

***Are your improvements 'really' improving your business?***

***Does your job require you to improve your operation?***

***Do you have to justify proposals for change?***

***Are you a process, industrial or manufacturing engineer?***

***Are you a scientist in manufacturing?***

***Are you a manufacturing consultant?***

***Are you in R&D or New Product development trying to figure out what it will 'really' take to make your new product?***

***Are you in Finance being asked to value projects?***

***Are you the Senior Executive responsible  
for Operations?***

***If 'Yes' is the answer to any of these  
questions then read on....***

## **What Others Say...**

*Presented with 'Global Innovation Award' by Bristol Myers Squibb*

Nicknamed "*The Dynamic Duo*" by , Operations Director, a division of  
Johnson & Johnson

*"...[we had] 453 projects not prioritized or quantified...It's just about identifying what are the vital few projects..."*

**Andrew Lowe, Operations Director, Ortho-Clinical Diagnostics**

*"I was able to [get] executive board approval and release of funds for the product development process."*

**Global Marketing Director, US based multi-national healthcare supply company**

*"...will teach your people how to fish..."*

**P.J. Babaoglu, VP WW Process Engineering, a Johnson & Johnson company USA**

*"Questions to really make you think about your business." Says*

**Mike Sherwood, Manufacturing Consultant, formerly of Tyco Healthcare**

*"...this tool will help guide decision making and will improve profitability"*

**Trevor White, European Business Director, Kodak Clinical Diagnostics**

*"I anticipate being able to use it in other studies as well"*

**Sam Narotsky, Management Accountant, a Johnson & Johnson company New York**

*“Allows you to visualize the ‘implications’ of decisions and the alternatives”  
Says*

**Jenny Abbott, JigSaw Medical Marketing, formerly of Baxter Healthcare**

*“Identifies the core problem(s) & solution(s)” Says...*

**Matthew Bergmann Smith, Managing Director, Connector Ltd.  
(Medical Device & Diagnostics)**

*“Conventional accounting systems only tell you what you have spent, not how to spend less in the future. Johnson & Johnson will benefit because...cost reduction in the manufacturing organization can eventually benefit everyone, from Shareholders through to Taxpayers... Some projects that had been proposed (through normal ‘gut instinct’ approach) have been dropped that were not cost-effective, and some new projects have replaced them, with the potential to reduce costs significantly”*

**David Wild, New Manufacturing Technology Manager,  
Johnson & Johnson Clinical Diagnostics**

*“For many years I have worked on return on investment calculations and used judgement to get the best of out of my spreadsheets and models. The work of reMODEL makes even highly complex and interrelated calculations assessable. The system points you in the ‘right direction’ and leads you quickly to truly optimal answers that reflect the ‘real world’.”*

**Trevor Lewis, Founder & Principal Consultant  
Medical Device Consultancy  
[www.medicaldeviceconsultancy.co.uk](http://www.medicaldeviceconsultancy.co.uk)**

*“Bridging the gap between vision and reality” Says...*

**Kirsten Hemingway-Arnold, Managing Director, Hemingway Corp**

# Bridge of Faith

## For Operations

with examples for  
medical device and diagnostic manufacturers

James La Trobe-Bateman  
& Lorrie MacGilvray

*“If you don’t know where you’re going,  
any road will take you there.”*

George Harrison

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## Bridge of Faith for Operations

With examples for Medical Device and Diagnostic Manufacturers

by James La Trobe-Bateman & Lorrie MacGilvray

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reMODEL worldwide clients’ excitement, enthusiasm and passion to learn more about *their Operation* with a broader vision & thinking by using the “Bridge of Faith”...

*James La Trobe-Bateman & Lorrie MacGilvray*

*This book is dedicated to :*

Daughters Ellie & Jenifer for living and breathing the “Bridge of Faith” their entire lives.

Also to those prepared to take the first step onto the Bridge of Faith toward a new, fresh and inspirational way of looking at your entire business and operation.

*...Thank you again for taking that leap of faith together with us.*

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# 1. Introduction

## What Is a “Bridge of Faith”?

If you are a visionary, you feel that you are already at your destination. It’s a great place! In your mind “It’s done!” So why do you have difficulty getting others to see it?

If you are not the visionary, you are still a long way from that great place. You have great difficulty seeing what the visionary imagines. Both of you are frustrated by your inability to be there too. There the visionary stands, on the other side of the Grand Canyon, as it were, while everybody else cannot imagine how to ever get there. They fear that it will mean hard work, disruption and absorb resources (and possibly their own money!).

If you are the CEO and know that you must improve, you need a method to bring people with you. If you are at a lower level in the organization, you must prove the value of your suggestions before getting approval to go ahead.

Both types of visionary need to persuade people it is worth crossing that abyss. They need to construct a “bridge” to minimize the Leap of Faith that people are being asked to make.

That’s the metaphor.

## Real Questions about Your Business

You have probably got concrete questions, such as:

- How do I justify proposals for change?
- How do we become more profitable with the least effort?
- How do I convince myself that my idea is great?

- How do we go about designing a new product for manufacturability?
- Which process should be improved?
- Where are the key levers to the biggest improvement?
- How does this change affect the whole operation?
- Where should we deploy our improvement people?

This book is about the nuts and bolts of answering these questions.

It describes a method to bridge the gulf between shop floor terms and business measures. It uses numbers to help everybody understand. Crossing this bridge before making any commitment provides the confidence and conviction to do it.

The methodology has been developed by **reMODEL Consultants International Ltd** over 15 years. They have proven its value in the course of their business with large and small suppliers to the healthcare industry.

The fundamental concept is applicable to all business functions. Indeed, it takes all parts of the organization to co-operate to reap the benefits of any improvement. Operations, finance, marketing, sales, product design and development from the shop floor to the CEO need to be able to see the same picture.

## How Does It Work?

The book introduces concepts one at a time and gradually increases in complexity with each scenario. The learning comes from having to think through every issue. You can check your answers and find more explanation at the book's website [www.BridgeofFaith.com](http://www.BridgeofFaith.com)

If you like logical puzzles, then this is *really* for you.

## Visualizing the Problem

Business managers pay attention to information that tells them how well the business is doing.

The shop floor is preoccupied with a range of different facts and figures, including machine speeds, waste, manning levels, batch sizing policy, stock policy, shift patterns.

Improvement calls for change on the shop floor. But how does shop floor information relate to business measures?

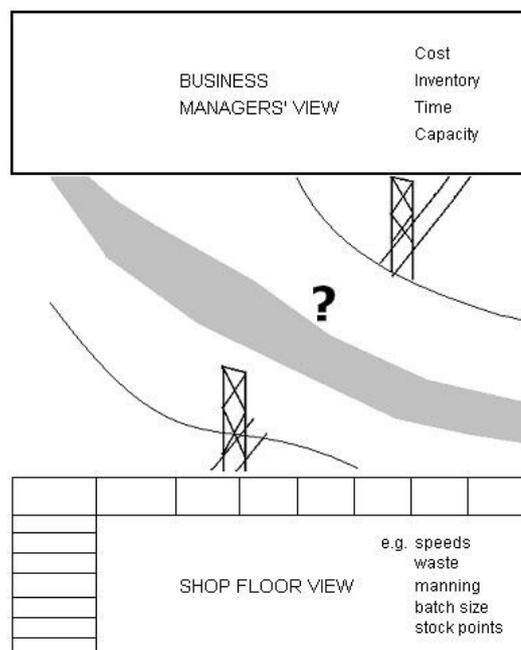
How can the shop floor instigate change without understanding its implications?

How can the business managers agree to change without seeing the effect on their measures?

Neither party talks the language of the other. Nonetheless they must communicate.

At the top is the business manager's view.

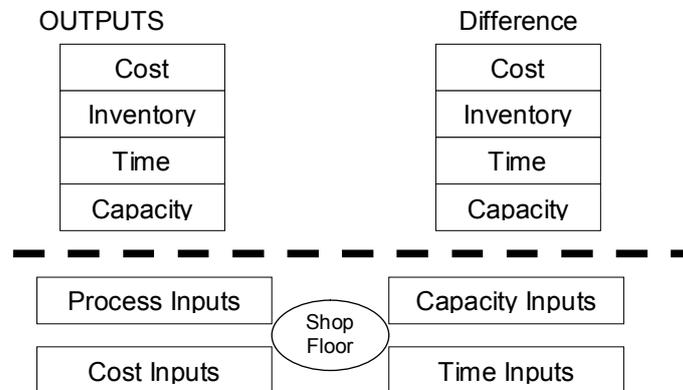
At the bottom is a more complex set of shop floor data



## How the Scenarios Are Laid Out

Each scenario is displayed on opposing pages.

At the top are the business measures. On the left are the actual output figures. On the right are the differences created by the change.



Below the dotted line, the shop floor view is divided into 4 groupings: related to Process Description, Variable Cost inputs, Capacity inputs and Time and Inventory inputs.

Further detail is provided by listing the inputs for each process step. Everything interacts to create the business performance summarized at the top of each page. The minimum data needed is used to provide the most management information.

In order to make the learning easier, we are going to introduce the key management measures one at a time, until they are all in use. Then we will look at the interactions between all of them.

We will look first at Cost.

## 2. COST



## Including 35 Worked Scenarios

A couple of samples. First a simple one:

### #04 Simple Factory: Cost

#04

This is still the same operation as the previous exercises.

The relationships are now a bit more complex.

#### Question:

Which input in the Variable Cost table would cause the changes shown in the difference table below?

How much has it changed?

There are 2 possible answers.

#### Hint:

The difference table has 2 changes. It looks like a labor issue, and you need to work out whether there is a batch size issue or not.

Predicted Values		250,000 items/yr		
COST	Material	Other	per item	
VOLUME	\$417,781	\$211,676	\$2.518	
BATCH		\$5,080	\$0.020	
PRODUCT		\$0	\$0.000	
FACILITY		\$280,000	\$1.120	
TOTAL	\$914,537		\$3.66	

#### Differences

Cost Change	Material	Other	per item	
VOLUME	\$0	-\$105,838	-\$0.423	
BATCH		-\$2,540	-\$0.010	
PRODUCT		\$0	\$0.000	
FACILITY		\$0	\$0.000	
TOTAL		-\$108,378	-\$0.434	

#### Process Description

Task ref	Activity	Qty per sale	unit	Run waste	Fixed Batch waste	Batch size	Batches per Year	Same Batches per Year as other task?
1	All-in-one process	1	pack	15%	300	2,500		

#### Variable Cost Inputs

Task ref	Activity	Items per Minute	Batch Change over Hours	Manning	Non Value Adding Hours per Hour	Labor Rate per Hour	Employer Costs per Hour	Material Value Added
1	All-in-one process	2	0.50	3	1.0	\$15.00	\$4.00	\$1.25

Extra features added gradually so that you can learn about the interactions of Cost, Inventory, Time and Capacity

A more complicated scenario:

#34 Body Fluid Testing Kit

#34

The excessively high batch related costs are the target for cost reduction here. However, another change that costs extra money is needed in order to also improve responsiveness.

Predicted Values			860,000	items/yr
<b>COST</b>	Material	Other	per item	
VOLUME	\$130,564	\$47,857	\$0.207	
BATCH		\$362,015	\$0.421	
PRODUCT		\$112,000	\$0.130	
FACILITY		\$608,000	\$0.707	
<b>TOTAL</b>	<b>\$1,260,436</b>	<b>\$1,466</b>		
<b>INVENTORY</b>	Material only	ML&O		
Raw Material	\$36,118	\$36,100		
WIP	\$2,136	\$20,600		
Finished	\$0	\$0		
<b>All</b>	<b>\$38,254</b>	<b>\$56,700</b>		
<b>RESPONSE TIME</b>	Ship	19 days	<b>LEAD TIME</b>	4 days
<b>CAPACITY</b>	Truck	77% Utilization		

**Question:**

Changing which 2 inputs would lead to the differences below?

Differences				
<b>Cost Change</b>	Material	Other	per item	
VOLUME	-\$1,430	-\$2,324	-\$0.004	
BATCH		-\$218,289	-\$0.254	
PRODUCT		\$0	\$0.000	
FACILITY		\$0	\$0.000	
<b>TOTAL</b>	<b>-\$222,043</b>	<b>-\$0.258</b>		
<b>Inventory Change</b>	Material only	ML&O		
Raw Material	-\$353	-\$400		
WIP	\$16	-\$3,200		
Finished	\$0	\$0		
<b>All</b>	<b>-\$337</b>	<b>-\$3,600</b>		
<b>Response Time Change</b>	Ship	-15 days	<b>Lead Time Change</b>	0 days
<b>Capacity Change</b>	Formulations	11% Utilization	Difference	

Process Description								
Task ref	Activity	Qty per sale	unit	Run waste	Fixed Batch waste	Batch size	Batches per Year	Same Batches per Year as other task?
1	Pretreat RM	0.0008	liter	15%	1	20		
2	Make generic	0.0020	kg	35%	5	100		
3	Formulate reagent A	0.80	ml		150			7
4	Fill test tube	1.00	tube		250			7
5	Test		batch					7
6	Calibrate		batch					7
7	Pack	0.02	pack				572	
8	Ship	0.00015	truck			1.0		

Capacity Inputs						
Task ref	Work Center	Spell Hours	Spells per Week	Number of Lines	Break Batch?	Hours per Wk not Availabl s
1	Pretreat	8	5	1	Yes	2
2	Formulations	8	5	2		4
3	Formulations	8	5	2		
4	Filling	8	5	1		4
5	QC	8	5	2		
6	Calibration	8	5	1		
7	Packing	8	5	1		
8	Truck	168	1	1		

Variable Cost Inputs								
Task ref	Activity	Items per Minute	Batch Change over Hours	Manning	Non Value Adding Hours per	Labor Rate per Hour	Employer Costs per Hour	Material Value Added
1	Pretreat RM		24.0	1	2.0	\$22	\$6.00	###
2	Make generic	1.2	3.0	1	2.0	\$22	\$6.00	\$9.00
3	Formulate reagent A		3.0	1	2.0	\$22	\$6.00	
4	Fill test tube	80	0.8	3	1.0	\$20	\$6.00	\$0.02
5	Test		3.0	1	2.0	\$25	\$7.00	
6	Calibrate		2.0	1	2.0	\$25	\$7.00	
7	Pack	3	0.2	4	0.5	\$20	\$5.00	\$0.80
8	Ship		24.0	1		\$10		

Response Time, Lead Time & Inventory Inputs							
Task ref	Varieties	RM Min Days Stock	RM Days between Deliveries	Intermed Days Hold Time	Intermed Days Min Saw tooth	Finished Goods Days Hold Time	Finished Goods Days Min Stock
1	11	30	30				
2	1	30	30	1			
3	11						
4	11	60	60				
5	11			1			
6	11						
7	11	30	14				
8	11						

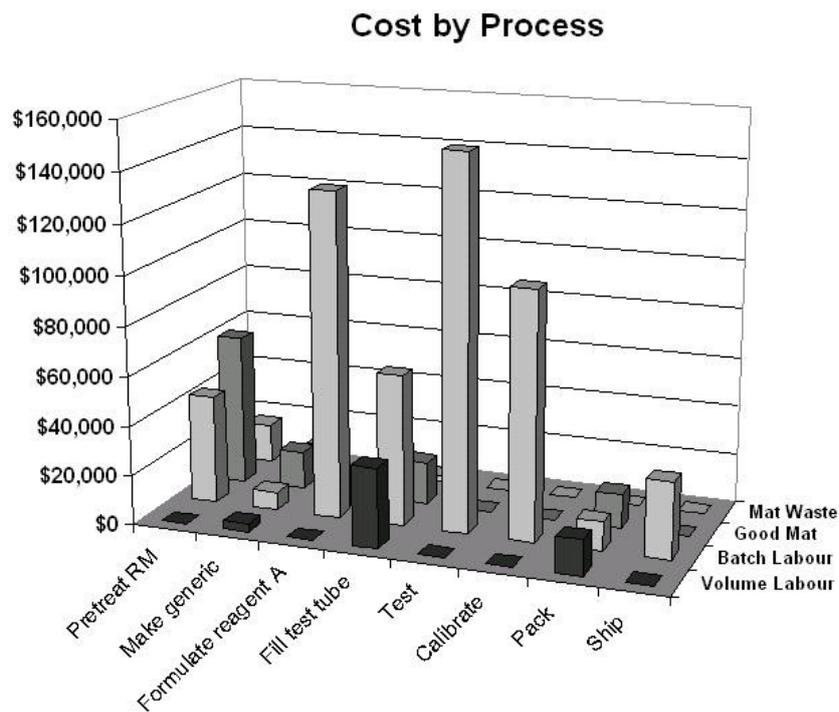
*More ways of looking at your operation:*

## Chapter 8: Closer Look at the Body Fluid Testing Kit

Let's examine the Body Fluid Testing Kit operation of Scenarios 34 & 35 in more depth.

In the scenario summary tables you see the totals for all processes. We will now look in greater depth by looking at cost, inventory, time and capacity elements by activity and work center.

Cost first:



Material, waste and labor cost is charted for each process as a Manhattan Diagram.

Material waste is separated from the "good" material that is actually contained in the product that the customer receives. The largest material cost is for the pretreated raw material at about \$60,000 per year. However, the most striking observation is that there are high batch related labor costs across many processes. In fact, the highest bar relates to the testing step.

If the testing effort were reduced by 20%, the annual saving would be about \$30,000 per year.

However, another way of saving money is to make fewer batches, i.e. make larger batches. As you saw, most of these processes are linked together. So, if you increased batch size throughout, you save batch related expense on all of them. A 20% increase in batch size would thus save \$100,000.

Unfortunately, increasing batch size has a negative effect on response time: larger batch size means a longer time between batches. Time between batches is one of the factors that make up response time. To compensate for this, extra transport was suggested in Scenario 34 that added cost. Not good for the transport manager's budget, but good for the business overall.

Of course, there may be a negative impact on other measures which should be looked at.

What about the inventory picture?...

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You will also find answers, further  
explanation and more online

Workbook & CD coming soon.

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