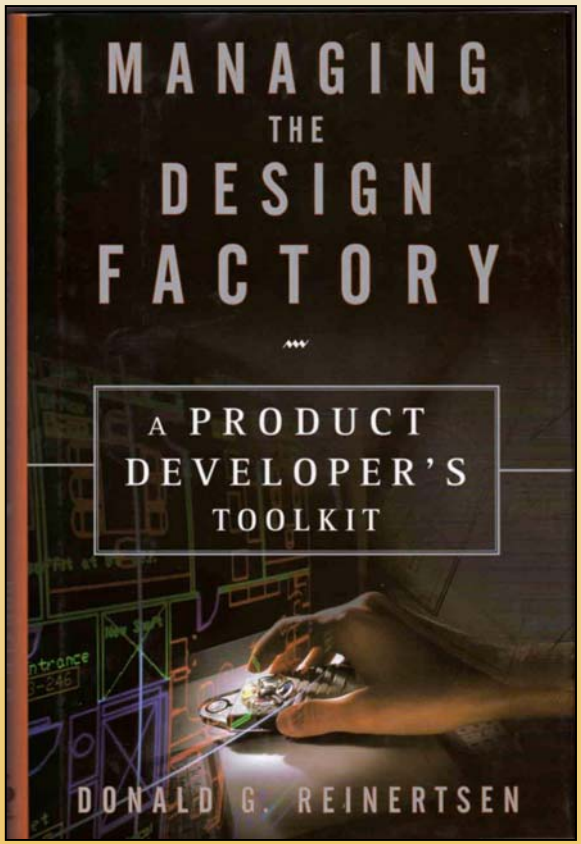
Summary

- **Our objective is to influence economic outcomes.**
- **We have multiple interacting variables.**
- **We must drive them into the same frame of reference.**
- **Such frameworks are politically neutral.**
- **They permit people to change their minds.**
- **They enable management to quickly decide to give you enthusiastic support.**

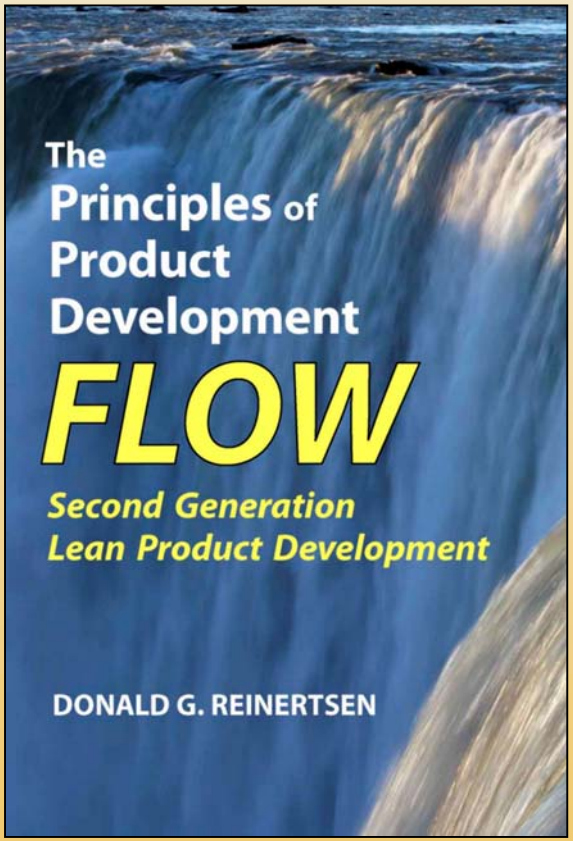
Going Further



1991 / 1997



1997



2009